

Another arrangement (Ger. patent 127,974) resembles patent 122,885, only that in place of moving the bottom of the machine, the compass board is

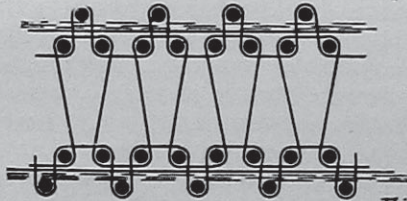


Fig. 18

moved. No advantage over the previously referred to two arrangements is obtained by it.

Rather simplified, however, is the affair in connection with Ger. patent 156,598 and where the bottom of the jacquard machine is fixed, also the griffe for section 1, *i. e.*, the upper fabric structure. Between both of these moves, a griffe so constructed that the same acts for section 2, lower structure, as griffe, and for section 1 as bottom. To obtain this result, the needles of section 1 are provided at both shanks with crooks. The crooks of the short shanks hang on a movable griffe, but are not connected with the needles of the machine. The crooks of the long shanks are placed reversed and are brought as required through the cards and needles upon the knives or griffe bars of the fixed griffe. The movable griffe is raised or lowered every alternate pick. Only one card is needed every four picks. To use this jacquard machine requires the arrangement of the filling to be two picks pile to alternate with two picks ground, or the same arrangement as observed in connection with Ger. patent 90,420.

Two separate machines may also be used, providing them with fixed and movable griffes and bottoms, or all may be made movable.

For carpets and similar fabrics, as a rule, a three pick weave is used, see Fig. 18. The *over* pile threads in this instance lay in one line with the tight warp. Any one of the previously described procedures is used, inserting alternately three picks in the upper structure and three picks in the lower structure. Since pick one and three, as well as four and six, have the same interlacing, it will be of advantage to use the arrangement so that for these picks the same card can be used.

Previously to closing the subject, it will be in place to refer to a weave used also in the double plush carpet manufacture, but which will hardly find extensive use. Fig 19 shows this weave by means of the section of a fabric structure. In order to give to the pile loop in spite of its pile up a solid stand, the picks are interlaced alternately over and under a tight warp, the pile loops then hanging around the pick as is resting on the back of the fabric. The filling used must be of a sufficiently heavy count that the same will hold the pile loop solid. Provided we would permit the over pile picks to also interlace, a great waste in material would be the result, again, if we would float them under the structure, a great portion of the pile loops would later on pull or fall out of the structure. For this reason these threads are floated between both

structures, and the thus resulting ends must be later on clipped off. As a consequence, the pattern must be so arranged that the threads do again interlace

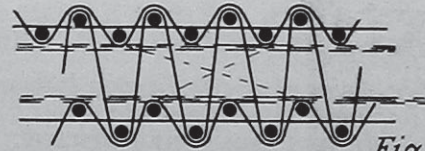
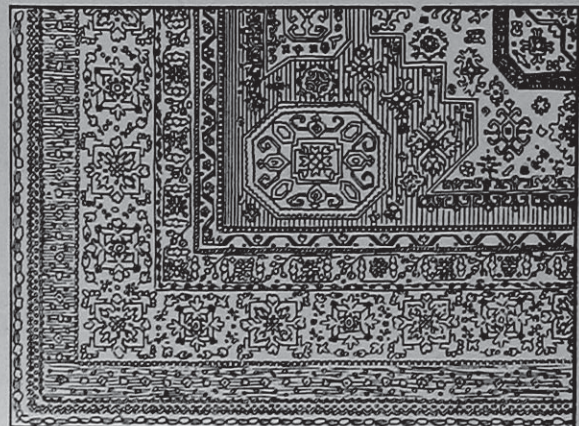
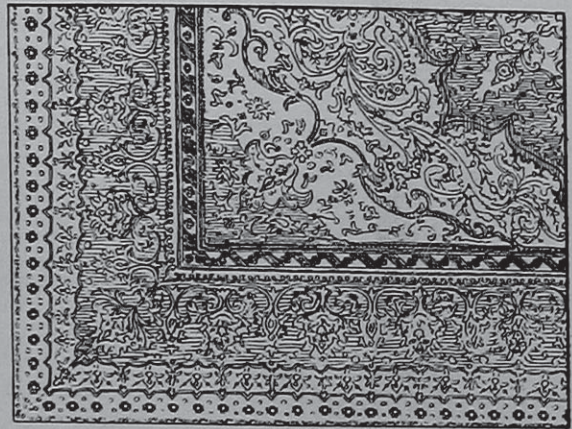


Fig. 19

previously to cutting their last interlacing. Considered all around, the threads will not as readily pull out of the structure as if floating them on its back.

New Rug Designs (Patented).



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TO HOLD CONVENTION IN MAY.

Fred W. Simons, president of the National Association of Hosiery and Underwear Manufacturers, has issued a circular notifying the members that the fourth annual convention will be held in Philadelphia in May next, and that in connection with the convention another exhibition of textile machinery and supplies will be held.

COTTON INDUSTRY IN MASSACHUSETTS, notwithstanding the growth of the industry in the South and the effect of competition from that quarter, shows a progress greater than that of any other leading industry in the commonwealth, according to the Bureau of Statistics of Labor.

Considering the cotton textile centres, Lowell, New Bedford and Fall River, the number of operatives has increased over 1905 from 28,836 to 34,539 in Fall River; from 17,855 to 21,834 in New Bedford, and from 29,303 to 30,738 in Lowell.

The gain in the value of manufactures of all kinds in these three well known cotton centres amounts in

the aggregate to \$52,658,296, or 43.95 per cent. over 1905.

The value of the cotton goods produced during 1907 in the State of Massachusetts was \$193,276,574. Including cotton, woolen and worsted goods, the product value of textiles was \$326,206,933.

The total average number of wage earners in the State was 539,982, of whom 367,471 were males and 172,511 females. Out of this number 102,425 were employed in cotton mills, 26,676 in worsted mills, and 24,076 in woolen mills.

Fall River still heads the position of being the largest cotton goods centre in the United States. In that city there are forty-four cotton manufacturing companies with a combined capital of \$47,873,760.

Australian Wool Clip.

The advices received from time to time from the chief wool growing districts of Australia regarding the probable yield are very conflicting. That conditions during the middle of the year were discouraging and preclude the possibility of a large amount of wool being shorn, but the abundance of recent rains has greatly improved the prospect. Some of the correspondents venture the opinion that a decrease of 100,000 bales will be noted, as compared with last year on the strength of the reports concerning the very dry state of the ground in Victoria and Riverina some months ago. Others place the shortage at half this amount. The information available, however, is so intangible that it is altogether too soon to make even an approximate forecast.

All that is known is that upon large stations in Queensland a very marked increase in this season's clip over last year is confidently expected. While the results of the shearings in South and Western Australia are not known definitely, nevertheless little doubt is expressed by well informed observers that the total number of bales will show a moderate increase on the big clips cut a year ago, for the season has been very favorable in both of these States. In Victoria the number of sheep shorn will be greater, but the lightness of the fleeces will, despite this, probably bring the quantity of wool slightly above the figures of last year.

The most depressing news comes from the Riverina, where the yield will be greatly diminished, owing to the drouth. But the amount that will finally be placed upon the market will not, according to sound opinion, be quite as small as some suppose.

Whether there will be wool enough to meet the demand is a mooted question, but in estimating the supply of Australian wool, South American and the yield of this country more attention should be paid to South Africa. Last year the amount grown there jumped from 200,000 to 250,000 bales and another big increase, it is predicted, will be noted for 1908.

According to mail advices from Yokohama, this year's raw silk crop will yield from 110,000 to 115,000 bales suitable for export, between 5,000 and 10,000 bales more than was at first anticipated.

Cotton Standards.

It seems of advantage that there should be a fixed standard for uniformly classifying the various grades of cotton on the different exchanges where this staple is traded in futures. If there are any practical objections to it the bill introduced in Congress by Representative Wiley of Alabama will surely bring them out, and if there are any serious differences of opinion the question may be raised as to the authority of Congress to prescribe or enforce rules in the premises. In the absence of authoritative legislation it would be difficult to secure uniformity in grading and fixed differences in the prices on all exchanges, but it is a question whether the trade should not be left to work out its own problems.

The bill is brief and very general in its provisions, directing Secretary of Agriculture to "fix a standard of cotton classification in the transaction of cotton business by the exchanges in the United States," and declares that "all exchanges must thereafter use the same and have the same rule for receiving, delivering and tendering grades of cotton on contract, and the difference between the grades must be the same at all places where exchange business is done."

Nothing is said in the bill as to the basis of classifying or the number of grades or the manner of determining differences. All seems to be left to the discretion of the Secretary of Agriculture, who is simply "authorized and directed to prepare in the most practical form said standard of cotton and on request" to furnish it to various persons, associations and institutions, including "any cotton exchange dealing in bona fide sales of cotton for future delivery," on payment of "the exact cost" of furnishing it.

It is reported to be the intention to assemble at Washington a committee to advise the Secretary of Agriculture in the matter, composed of men "not only of the highest ability in matters connected with cotton grading and with the cotton business generally," but of the "highest personal character and most prominent business standing."

Something of the kind would obviously be necessary to secure a standard which would be generally accepted and to which all the exchanges would be willing to conform. It could hardly be expected that the Secretary of Agriculture would be qualified himself to prepare such a standard.

The bill makes no provision for enforcing compliance with the standard or with the requirement of a uniform rule in regard to differences between grades and receiving, delivering or tendering on contracts. The most serious question regarding the proposal concerns the power of Congress to prescribe or enforce a standard for trading on the exchanges. An official standard of classification, prepared in pursuance of an act of Congress, might be voluntarily accepted and serve the same purpose as if it had been privately agreed upon, but it is doubtful whether requiring its adoption would come within the constitutional power of Congress to regulate commerce among the several States and with foreign nations, under which alone authority is to be found for meddling in the matter.

Warping, Spooling and Winding.

Warping and winding, without question is the backbone of successful production in the weave room, as well as perfect cloth; for which reason, any improvement in that type of machinery will be of the greatest of interest to textile manufacturers, and for which reason, we are pleased to be able to call their attention to the new Warpers, Winders and Spoolers, as built by the well known firm of Jacob K. Altemus, the prominent builders of textile machinery, 2824 N. 4th Street, Philadelphia. Although this class of machinery as built by Mr. Altemus is well known here and abroad, at the same time, Mr. Altemus is continually improving this machinery in order to keep it up to the times, having now perfected a *Patent Winder for Filling Yarns*, winding from the Skein to the Shuttle, which has no equal in the market. At the same time, he has now perfected his type of *Skein Spoolers for Fine Yarns* to meet the demands as any occasion may require; the same being also the case in connection with his *Warping Machinery*, the latter on account of his Pinless Device obviating any pin or section stripes in the fabric.

All these improvements, in connection with these important type of preparatory machinery for the weave room, are based upon a life long experience of Mr. Jacob Altemus in that class of machinery; and what is equally as important, Mr. Altemus paying personal attention to every order coming in, the same as every machine going out of his plant. Mr. Altemus will always be pleased to give his vast experience on warping and winding questions gladly to parties interested in the same. Never hesitate to consult him.

Producing the most improved machinery only in his line has been the success of this concern, and accounts for this Machine Shop running to its fullest capacity, and with orders ahead.

Woolen Goods in Mexico.

Consul Wm. W. Canada, of Veracruz, submits the following report concerning the trade in woolen piece goods in Mexico and the manner in which American woolens can find enlarged sales in that market to the Department of Commerce and Labor, Bureau of Manufactures:

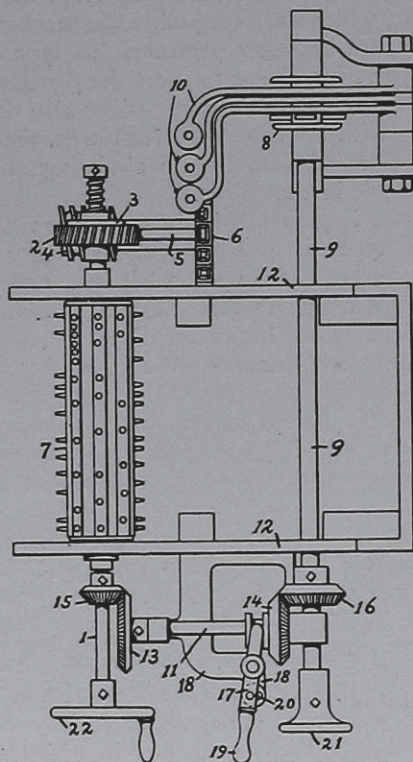
For this hot climate only light-weight goods for summer and medium weights for winter are suitable. A fair percentage of neat, plain patterns would be bought, a larger percentage of rather smart patterns would go off readily, and a smaller percentage of what might be called loud patterns could also be disposed of by a good salesman. A salesman will not make sales of any consequence until a short time before Easter and again prior to the last of October. These are the seasons when new clothing is more generally bought than at any other time of the year. Merchants make their purchases almost always by correspondence, and the goods brought in certainly indicate it. Such a method of selling ought not to be attempted. A salesman should come to the territory or cities with a good assortment of samples and a fair number of bolts of goods. He ought to sell to the

merchants if possible; if they will not buy of him, then let him go in and sell to individuals direct. The people appear tired of the goods laid out to the public and will rally to the salesman or merchant who will give them what they want at a more moderate price. The trade, after once established, on account of the increasing facilities of transportation will be easily held.

THE WITHIN DOBBY LOOM.

Pattern and Box Chain Drive.

The two driving shafts, *i. e.*, the one for driving the pattern chain and the other for driving the box chain are in this loom so arranged that by the simple movement of one lever they can be connected or dis-



connected, a feature which will greatly simplify work for the weaver, when he has to pick out or re-set chains for one reason or the other; again the construction permits a ready disconnecting of the shuttle box mechanism when desired to use the loom as a single-box loom; again the construction of the mechanism is of such a simple construction that any weaver cannot help grasp the construction and operation of these two main mechanisms of a loom at once.

In order to be able to give the reader a thorough description of the method of operation, the accompanying illustration has been prepared, it being a top plan view of a portion of the loom dobbie, showing the pattern and the shuttle box operating mechanisms, the drive for the first and the connection between both, *i. e.*, the drive for the latter.

THE DRIVE FOR THE PATTERN CHAIN.

In our illustration 1 indicates the pattern chain shaft, provided at one end with an idly mounted worm

gear 2 and a friction slip-clutch 3, held against gear 2 by a spring. A worm 4 engages with the under-side of gear 2, said worm being carried at the end of a short shaft 5, which on its other end is driven by sprocket chain 6 through two gears (not shown) from the crank shaft of the loom. This explains the drive for the pattern mechanism from the crank shaft of the loom to the pattern chain 7, proper.

THE SHUTTLE BOX PATTERN MECHANISM.

The shuttle box pattern chain is carried by its chain drum 8, on the shaft 9. Lifting levers 10 for the boxes are located above the shuttle box pattern chain.

CONNECTION OF PATTERN AND BOX CHAIN MECHANISMS.

The pattern chain shaft 1 and the box chain shaft 9 are connected together by means of a short shaft 11, journaled in brackets on the frame 12, carrying at each end a bevel gear (13, 14) which mesh respectively with the pinion 15 on the shaft 1 and pinion 16 on the shaft 9. Pinion 14 is slidably mounted upon this shaft 11, so that it can be moved into and out of engagement with the gear 16, thus constituting a clutch between the two shafts 1 and 9, by means of which they may be connected or disconnected as desired. Clutch gear 14 is shifted in or out of contact with gear 16 by a shipping lever 17 fulcrumed on a bracket 18, the lever 17 with one end engaging an annular groove in the hub of pinion 14, the other end being formed into a handle 19. A spring detent 20, is housed within the bracket adjacent to the fulcrum pin of the shipping lever 17 for retaining the same in either its connected or disconnected position.

Shaft 9 is provided with a hand wheel, *i. e.*, a knob 21, by means of which it can be rotated by the weaver by hand, if so necessary, for setting the box mechanism.

The pattern shaft 1 is provided with a crank wheel 22, for turning the same by hand, as occasions may demand.

When the loom is running with boxes in operation the two shafts 7 and 9 are geared together, as indicated in the illustration, so that the motion imparted to the shaft 1 will be communicated by it to the shaft 9.

If any time, on account of a pick out or for any reason whatever, the weaver has to turn the pattern mechanism backwardly, without using the power of the loom, he then simply turns the crank wheel 22, which produces corresponding rotation of both chains. During this adjustment the clutch 3 will slip on the driving worm gear 2.

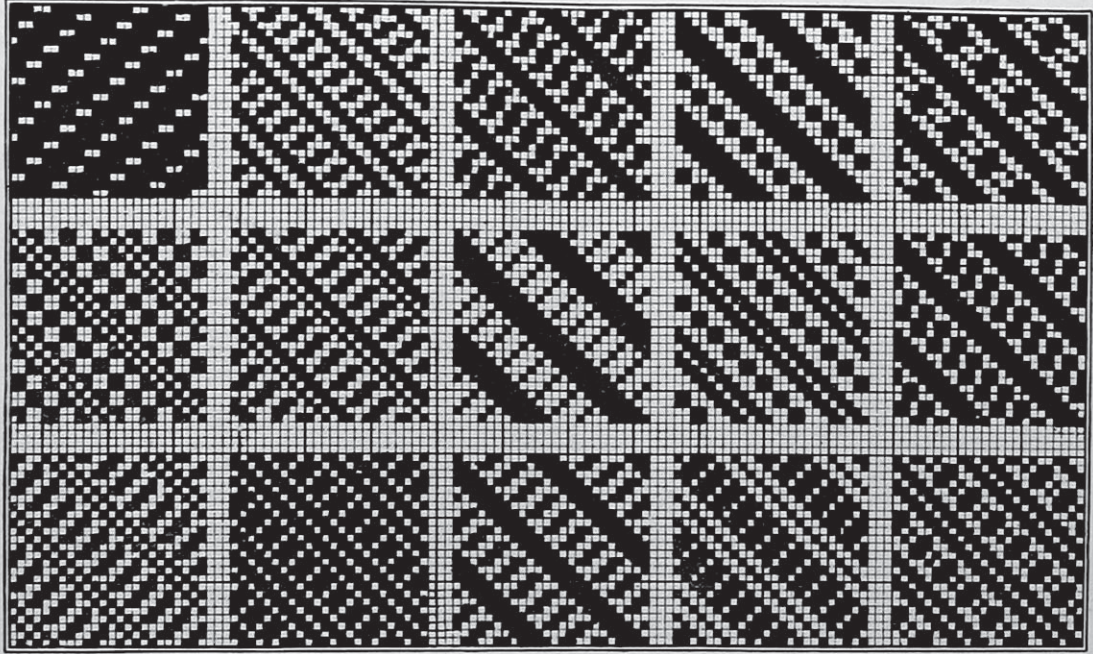
If, however, the weaver for one cause or the other, has to adjust one chain independently of the other, he then simply opens the clutching means of the inter-connecting gearing, (*i. e.*, pushes handle 19 to the right, in our illustration.)

SINGLE BOX WORK.

In this case the shuttle box mechanism is disconnected, as before explained, and rendered inoperative by leaving the clutching lever 17 in its open position.

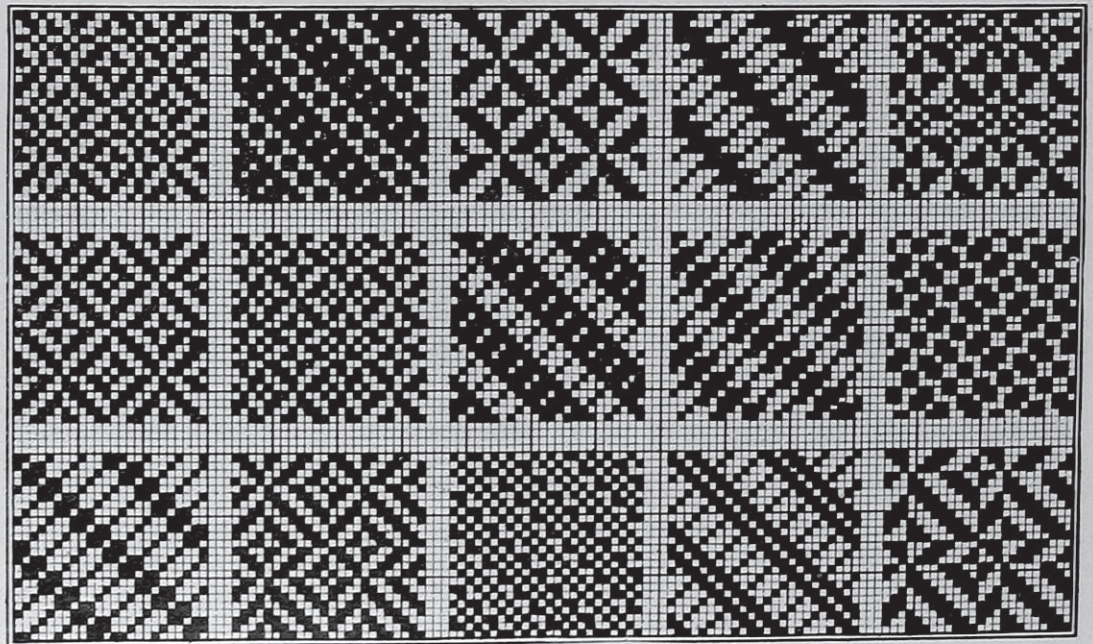
DICTIONARY OF WEAVES.

TWELVE HARNESS



12 X 12

TWELVE HARNESS



12 X 12

MOTIVES FOR HARNESS WORK.*(Continued from page 146, Vol. III.)*

Explanations given then on pages 145 and 146 refer also to this plate of designs, the present collection calling for from 3 to 12 harness for their repeat, not considering the bordering stripes or edges

through the shed varies, compared to that required with another weave. Now using the same power for these two weaves, in either case, may be the cause of the shuttle flying out.

PICKING. Never adjust the sweep-strap too low on the picker stick, since nothing will throw the shut-



and which as mentioned in the November issue have only been added so as to more properly separate the various designs on the plate.

As will be readily understood, the centre and the four corner sets of stripes have to be considered turned 45°, they being shown in their given position to produce a better contrast between the various designs.

POINTS ON LOOM FIXING.

By Wm. Secor, Master Weaver.

(Continued from page 178, Vol. III.)

THE WEAVE. However, the adjustment of the loom itself, has a great deal to do with shuttles flying out. After a loom is set for a certain fabric, it must, to a certain extent, again be reset, when a new style of fabric is required, *i. e.*, a new weave has to be used. By this we mean, that the loom must always be adjusted to suit the weave, it being impossible to make the weave suit the loom. We may find that in connection with one weave, the power required to drive the shuttle

is more crooked than the quick jerk given when the leverage is too short between the sweep-strap and the stud on the bottom of the picker stick. Most fixers believe in a short, sharp stroke of the picker stick. More power can certainly be had in that way, and sometimes, on very hard weaves, it is necessary to utilize every known point to get power enough to get the loom to run smoothly, but ordinarily, should there be any trouble about the shuttle flying out or going crooked, it will be advisable to lengthen the sweep, obtaining in this way a more steady power, throwing the shuttle more accurately.

The sweep can safely be run to within $\frac{3}{4}$ of an inch of the bunter, taking care not to overdo this, for should the sweep be so long that the picker stick should bind tightly against the bunter, something will surely break, frequently the top of the upright on the shoe shaft. Try to have this long, even sweep, and adjust the picking-shoe and lay so that there is no perceptible jerk. This then is an assurance that the trouble, if existing after that, is not in the picking motion.

OTHER CAUSES. Another cause for the shuttle flying out, is found in the fact that different parts of any machinery or device, will wear more or less, and such difference in connection with a loom may in turn be the cause of the shuttle being thrown out.

The boxes should move late enough to let the protecting dagger catch the dead stop, should the shuttle fail to enter. It is always best to move the boxes as late as possible, and should there be no trouble about jerking, they may safely be so adjusted that they reach the level of the race-plate at precisely the moment the sweep begins, after the lay is well over. The advantage of this, is to give the picker all the time possible to clear before the boxes move. From that point, however, to the point where it interferes with the protection, there is plenty of scope to overcome an ordinary evil.

The shuttle is often thrown out by the carelessness of weavers, but unless caught in the act, they will seldom acknowledge the fault. A fixer, seeing the shuttle thus fly out, might look all over that loom for the fault, and of course, not find it.

Some weavers change the shuttle without stopping the loom, which operation, often, by a slight slip, or lack of judgment, causes the shuttle to fly out. This will certainly happen, should they fail to properly catch one shuttle after throwing the other shuttle in the box, for in that case the two must come together and the probability is, that both will be thrown out. This system of catching the shuttle *on the fly*, makes it easier for the weaver, particularly on coarse and heavy work, for it is much easier to catch the shuttle than to stop and start the loom. Some persons claim that it helps very much in regard to production, if done properly, without mistakes or accident, they also claiming that it is better for the looms, than to stop and start them so frequently.

However, there are a great many persons who object, and properly so, to this procedure of taking the shuttle out on the fly. Ordinarily, a weaver will lose a couple of picks by the stopping of the loom, whereas if he happens to make a miss, with a complicated cross draw, it may take him hours to repair the damage done.

Before, we mentioned that using uneven shuttles is a very unsatisfactory method. This brings to my memory the fact that I have known lots of mills where they do this thing—by pairing and numbering shuttles to run in individual boxes, when some of the shuttles may have been cut away on the back to match with the other sets and when after the shuttles will get cut down on both ends and by lying on a flat surface, will have a tendency to act like a rocking horse. Shuttles, in this shape, if they do not fly out, will cut hundreds of ends out, thereby making, what ought to be a good running warp, a very poor producer of yards.

By cutting shuttles on the back, to make individual pairs, also by leveling when they are worn on each end, we throw the point of the shuttle out of line with the hole in the picker, since a shuttle thick on the bottom, will point higher in the picker, compared to one thick on the back and which will point out more

to the end. This will have a tendency to form two holes in the picker, thereby throwing the shuttle either out, or crooked. There is nothing that will act on any person's nerves, like a loom throwing a shuttle against the top or side of the box.

If you have a bad case of shuttle flying out, put a straight edge on it, throwing the line of the shuttle just a trifle towards the reed. This will frequently help to overcome atmospheric conditions causing the frictions to stick, thereby raising the shed off the race plate. Sometimes the shed, the least bit high, will change the course of the shuttle in its flight, causing it to fly out, more especially when all other conditions are not at their best.

Also see that your shuttle boxes are not low on the back end. Often the picker rod gets bent by the picker getting caught, thereby throwing the shuttle towards the top of the shed. If not throwing it out, it will cut any amount of ends. Run the box just a trifle high in the back, but not so that it interferes with the picker.

For matching a set of shuttles, lay them on a perfectly level surface, where the points should perfectly meet on all three sides.

SUMMARY: Have a long rolling pick and not those short, quick jabs.

Have your picking roll follow as near the length of your shoe as possible, thereby giving you a more steady pick.

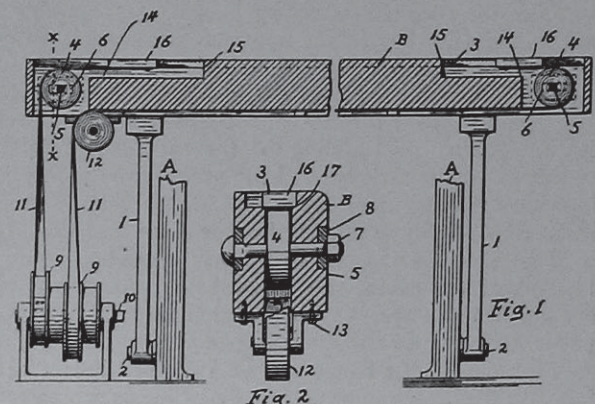
Do not start your sweep too early when working for flying shuttles, although ordinarily I like an early sweep as it gives the shuttle more time, thereby requiring less power to get them home.

Have the hole in the picker not too large, since the latter, in damp weather, more especially where sizing is used, will cause the shuttle to stick in the hole, bringing the boxes down with a jerk.

Run the excentric gears to end up on the slow side, all of which will remedy lots of bad cases of shuttle flying out.

Shuttle Driving Mechanism for Narrow Ware Loom.

The driving means for this class of looms until now usually has consisted of a pair of straps, one



end of which is connected to the sliding rack bar near one end of the lay, then passed around guide pulleys and joined to the actuating means. In this

construction the rack bar is pulled first in one direction, then pushed in the opposite direction, with the result that when pushed from one end, the light rack bar is apt to buckle or spring, due to the strain required to move it against the resistance of the shuttles, especially if dealing with wide looms or a plurality of banks of shuttles. On the other hand, it is essential that the actuating means for the sliding rack bar be conveniently applied either to right or left hand battens. To overcome the drawbacks, as well as provide the advantages quoted, is the object of the new driving mechanism.

ILLUSTRATIONS: Fig. 1 is a sectional side elevation of so much of a narrow ware loom as required to clearly disclose the new mechanism as applied thereto. Fig. 2 is a cross section on the line $x-x$, Fig. 1.

DESCRIPTION OF THE CONSTRUCTION: In the illustrations, *A* represents a part of the loom frame to which the batten *B*, is connected by swords 1, pivoted to the frame *A* at 2. Mounted upon the top portion of the batten *B* is the sliding rack bar 3, the teeth of which engage the rack teeth of the narrow ware shuttles to thereby actuate them in their passage through the sheds.

Adjustably mounted in a recess at each end of the batten *B* is a roller 4, the adjustability of these rollers 4 towards and from each other being secured by means of the axial pins 5, movable back and forth in slots 6 of the batten, and held in position by means of the nuts 7, set up against the plates 8.

Disposed at the side of the loom frame is a rack bar actuating means, comprising the rolls 9, eccentrically mounted upon a shaft 10 connected to a moving part of the loom for back and forth rotary movement. Connected with each of the rolls 9, is a flexible bank 11, one of which passes directly around the roll 4 at the same side of the loom and is secured to the adjacent end of the rack bar 3, and the other of which passes about the guide pulley 12 secured to the batten on that side adjacent the rack bar actuating means, and from thence it passes lengthwise of the batten about the roller 4 at the opposite end and is secured to the adjacent end of the rack bar 3.

Since the rack bar actuating means 9, is operated first in one and then in the opposite direction, it will impart to the rack bar 3, through the flexible straps 11, a pull to move the rack bar in one direction, and then a pull to move it in the opposite direction, avoiding any spring or buckling of the rack bar. This movement of the rack bar is at the same time secured from an actuating means disposed at one side of the loom, thus readily accessible for the fixer.

The guide roll 12 is secured to the batten by screws 13, so that the device can be used on either a right or left hand batten, by simply changing the guide pulley 12 to one or the other end of the batten.

Each end of the batten has an L-shaped recess 14 formed therein, the upper portion of which terminates in a stop or wall 15, the ends of the rack bar having side projections 16, to which the flexible connections 11, are secured, said projections, and consequently the

rack bar, being limited in their reciprocating movements lengthwise of the batten, the said projections riding on the ledge 17, Fig. 2, effectively preventing any tipping movement of the rack bar as it is reciprocated.

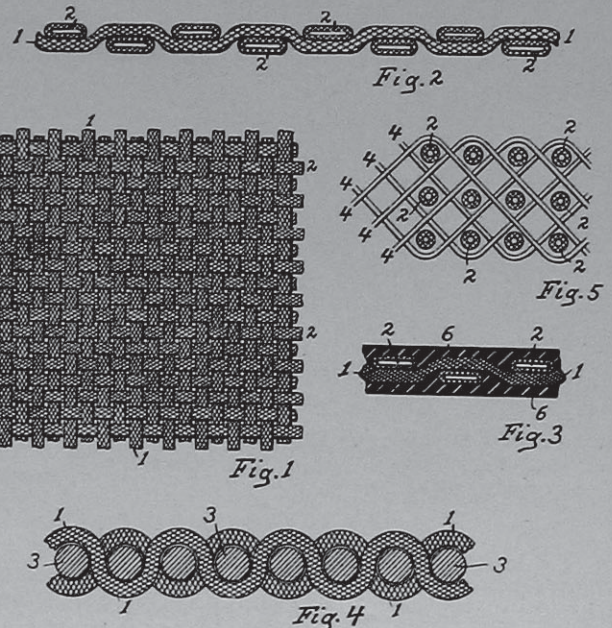
The rack bar engages rack teeth on a number of small shuttles disposed to move in short circular or curved paths through the several sheds formed. To define the beginning and end of each reciprocation, *i. e.*, that the shuttles will be entirely clear of their sheds prior to their picking movement and be carried clear of the shed at the end of the picking movement, a simple adjustment of one or both of the rolls 4, which serve to alter or adjust the path of movement of the rack bar and, consequently, that of the shuttles, is all that is necessary.

The new device can be readily applied to looms of older construction, now installed in mills.

A New Fabric Structure for Wheel Tires

for automobiles, carriages and bicycles, as well as for hose, belting and the like, *i. e.*, a class of fabrics in which the woven web is later on coated with rubber.

During a visit last month, in the interest of the text matter of the Journal, amongst leading New



England Textile Plants, and while then in Indian Orchard, Mass., the General Manager of the Hodges Fibre Carpet Co., Mr. Wm. M. Stevenson, showed us different specimens of a new fabric structure, the subject of our article, which on account of its ingenious construction deserves more than a passing description. The purpose of the new fabric structure is to revolutionize the present construction of tires, etc., and which it has all prospects to accomplish, since by its construction it produces characteristics for said fabrics which such as until now produced are lacking.

In order to give a clear description of this new fabric, the accompanying illustrations are given, and

of which Fig. 1 is an exaggerated face view of a piece of the woven web. Fig. 2 is a transverse section of the same, and Fig. 3 a view of the rubber coated fabric. Figs. 4 and 5 are transverse sections of other styles of woven webs embodying Mr. Stevenson's invention.

The main feature of the new fabric consists in using for the warp or filling, or for both, a braided cord, of hollow tubular form, such cord possessing greater strength than a spun or twisted yarn of like weight and being relatively elastic, because of the tendency of the spirally disposed and intertwined strands of which the braid is composed, to assume a straight line when the braid is subjected to tensile strain. This renders the woven web specially available for use in the manufacture of articles in which the woven web is combined with a coating of rubber. Another advantage of the new fabric structure consists in that the braided cords present a relatively open mesh and thus permit of the ready penetration of the fluid or plastic rubber, or rubber compound, assuring at the same time a correspondingly secure hold of the latter upon the woven web.

The fabric shown in Figs. 1 and 2 is interlaced with the plain weave, both, the warp threads 1 and the filling 2 being composed of a hollow tubular braided cord. Fig. 4 represents a fabric structure, having warp (1) composed of braided cord, whereas its filling (3) is composed of spun or twisted yarn, while Fig. 5 represents a fabric having its filling (2) composed of braided cords and the warp (4) of spun or twisted yarn, this fabric being a 3-ply fabric, showing that the new fabric structure is also applicable to multi-ply as well as single-ply webs.

During the process of weaving, the hollow tubular braid is necessarily stretched to a certain extent, when the pick is beaten up by the reed and confined by the crossed warp threads. However, the braid contracts and resumes, more or less, its hollow tubular form after the fabric leaves the fell of the cloth, and therefore, the said hollow tubular braid regains in a great measure, its original or normal elasticity, with the result that the fabric thus produced possesses the desired elasticity. The hollow braided cord, composing the filling, is inserted in the fabric without twist, lying perfectly straight from the selvage to selvage, a feature which preserves its original elasticity.

Fig. 3 shows a web of the same character as that illustrated in Fig. 2 but having a coating 6 of rubber upon both sides.

A NEW WEAVE FOR DOUBLE FACED TERRY PILE FABRICS.

Under this heading there appeared on page 174 of the December issue an illustrated article on a New Turkish Towel Weave, which we are informed is the invention of Messrs. W. H. & A. E. Margerison & Co. of Philadelphia, who hold a patent on it, and to whom all inquiries on the subject should be addressed.

COTTON SPINNING.

RING SPINNING:—A General Description of the Modern Ring Frame—The Creel—Roll Stands—Weighting Rolls—Top Rolls—Bottom Rolls—Clearers—Care of Rolls and Roll Stands—Faulty Work of Rolls—Thread Boards—Rings—Ring Holders—Size of Ring to Use—Traveler Clearers—Setting Rings—Care of Rings—Finishing of Rings—Ring Travelers—The Action of the Traveler—How Travelers are Made—Weight of Travelers—Spindle Rails—Spindles—Setting Spindles—Lubrication of Spindles—Bobbins—Bobbin Clutches—Banding—Banding Machine—Band Tension Scale—Tin Cylinders—Ballooning and Separators—Winding—Builder Motions—The Warp Builder—How to Set the Builder Motion—The Filling Builder—Spinning Filling on Paper Tubes—The Combination Builder—The Care of Ring Rails and Lifter Rods—Some Causes for Badly Shaped Bobbins—Doffing.

NOTES:—Management of the Spinning Room—Data on Ring Frames—A new Spindle Drive Device—Care of Machines—Oiling—Leveling Frames—Power Tests—Power Consumption—Arrangement of Machinery.

FAULTY YARNS:—Knots and Bunches—Variations in Counts—Uneven Yarn—Thick and Thin Places—Weak Yarn—Kinky Yarn—Dirty Yarn—Kockled, Curled or Knotty Yarn—Slack Twisted Yarn—Hard Twisted Roving—Cut Yarn—Harsh or Wiry Yarn—Badly Wound Yarn—Bobbins Wound too Low—Soft Wound Bobbins—How to Prevent "Double"—Colored Work—Waste—Breaking Strength of Yarn.

CALCULATIONS:—A general Description on the Subject of Draft, Twist, Production and Gearing—Calculating the Draft from the Gearing—To find the Draft—To find a Constant—To Ascertain Draft Change Gear—To Ascertain Hank Roving—To Ascertain Draft—Twist—Standard Twists—Contraction Due to Twist—Notes on Twist—Calculating Twist—To Ascertain Speed of Spindles—Calculating Twist from Gearing—Traverse Gear—Taper—Sizing the Counts—The Grading of Cotton Yarns, Single, Two or More Ply—Production—Programs for Spinning Yarns of Various Counts, from Bale to Spun Thread—Illustrations with Descriptive Matter of the Different Makes of Ring Frames.

The Ring Frame.

THREAD BOARDS.

(Continued from page 181, Vol. III)

Lately the Whitin Machine Works have brought into the market an improved make of a Thread Board, in which besides using the usual adjustable thread

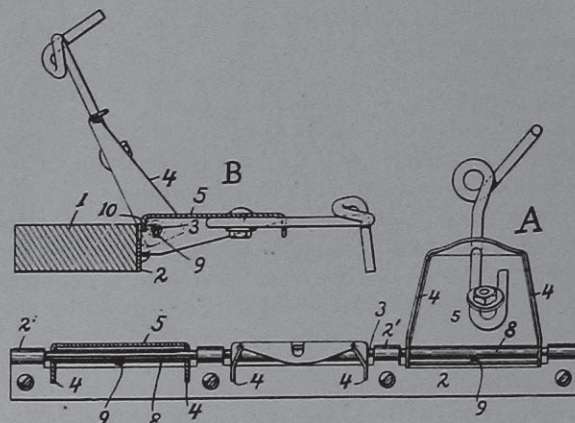


FIG. 258

guide wire, they at the same time provide most simple means for permitting a bodily movement of each finger head (or finger board, as they are also termed) independent from the others—to and fro—in the width of the ring frame, to suit the position of the spindle, in turn assisting the operator to make a quicker and at the same time most perfect adjustment between the eye of the guide wire and the spindle.

Figure 258 will readily explain the new mechanism.

Diagram *A* is a side elevation of three finger heads, one of them being shown in section through the hinge wire. Diagram *B* is a transverse section of Diagram *A*, through the centre of one of these finger heads.

Numerals of references accompanying the illustrations indicate thus: 1 the wooden or metal thread board rail, hinged in turn to the roller beam of the ring frame. On its front face it carries, *i. e.*, has screwed or bolted to it, a long hinge member 2, formed of a single piece of sheet metal and long enough to accommodate a number of finger heads, besides being provided in its length with several hinge ears 2'. These ears hold a wire 3, extending across the entire length of the machine.

The finger heads are sheet metal blanks, pressed into a form, wherein they each have two side flanges 4, depending from a flat top portion 5. The flanges are pierced with aligned hinge apertures, near their upper corners, to receive the hinge wire 3. The thread guide wires are supported on the finger heads 5, by means of a bolt as shown.

By this new construction, the finger heads do not occupy the entire space between the hinge ears or supports for the hinge wire, leaving space for adjustment of the finger heads longitudinally on the wire. They are held in proper lateral position with reference to their respective spindles, each by means of a sleeve (tubing) 8, surrounding the wire 3, being adjustably secured to the same by set screw 9 therein.

These sleeves are cut of the proper length to fit in between the flanges 4, without binding thereon. When the finger heads are properly located on the hinge wire 3, the set screws 9 are set in, and the sleeves are thereby secured to the wire so that the shifting of the finger heads thereafter is impossible. Further endwise adjustment of the guide wire may then be effected by sliding the shank of the same forward or back in its seat on the body of the finger head. The latter, in addition to the flanges 4, are also provided with depending back flanges 10, located near the rail 1 and which close the gaps which would otherwise exist between it and the body portions 5.

The *Mason Machine Works*, have also lately brought out a new Thread Guide Support *i. e.*, Finger Head, in the gist of the construction of which they have gone still one step further, *i. e.*, providing besides all other adjustments, also a radial or angular adjustment of the thread guide wire so as to give any desired angle or position to the eye and kink arrester; the latter adjustment being very valuable, particularly in fine work, in the case of the thread guides which have depending kink arresters. This adjustment is not obtainable by any other guide wire supporting devices.

Of the accompanying illustration Fig. 259, Diagram *A* is a side elevation of the thread-guide and support therefore, partly broken out, the fixed part of the frame on which the support is mounted, being shown in section, dotted lines showing two positions of some of the parts, and to which reference will be made later

on. Diagram *B* is a front elevation of the new metallic finger head.

Quoting numerals of references accompanying the illustrations will readily explain the construction and adjustment of the new device. To the roller beam of the ring frame is pivotally connected the finger head rail or support 1.

A plurality of hinges are secured to the roller beam by screw bolts 2, extended through slots in the leaves 4 of the hinges, so that the latter may be adjusted vertically. The shorter free leaves 5 of the said hinges are secured by fastenings 6 to the bodies 7 of metallic brackets, which are rigidly attached to the web of the finger head rail 1. Said rail is thus pivotally connected or hinged to the roller beam and can be swung up into dotted line position at *X* for doffing.

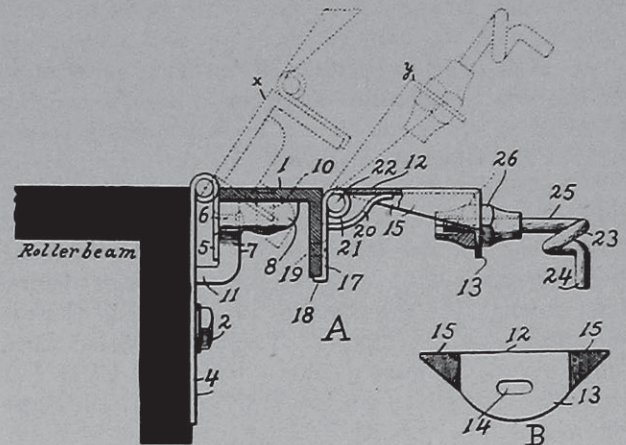


FIG. 259

In order to maintain the rail in its operative horizontal position, each bracket is formed with a depending and rearwardly turned extension 11 adapted to bear against the fixed leaf 4 of its adjacent hinge, (see full lines) the extension serving as a stop to limit descending movement of the rail and maintain it in its operative position.

The thread guides are mounted on finger heads, or finger boards as sometimes termed, one for each, and a series of such finger heads are pivotally connected with the rail.

The finger heads are made of sheet metal, stamped or pressed into shape to present a flat top 12, a depending front portion 13 having an elongated transverse aperture or slot 14 therein, (see diagram *B*) and downturned stiffening portions 15, extending from the side edges of the portion 13, toward the back of the finger head and decreasing in depth, so that the stiffening portions are substantially triangular in shape.

Finger heads and rail are connected by sheet metal hinge members, each member having a flat body 17, rearwardly turned at its lower edge to form a guide foot 18, which projects beneath the edge of the flange of the rail 1, the body being attached to the face of the flange by screws 19.

The central portion of the body is slitted down-

ward from its upper edge and the intervening portion of the metal is bent forward and upward, as at 20, to form a stop or support for the finger head to retain it in its operative position, as shown in full lines. At each side of the stop 20, the metal of the body 17 is bent over to form two pin sockets 21 in alignment, and separated by a distance slightly greater than the length of the socket on the finger head, so that the latter socket will fit easily in the vacant space.

A hinge pin 22, passed through the sockets, pivotally connects the finger head and hinge member, and through the latter the finger head is connected with the rail 1.

The operative position of the rail and finger heads is shown in full lines in diagram *A*; when the rail is swung up for doffing, all the finger heads will be swung up in unison, but any one of the finger heads can be swung upward on the pin 22 as a fulcrum, as shown by dotted lines at *Y*.

The thread guide is as usual a piece of stout wire, bent to form a guide eye 23, a depending kink arrester 24, and an elongated, straight, cylindrical shank 25, screw threaded for a portion of its length, the shank being of such diameter that it will pass loosely through the slot 14 of the finger head.

Two clamping nuts 26 hold the thread guide securely and rigidly in position, said nuts engaging the threaded portion of the shank and are set up against the opposite faces of the depending portion 13 of the finger head.

The Adjustment of the Thread Guide. By loosening one of the nuts the shank can be moved laterally in the slot, to adjust the thread guide longitudinally of the frame, and when the nuts are again set up, the guide is rigidly clamped in such adjusted position.

By setting up one nut and easing off the other, the guide is adjusted in a fore and aft direction, or longitudinally of its shank, and of course there can be combination of such adjustment with the lateral adjustment described.

If a radial or angular adjustment is required, the thread guide is turned on its shank as a centre, in one or the other direction, to give any desired angle or position to the eye and the kink arrester, the nuts when set up holding the adjustment.

Any or all of the adjustments of the thread guide can be made very finely or accurately, all adjustments, as explained, being held by the common clamping means.

Rings.

They are secured to the ring rail, over the holes provided for that purpose in the latter. Through the centre of the ring extends spindle and bobbin, and onto the upper flange is sprung a small piece of bent steel wire, known as the traveler, and which is revolved by the action of spindle and yarn, around said ring, at a speed slightly less than that of the spindle, this lag being the means for winding the yarn onto the bobbin. On account of the great speed

at which the traveler has to revolve around the ring, and this on an absolutely true circle, it will be at once seen that the ring is a most important part of the machine, it must be true, free from flaws, nicks and defects of any kind, or the spun yarn will be imperfect. They should be very highly polished and should be tested within one-thousandth part of an inch for accuracy, as to their true roundness. It is essential that rings be kept absolutely clean and bright, otherwise the traveler will not be able to run freely, and bad work will result.



FIG. 260

The rings in use are of two kinds, single and double. The single ring has one flange and the double ring has two flanges, so as to be reversible. The latter type is known as the double adjustable ring and is the ring in general use, a specimen of it being shown in Fig. 260, which can be used either with cast iron or plate ring holders as preferred.

There have been various ingenious and apparently useful forms of rings invented, but they have not taken deep root, and to-day, the use of the standard double flanged ring, with plate holder and traveler cleaner, is substantially universal.

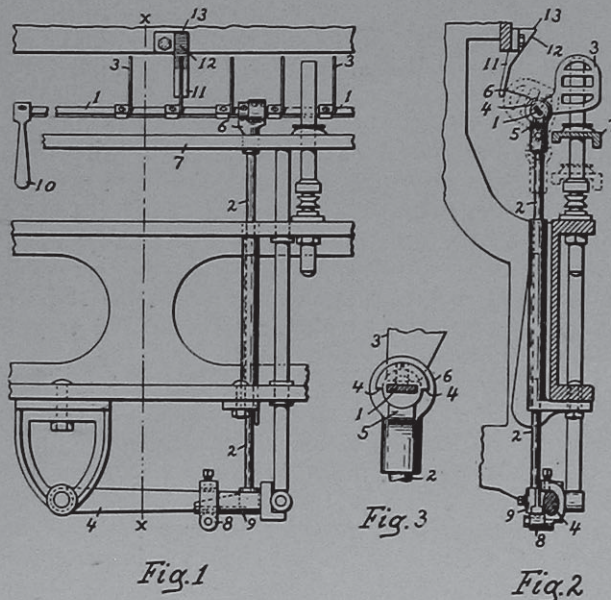
In 1866, Mr. James Higgins invented a system of forging ring blanks without a weld. This system is at present largely, if not universally, in use.

The Draper Co., make their rings from bar steel, drop forged into shape for turning. These forgings, after being properly treated to destroy the scale, are turned. After being turned they are inspected, all substantially perfect rings going to the polishers, from them to the hardening furnace, again to the polishers, and finally to the inspectors. Rough turned rings—that is to say, rings with improper surface, but within standard gauges of size—are ground, hardened and polished. Great care must be used in forging the blanks from which the rings are turned, to know that the metal is not overheated and yet shall fill the dies. This calls for the exercise of the highest skill. Any large excess of heat, or not heat enough, means a spoiled forging. The hardening of rings is also of the utmost importance. Rings not hard enough, or unevenly hardened, will wear out rapidly. Rings hardened too much, that is to say, rings hardened at too high a degree of temperature or exposed to heat for too long a time, become changed in character, the metal becomes granulous and rotten and the surface becoming glassy. The best wearing rings are so tempered that they cannot be cut with a file. The flanges should gauge alike in width and thickness. Also the ribs connecting the flanges should be exactly the same thickness in every ring. The nearer to a standard these dimensions are, the smoother the

traveler will run and the longer it will wear, which means less waste, and more spindles per spinner. A ring slightly out of level on the rail, will affect the work as much, if not more, than a ring not exactly true as to its roundness, since a ring out of level will cause the traveler to vibrate, thus wearing the traveler and ring faster than a traveler running on a ring which is not perfectly round.

Improved Mechanism for Operating Separators in Ring Frames.

The same refers to a late improvement in the construction of their ring frames by the Howard & Bulough American Machine Co. Ltd. Its advantages will be readily understood from consulting the three illustrations accompanying our article and of which Figure 1 is a front view of portions of a ring frame



provided with the improved mechanism, showing the ring rail in a central position and the separators in their operative position. Fig. 2 is a vertical, sectional view taken on line x—x of Fig. 1, showing the separators in full lines in their operative position, and in that for doffing in broken lines; also showing the cam on the top rail for automatically throwing the separators into their operative position. Fig. 3 is an enlarged (compared to Figs. 1 and 2) transverse, sectional view through the separator bar, looking at the bearing on the upper end of the actuating rod, showing the separator bar in an intermediate position with the greater part of the separator blade (for convenience of illustrating) broken away, showing also the stops for limiting the forward and backward movement of the separators.

In the operation of the new mechanism, the separator bar 1 is supported on two or more actuating rods 2 and their operative parts.

The separator blades 3 are held in their operative positions by the forward stop shoulder 4 on a bushing

engaging with the stop 5 on the bearing 6 as shown in Fig. 2. The separator blades 3 now have a vertical reciprocating motion, corresponding to that of the ring rail 7 through the roll 8, the shoe 9, the actuating rod 2 the bushing as engaging with the stop 5 and the separator bar 1.

The separator blades can be adjusted relative to the ring rail for different heights of bobbins, by adjusting the shoe 9 on the lower end of the actuating rod 2 and adjusting the bearing 6 on the upper end of the actuating rod.

The separator blades are thrown beyond the centre into their backward or inoperative position for doffing, as shown in broken lines in Fig. 2 by a forward and upward movement of the handle 10 which partly rotates the separator bar 1 and bushings in the bearing 6. The separator blades are now held in their backward position, supported by the rear stop shoulder 4 engaging with the stop 5.

On the first upward movement of the ring rail 7 and the separator blades 3, the upper rounded end of one of the separator blades will engage first with the downwardly extending arm 11 and then with the cam face 12 of the cam plate 13 which throws the separator blades beyond centre toward the front, and where they automatically assume their operative positions between the bobbins, by gravity, or the separators may be made to assume their operative positions by the downward movement of the handle 10.

By adjusting the roll 8 lengthwise on the lifter arm 14 a lesser or a greater vertical movement may be by the new mechanism imparted to the separator blades.

THREE LATE INVENTIONS IN COTTON SPINNING MACHINERY.

I. A New Top Roll Cleaner. This new device is a combination arrangement, utilizing a roll to clean the front drawing roll and a board to clean the back rolls, the board preventing fly and dirt from accumulating on the back rolls and keeping them clean while the waste taken from the front roll is wound in a lap on the cleaner roll provided for the purpose.

Fig. 1 shows a sufficient portion of this top roll cleaner to clearly explain its construction and operation to the reader. 1, is the cleaner board which has its under face covered with cleaner cloth 2, and which rests in the machine on the middle and back top drawing rolls, the front edge of the cleaner board resting against upright stops on the, usually met with, cap-bar of the machine. The front edge of the board is beveled at 3, to provide a clearance for the cleaner roll. The middle and back top rolls are kept clean from fly and dirt by the cleaner board.

Upon the top of the cleaner board is mounted a light metal bracket 4, longitudinally slotted at 5, to receive the retaining screws 6, so that the brackets can be adjusted to suit or fit different frames, or different distances between the front and middle top rolls.

Each bracket at its front end is bent downward and rearward, to form a substantially J-shaped guide 7, 8; the heel 8 being turned rearwardly toward the board, the free end of the bracket being upturned and elongated, at 9.

These guides receive the journals 10 of the front cleaner rolls 11, which is a common wooden roll, covered with felt, flannel, or other suitable material 12. As fly and dirt gathers on the front top drawing roll, it is cleaned therefrom and wound up in a lap on the cleaner roll 11, and as the lap increases in diameter the roll journals can conveniently rise in the guides 7 without interfering with the efficiency of the cleaning action. It will also be seen, when so necessary, that the cleaner rolls can be removed for cleaning or other purposes without disturbing the cleaner board, or the latter and the rolls can be removed simultaneously.

The inventor of the new cleaner, Mr. J. F. Reed, claims:

(1) That in practical work he has found that his cleaner will run at least twenty-five times as long as the usual cleaner devices used, before it is necessary to clean it.

(2) When the board is turned up, the curved heels 8 of the cleaner roll guides prevent the journals from falling out, the cleaner rolls returning to operative position when the board is replaced.

(3) By lengthening the uprights 9 at the front of the guides 7 the roll journals are held in place even should a very thick lap of waste be permitted to accumulate.

II. A New Spindle. The objects aimed at by the inventor of this new spindle, Mr. A. Long, are:

(1) To provide a bearing which is dust proof.

(2) To provide a bearing which will be nearly frictionless, and that the instant any friction occurs, between the lower end of the spindle and the immediate surrounding surface, oil will be automatically fed to that surface.

(3) To lock the spindle to its seat but at the same time permit ready separating thereof.

Fig. 2 of our plate of diagrams represents a vertical section through this spindle and its bearing. Fig. 3 is a detail elevation of the bushing removed.

Examining illustration Fig. 2, we find the bearing 0 formed with a hole in its lower end, internally threaded to a fine pitch, a screw 1 having a cone bearing 2 being fitted to said threaded opening. The upper end of the bearing forms oil chamber 3, which communicates by a small hole 4 with the interior of the bearing 0. Fitted somewhat snugly within the bearing 0 is a fibre metal bushing 5, formed with an external spiral groove 6 (see Fig. 3), and with a hole 7, connecting the lower portion of the spiral groove with the vertical recess inside of said bushing. Said bushing rests upon the cone bearing 2 of the screw 1 and at its upper end extends to or nearly to the upper end of the bearing 0.

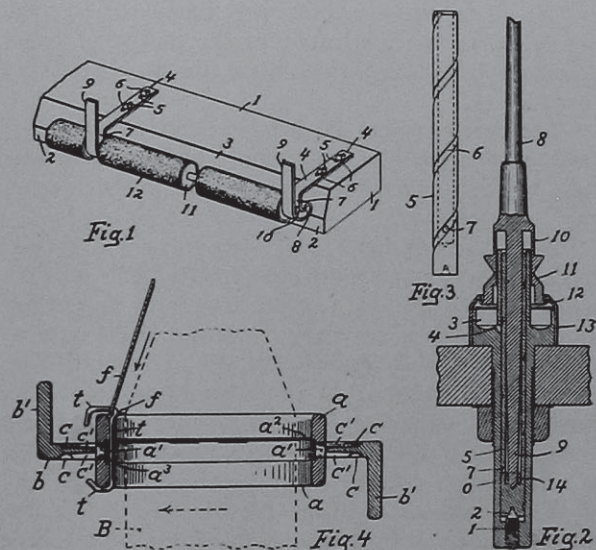
The spindle 8 is formed with a tapered lower end 9,

extending into the recess in the bushing 5, the extreme lower end of the spindle having a step bearing on the bottom of the bushing.

The spindle is also provided with an annular hood 10, the lower portion of which is formed as the whirl 11, its extreme lower edge being formed with a slightly horizontal flange 12.

Cover 13 fits over the flange 12, being formed with a bayonet slot adapted to engage a pin projecting from the wall of the oil chamber 3.

The cover 13 and the wall of the oil chamber 3, are formed with holes which register for supplying oil, but are turned out of register afterwards,



thereby closing all entrance to the oil chamber which might admit dust or dirt. The opening in the top of the cover 13 fits the whirl 11 so closely that it and the presence of the flange 12 below it, prevents access of dust or dirt through the top of the cover.

LUBRICATING THE SPINDLE: Oil being present in the reservoir 3, it leaks through the hole 4 down around the bushing and along the spiral groove thereof and through the hole 7 to the space around the lower end 9 of the spindle. If the contacting surfaces of the bushing and the lower portion of the spindle are sufficiently lubricated, said bushing will not turn; but as soon as any friction occurs between the spindle and its bushing, sufficient to rotate the latter, oil will be carried up along the spiral groove, the direction of the spiral being such that the rotation of the spindle in use (which is of course usually to the right) will cause the oil to be forced up the said spiral groove. The oil which is forced up to the top of the bushing escapes, some of it over the top down to the inside of the bushing and the surplus returns over the top of the upper sleeve portion of the bearing and inside of the hood 10 and the whirl back to the oil reservoir 3.

A loose collar 14 surrounds the lower end of the spindle 9 to center it and prevent its getting away from its step bearing.

III. A New Spinning Ring. The gist of the invention claimed, consists:

(1)—of a flangeless reversible vertical spinning ring having a comparatively wide and shallow circumferential central recess formed in its inner or concave face and one or more suitably located holes extending transversely through the wall of the ring and being in continuous open communication with said recessed part.

(2)—In providing the upper surface of the ring rail, in which said ring is seated, with a narrow groove, disposed concentrically with the ring, and short channels or ducts freely communicating with said groove and holes.

(3)—Inexpensive and thorough lubrication of rings and travelers, the lubrication of the said parts being automatically accomplished while the machine is in operation.

The accompanying illustration, Fig. 4, represents the invention (by Mr. J. Pearson) applied to a flangeless, vertical, reversible ring and a reversible ring rail.

In said illustration *a* designates the spinning ring, having its outer and inner sides substantially straight and concentric with each other. The inner or concave face of the wall is cut away to form a shallow recess a^2 , the latter being located centrally of an extending, say about one-third of the ring's height or length, and having one or more holes a^1 drilled transversely through the wall and being in continuous direct open communication with said recess.

The ring rail *b*, is of a reversible type, that is, the two longitudinal front and rear edges thereof have each a rib or flange b^1 , arranged at right angles with the web part of the rail, the ribs being oppositely disposed. The rings *a* are maintained in place in the rail *b* by forcibly pressing the endwise until they stand centrally of the web.

The top and bottom plane surfaces of the rail *b* are provided each with a shallow groove *c* intersected by short radial channels c^1 leading to the openings a^1 of the ring.

In operation the yarn or thread *f* as it passes downwardly to and under the traveler is wound upon the rapidly revolving bobbin *B* (shown by dotted lines), and traveler *t* being freely carried around with it; at the same time, too, the rail is adapted to be slowly reciprocated in a vertical direction.

The recess a^2 serves to reduce the contacting area of the traveler with the inner surface of the ring and also forms a space a^3 for holding more or less of the lubricant, which is supplied from the annular reservoir or groove *c* and its ducts c^1 of the upper side of the rail. The lubricant sufficiently soft, then passes through the open holes a^1 registering with the ducts and into the recess a^2 of the ring. The traveler in its movements coming in contact with the lubricating material contained in said recess, thereby automatically lubricates the adjacent surfaces of the ring, engaging with the traveler.

WOOL SCOURING AND DRYING.

A description of the Processes and Machinery for it.

THE WOOL SCOURING PROCESS.

The fleece of wool as coming from the sheep, besides the valuable fibre of commerce, contains impurities and substances adhering to the latter and which after opening and sorting the fleece (wool sorting) must be removed previously to either dyeing the wool, or being able to transform *i. e.*, card and spin the same into yarn, for the loom or the knitting machine.

This is done by what is known as the wool scouring process and which has for its object to remove from the fleece.

(a) naturally adhering impurities, like yolk or suint and wool fat,

(b) mechanically adhering impurities, with which the sheep had come in contact while during the growing of the fleece on its body, while out in the open pasture or in the barn, the character and quantity of said impurities depending upon the condition of said pasture and the cleanliness of the barn, also the kind of a first washing, preparatory to shearing, given the sheep. These impurities in the main consist in dung, dirt, leaves, shives, burrs. The latter will not leave the fibres during scouring, more particularly those small screw burrs and which later on are removed either by burr-picking or carbonising, two processes which we will later on, treat in special articles. Large impurities of dung, etc., and which would either make trouble in scouring, besides prolonging the process, are, as a rule, sorted out by the wool-sorter, and with the wool adhering to it, treated and scoured separately; besides most of this dirt is found adhering to the lowest grade of the wool fibre of the fleece, *i. e.*, that from the breech and the tail, hence kept in a separate sort from that of the better grades of the fleece anyway.

The importance of thorough scouring of wool cannot be overestimated, and it is to be regretted that this foundation process for perfect cloth receives in many woolen mills but little thought and attention, successful running woolen and worsted mills however knowing different.

It is necessary, not only that the process shall entirely clean the fibre from all adhering matter, but that it leaves the wool in the best possible condition for further working, since without the proper cleansing it is impossible for the dyer to get brilliant and fast colors, nor for the carder and the spinner to produce good yarn; poorly scoured wool cannot be made to open freely on the card, but breaks up, instead of opening the locks of wool, and when in turn it is impossible for the spinner to produce a sound and even yarn. It will clog up the card clothing, requiring oftener stripping, with the consequence of loss in production and excess waste.

Perfect results in wool scouring must be accomplished by the mildest means possible, so as to retain as much as possible of the natural softness, strength and openness, of the fibre, since if the natural softness of the fibre is destroyed by harsh treatment, it

at the same time destroys its soundness; in fact, an improper method of scouring may so hurt the fibre, that it will be impossible to produce as fine a quality of yarn as should be afforded by that grade of wool under operation. The value of the material alone that passes through the hands of the wool scourer in a single day in a large mill amounts to a considerable sum.

As will be readily understood the construction *i. e.*, method of operation of the scouring machines used has considerable influence upon the final scoured condition of the wool fibre, for which reason any woolen or worsted manufacturer installing new wool washers should only procure the best made, like for example *The Model D Parallel Rake Machine* as built by the James Hunter Machine Co. of North Adams, a machine built upon the most approved scientific principles and which machine will be used by us later on for illustrating, *how to handle the wool during the scouring process.*

Having previously referred more in detail to the mechanical impurities adhering to the fibre, and since the latter are of minor importance when considering wool scouring from a technical point of view, we will now consider more in detail its natural adhering impurities.

These secreted substances can be divided into two classes, the first of which, sometimes called yolk or suint, is soluble in water, while the other, known as wool fat, is insoluble in water and can only be removed by alkaline liquids.

The soluble portion (yolk) usually forms the larger portion of the substances to be removed and consists mostly of soluble salts of potash, such as the carbonate, stearate, oleate, and probably also salts of palmitic and valerianic acids. The potash being derived from the sheep's food, and uniting with some of the fatty matters, form the above salts.

There are also present varying amounts of other salts of potash, such as the chlorides, sulphates, etc. Some of our western wools also contain considerable quantities of lime, magnesia, and iron salts, which produce trouble in the scouring bath by forming sticky, insoluble soaps which are very hard to remove from the fibre when once deposited, and when the method of scouring must be adapted to suit conditions. If we take a wool rich in soluble potash salts, and wash it in warm water, and so continue with fresh lots, we soon get a very turbid, soapy liquor which acts as a mild scouring agent, and not only removes the soluble portion, but also some of the wool fat by forming an emulsion with it. But in this case all the dirt goes into the bath, which soon becomes very dirty, and for this reason has to be thrown away, hence all the potash salts are lost.

If this were not the case the action of these soluble potash salts would admit of the wool being almost washed in a stream of running water were it not for the presence in the fleece of a portion of fatty matter, uncombined, chemically, with the yolk, which remains attached to the wool fibres, and refuses to pass off by the use of water only. In the interest of sound

yarn, the scouring should be carried on by water alone as far as possible, since in this manner getting away with a certain amount of dirty matter, we then can resort to much weaker alkaline solutions for final cleansing of the wool.

When applying alkalis to wool we must go carefully to work, for the fact that wool, subjected to the action of strong alkalis, dissolves, *i. e.*, we are taking away so much of the life element of the wool and thus spoil it for future perfect carding and spinning.

Heat carried to excess acts upon wool in a similar manner, and if the heat employed exceeds 120° F., the soda acts upon the wool very adversely, as wool is very sensitive to the action of alkalis, especially at high temperatures. By the action of hot water the



FIG. 1



FIG. 2



FIG. 3

outer scales of the wool fibre are raised slightly and also the interior cells are penetrated and softened. The action is slightly increased if the water is a little acid, and this accounts for the well known fact that in dyeing wool, it can be boiled much longer in the sweet way than in a sour kettle, without matting. The action is still greater if the water is made alkaline, and in all such cases great care must be used in order not to injure the fibre.

To illustrate the influence of scouring liquor, if either too hot or too strong, or both, upon the fibre, the accompanying three illustrations Figs. 1, 2 and 3 are given, and of which Fig. 1 represents a healthy wool fibre, magnified; Fig. 2 shows a similar fibre, when magnified, after being previously treated in a bath containing five per cent carbonate of soda to its weight and heated to about 100° F.; whereas Fig. 3 shows a similar fibre as visible by being treated in a bath containing only one per cent carbonate of soda to its weight, but being heated to 212° F. These results will clearly show that alkaline carbonates no doubt will hurt the fibre, but that boiling the scouring liquid will be more hurtful. These facts will readily demonstrate that the greatest of care must be exercised in scouring wool, since the latter may be injuriously acted upon by being subjected to too hot a scouring solution, or from being brought in contact with powerful alkalis. No rigid rule as to temperature can be furnished, this being a feature which varies according to the nature of the wool under operation, the best rule being never to have the scouring liquor a higher temperature than is absolutely necessary to cleanse the material properly, a pretty safe

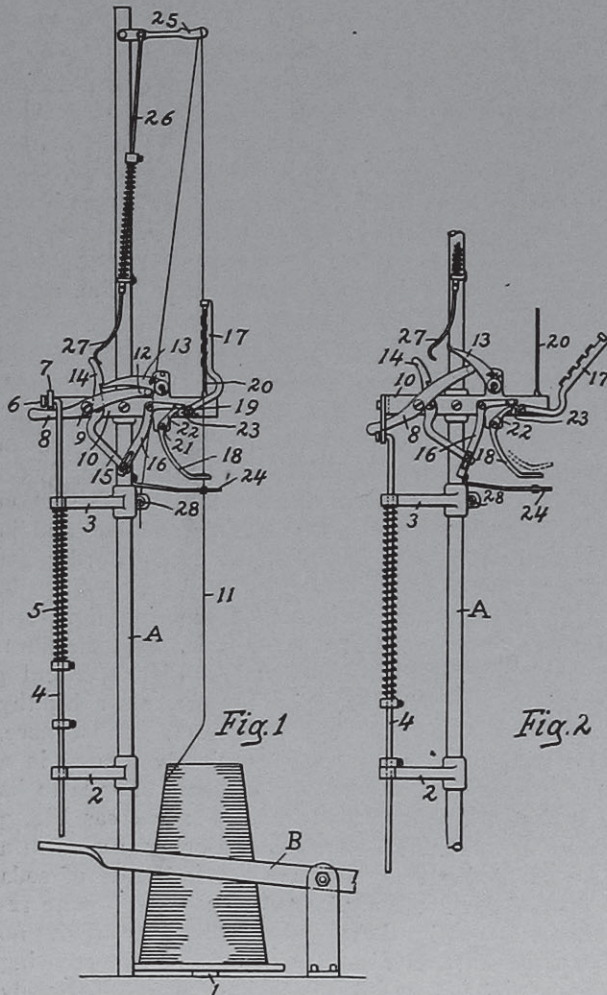
temperature being, not to exceed 110° F. for fine, nor 125° F. for coarse wools.

In some cases pulled wool is encountered which has been removed from the pelts by soaking them in lime. The wool is full of lime and this renders the scouring process very difficult. But in many cases this is brought about by carelessness of the wool-puller. The old process of sweating the skins has been abandoned entirely and pulling with the aid of sulphite of sodium has become generally used by pullers.

(To be continued.)

A New Stop Motion for Knitting Machines.

The same refers to circular knitting machines, arresting the rotation of the latter automatically, either by the failure of the thread, by undue tautness of the same, or when bunches or knots occur.



Of the accompanying illustrations, Fig. 1 shows the new stop motion mechanism in connection with the fixed bobbin, the parts being represented in normal, operative position. Fig. 2 is a fragmentary view corresponding with Fig. 1, but indicating the position the parts assume when operated by the failure, or tightening, of the thread.

This new stop motion is carried by a standard *A* secured to the machine frame adjacent the bobbin post 1. To this standard are secured brackets 2 and

which serve as guides for a vertically movable stop or hammer rod 4, arranged directly above the end of the stop motion lever *B* so that the descent of said hammer rod, actuated by spring 5, will depress said end of lever *B* for the purpose of operating the belt shifter of the machine. The upper end 6, of the hammer rod, is connected to the outer end of a pivoted arm 7, normally held in elevated position by a hammer rod lever 8, pivoted at 9 to a bracket 10 on the standard *A*; said lever 8 being supported by a trigger mechanism, which is automatically operated by the thread 11.

The inner end 12 of the lever 8 is normally depressed to raise the hammer rod 4, by means of a trigger engaging arm 13, the free end of which is held by the notched trigger 14. This trigger has an arm 15, which is engaged by a trigger operating trip lever 16, one arm of which is arranged in the path of two tripping fingers arranged to engage the thread 11—namely the feeler finger 17, and the knot finger 18.

The feeler finger 17 is of ordinary construction, being pivoted at 19 and normally held in vertical position by the passage of the thread between it and the corresponding grated fixed member 20, as shown in Fig. 1.

The knot finger 18, which is pivoted to the bracket 10 at 21, is provided with a tripping projection 22, which, like the similar projection 23 of the feeler finger 17, is normally located in close proximity to the before mentioned arm of the trigger operating lever 16, so that an upward movement of the thread engaging end of the knot finger will swing said lever 16 in the same manner as does the fall of the feeler finger 17 (see Fig. 2), so as to in either case release the trigger 14 and permit the fall of the hammer rod 4.

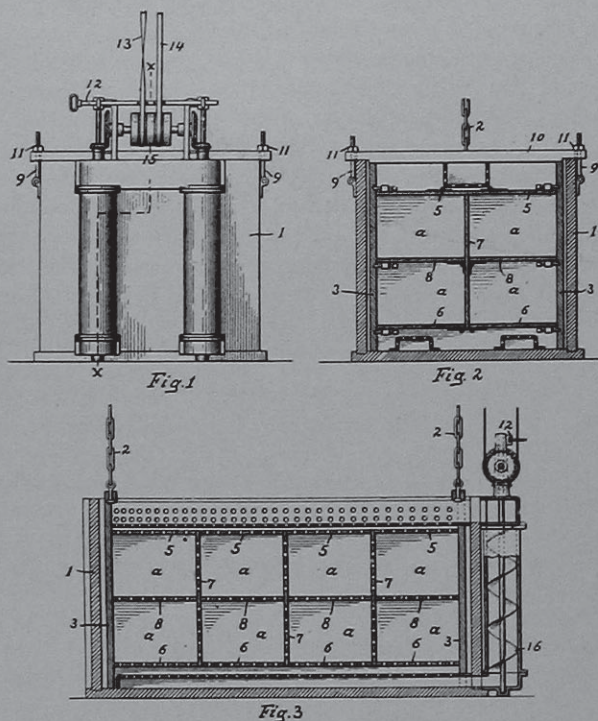
The thread 11, from the bobbin, after passing through the fixed guide eye 24 and the knot finger 18, and the feeler finger 17, as described, is carried upon the sweep 25, which is pivoted to the top portion of the standard *A* and is normally held in approximately horizontal position by a spring pressed rod 26, so as to be readily depressed by any undue tension upon the thread. As shown, this spring pressed supporting rod 26 for the sweep, is provided at its lower end with a trigger operating finger 27, arranged to contact with the trigger 14, so as to directly release the latter when the sweep is depressed; the thread, which extends through the guide eye 28, to the machine, being thereafter released from the sweep so as to provide ample slack during the stoppage of the machine.

A Novel Knit Goods Dyeing Machine.

The object aimed at in the construction of this machine is to provide simple and efficient means whereby the material to be dyed is expeditiously handled and thoroughly subjected to the dyeing liquid.

Of the accompanying illustrations Fig. 1 is an end elevation of this dyeing machine. Fig. 2 is a transverse sectional view, and Fig. 3 a longitudinal sectional view, as on the line x—x of Fig. 1.

THE OPERATION OF DYEING as carried on in connection with the machine is as follows:—The material to be dyed is introduced to the series of compartments *a*, of the receptacle, through hinged doors. After closing these doors, the receptacle is lowered into the dyeing liquid within the tank 1, by means of chain arrangement 2, the dyeing liquid entering and filling the receptacle through the perforated bottom 6. The perforated top 5 serves to force the material to be dyed down into the dyeing liquid. 7 and 8 are perforated partition walls, and 3 the solid walls of the receptacle.



After the receptacle has been introduced into the tank, the bolts 9 are moved into the slots in the bars 10 and the nuts 11 are tightened to force the bottom of the receptacle against the bottom of the tank and retain the receptacle submerged.

The belt shifter 12 is now operated to move one of the belts 13 or 14 onto the pulley 15, thus actuating the propellers 16 and causing the dyeing liquid to circulate and flow through the receptacle to act upon the material to be dyed. The belt shifter 12 may now be operated to shift the other belt onto the pulley 15 to reverse the propellers 16, and thus reverse the flow of the dyeing liquid through the receptacle.

After the material to be dyed has been thoroughly subjected to the dyeing liquid in this manner, the receptacle is raised by means of chains 2 from the tank and the doors of the receptacle are opened to permit the discharge of the dyed material, or the receptacle may be introduced to another tank to subject the material to another liquid before it is discharged.

CIBA-COLORS.

CIBA-COLORS, which have recently come into prominence through the efforts of Messrs. A. Klipstein & Co., are of a new class of vat dyes. Their success lies in the fact that they produce unusually bright shades, fast to light, washing and chlorine.

Especially is this so of the *Ciba-Blues*, which stand out with much prominence above all other known blue dyestuffs.

Among other shades of the *Ciba-colors* are the *Ciba-Red G.*, *Ciba-Bordeaux*, *Ciba-Violet B.*, *Ciba-Violet R.*, but the most important of all remain the *Ciba-Blues*. Nevertheless the importance of the Violet is greatly enhanced by the fact that it is practically the only known Violet fast to light and chlorine.

These new Blues are just as well adapted for the dyeing of cotton, linen and artificial silk, etc., as for wool and true silk, mixed goods, unions and half-silk.

Loose cotton and yarn are best dyed in wooden or iron vats; whereas cotton piece goods are most satisfactorily handled on the ordinary Jigger or Padding Machine. In consequence of their good solubility and levelling properties, which considerably excel those of Indigo and Sulphur colors, *Ciba-Blues* will find extensive use in the dyeing of sliver, cheeses, cops, etc., on mechanical apparatus.

These *Ciba-Blues* have the advantage above all known blue dyestuffs, that in chemicking, etc., their shades do not change but only diminish in intensity, also that by repeated washing, the colors do not lose their beauty and fullness of shade as is the case with Sulphur Blues.

In connection with wool-dyeing, more particularly with articles fast to wearing, and for which excellent fastness to fulling, light, acids and potting is required, *Ciba-Blues* will also be found superior in results; besides the shades produced surpass those obtained by either Indigo or Alizarine Blue, in respect to purity of shade and fastness.

Ciba-Blues have the property of dyeing in the same bath together with most of the other commercial vat-dyes; iron and copper have no effect on the dyestuffs; however, they will not withstand kier-boiling under pressure.

Ciba-Blue B which comes in the market in paste form, can be used for printing Cotton Yarns and Fabrics; *Ciba-Blue 2 B D* is also placed on the market in the form of paste, specially prepared for printing purposes.

DIRECTIONS FOR HANDLING CIBA-BLUE B PASTE AND 2 B PASTE IN CONNECTION WITH DYEING COTTON: For dissolving the dyestuff, for medium shades, use $1\frac{3}{4}$ times its weight of Caustic Soda 76° Tw., and $1\frac{3}{4}$ times the quantity of Sodium Hydrosulphite in powder (equal to 85 pounds), reckoned on the weight of dyestuff, after which, 30 to 40 times the quantity of hot water is poured over, and then slowly boiled. The reduced dyestuff solution is passed through a fine sieve, and allowed to run into the dye-bath already heated to 140 to 160° F. Instead of solid Hydrosulphite, a corresponding quantity of liquid Hydrosul-

phite may be used, and in which case the addition of hot water is proportionately diminished, since reduction takes place more easily in a concentrated solution.

See that the reduced dyestuff-solution, as well as the dye-bath, produce a *golden yellow tinge*; greenish looking baths show that the same have not been properly prepared, and which in consequence give dull and unlevel dyeings. Such baths may be corrected in most cases through addition of Caustic Soda.

For *light shades*, as well as when *water saturated with oxygen* is used, the quantities of Hydrosulphite and Caustic Soda must be increased to 5 to 6 times the quantity of dyestuff; whereas for *dark shades* these proportions are diminished to only twice as much.

DYEING COTTON YARN IN THE VAT. To facilitate the penetration of the yarns, make an addition of $\frac{1}{2}$ lb. alkaline Turkey Red Oil or Monopole Soap per 100 gallons dye-bath. For materials which are difficult to penetrate like knitting yarns, etc., the temperature must be raised to 160 to 175° F.

After first, well boiling-off and hydro extracting, the cotton yarn is then entered into the bath containing the necessary quantity of dyestuff, and turned for $\frac{1}{2}$ hour as usual.

The yarn, for *light shades*, is then squeezed-off and immediately rinsed in cold water, or the liquor is drawn off, and the yarn turned 2 to 3 times during $\frac{1}{2}$ hour and then rinsed.

For *medium* and *dark shades*, carefully wring out the yarn with sticks, spread well out, and leave it to oxidize for $\frac{1}{4}$ to $\frac{1}{2}$ hour. After hanging, the material is rinsed well 2 to 3 times with cold water, and then soaped for 20 to 25 minutes at the boil with 2 to 4 lbs. soap and 1 to 2 lbs. Soda Ash, per 100 gallons, turning 5 to 6 times. Soaping at the boil is absolutely essential for the production of bright shades, and at the same time, it considerably improves their fastness to bleach and washing.

By $\frac{1}{2}$ hour's after-treatment with 2 to 3% Copper Sulphate and 2 to 3% Acetic Acid at 195° F., a greener shade, possessing a somewhat superior fastness to chlorine, is obtained.

The vats may be conserved for a fairly long time. In the standing bath, the quantity of dyestuff is diminished to $\frac{4}{5}$ for light shades, and for dark shades to $\frac{2}{3}$ of the original quantity. After the fourth bath, $\frac{1}{2}$ the quantity of solid or liquid Hydrosulphite and Caustic Soda is sufficient, when the bath is daily employed.

DYEING COPS AND CHEESES ON MECHANICAL APPARATUS. This process may be carried on, either without or with *suction* and *oxidation appliances*.

(a) In the first instance, the dyestuff is dissolved in the tank as described for cotton yarn, and the dyeing then carried on for $\frac{1}{2}$ to $\frac{3}{4}$ hour at 160 to 175° F. The goods are then rinsed with cold water and oxidized with 1 to 3% Bichrome and $\frac{1}{2}$ to $1\frac{1}{2}$ % Acetic Acid for 20 minutes at about 160° F., after which same are again rinsed. By a further treatment for $\frac{1}{2}$ hour with boiling water containing 1 to 2% Soda on the weight of goods, the fastness to chlorine is somewhat improved.

(b) With suction and oxidation appliances, the dyestuff is dissolved and used as previously indicated. After dyeing, the liquor is drawn off, and the goods oxidized by air or in the hydro-extractor, after which they are then thoroughly rinsed for 5 to 10 minutes, and developed with boiling water and Soda as explained before.

In dyeing *light shades*, it is recommended to enable easy levelling, to make an addition of $\frac{1}{2}$ lb. alkaline Turkey Red Oil or Monopole Soap per 100 gallons dye-bath.

FOR PIECE DYEING, on the Jigger or Padding Machine, the same instructions as regards the quantities of Hydrosulphite and Caustic Soda, are to be followed, as was quoted for cotton yarn. The goods are dyed at 140 to 160° F. on the Jigger provided with squeezing-rollers. All folds and creases should be carefully avoided, as same cause light patches to appear at these parts of the material. The goods are then well squeezed-off, and in order to ensure thorough oxidation, they are given a short passage in the air on 2 to 3 rollers, after which they are rinsed and soaped at the boil as usual. For *dark shades*, the goods are further developed, after rinsing, with 3% Bichrome and $1\frac{1}{2}$ % Acetic Acid for 20 minutes at 160° F.

ARTIFICIAL SILK is dyed in the same manner as indicated for cotton yarn, but at the temperature of 105 to 120° F.

IN WOOL DYEING, $2\frac{1}{2}$ times the quantity of Caustic Soda 76° Tw. and Hydrosulphite in powder is sufficient, wherein the dyestuff is dissolved.

The reduced dyestuff solution thus obtained, is then passed through a fine sieve, and allowed to run into the dye-bath already heated to 140 to 160° F., after which 1 to 3 parts Sulphuric Acid 10% per 1000 parts are added according to the alkalinity, in order to neutralize the bath. In so doing, however, particular care should be taken that the bath does not afterwards show the slightest acid reaction with litmus paper, and also remains yellow.

The goods, after having been previously wet-out, are entered into the bath, dyed for 15 to 20 minutes, squeezed-off, and after the liquor has been drawn off, they are oxidized for 15 to 20 minutes. Hereupon the goods are well rinsed and developed at 85 to 105° F. in a fresh bath containing 8 parts Hydrochloric Acid conc. per 1000 parts water. Hydrochloric Acid may be replaced by Sulphuric, Formic, or Acetic Acid. After developing, the goods are again well rinsed.

SILK can be dyed in a similar manner, as wool, the shades obtained being specially remarkable for their brightness, as well as possessing a superior fastness to light and water.

HALF-SILK is dyed at 140 to 160° F. under addition of a little alkaline Turkey Red Oil or Monopole Soap, as previously indicated for cotton yarn.

PRINTING:

Ciba-Blue 2 B D is brought in the market in the shape of *paste* and is prepared for printing purposes thus: