(No Model.)

W. SHAW.

APPARATUS FOR PRINTING CARPET YARNS.

No. 446,299. Patented Feb. 10, 1891.

Fig. 1.

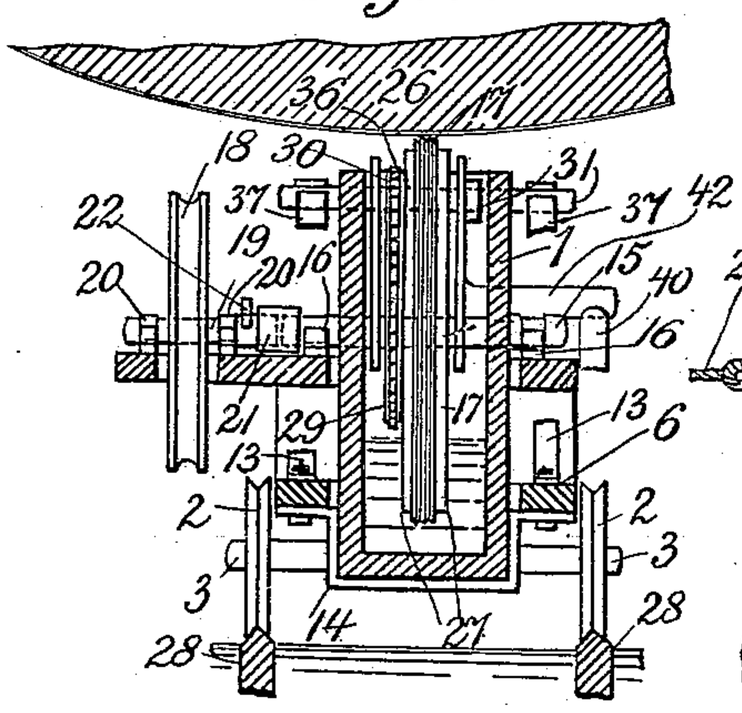


Fig. 2.

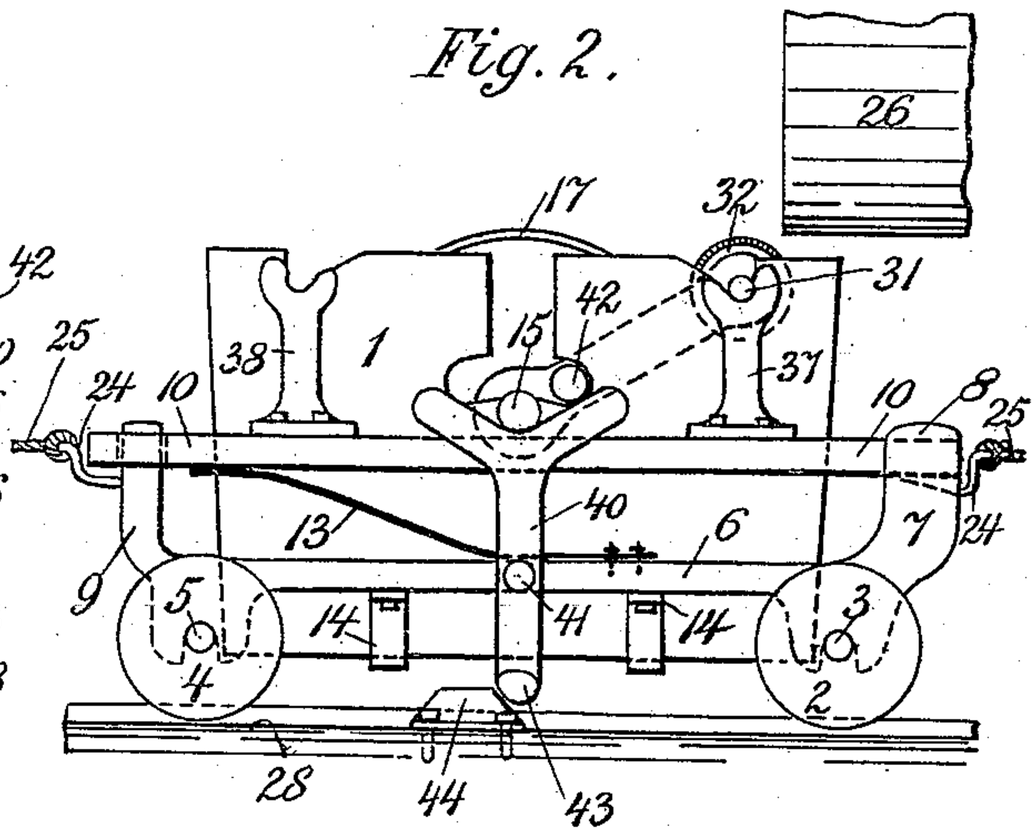


Fig. 3.

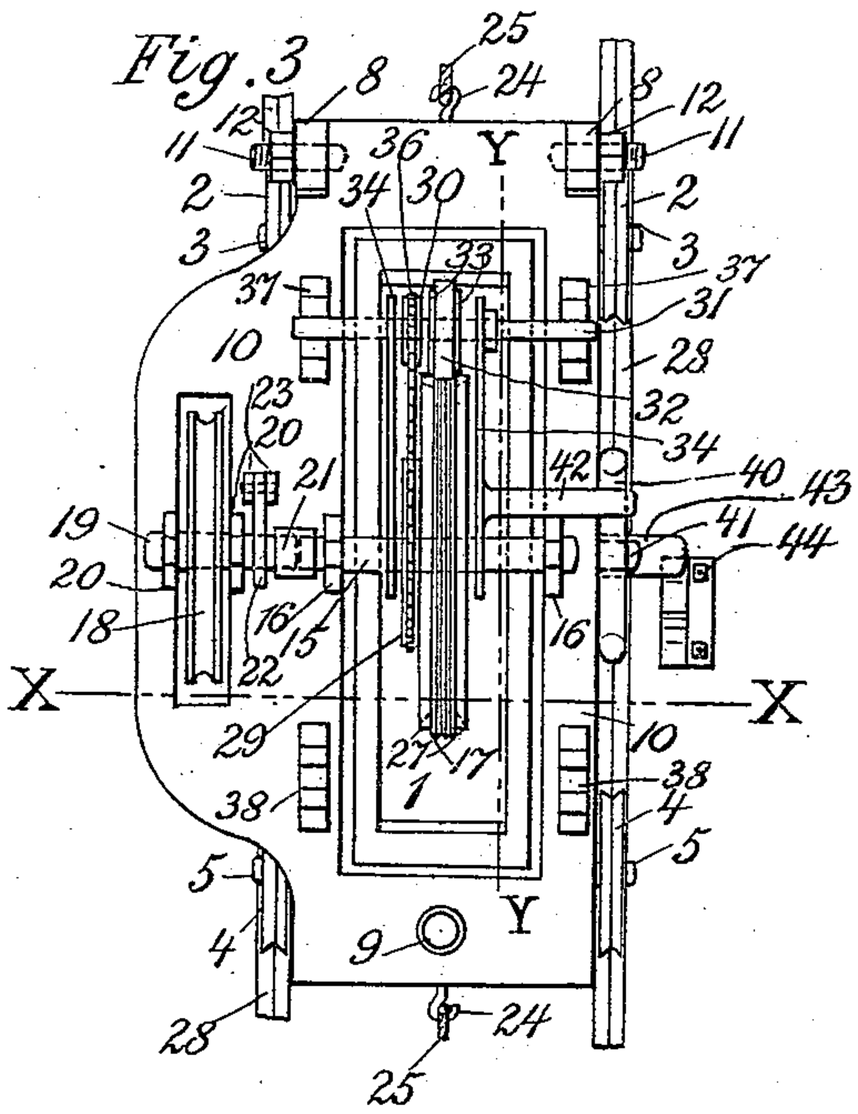
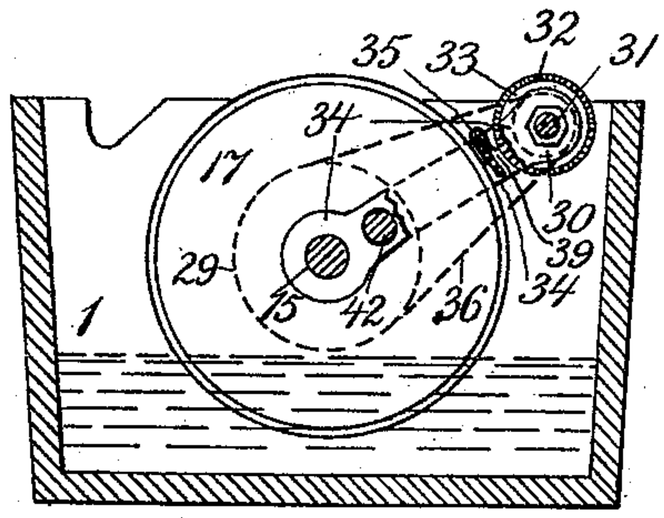


Fig. 4.



WITNESSES:

L. L. Boykin

James McLain

INVENTOR

William Shaw

BY

C. L. Horack

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM SHAW, OF NEW YORK, N. Y.

APPARATUS FOR PRINTING CARPET-YARNS.

SPECIFICATION forming part of Letters Patent No. 446,299, dated February 10, 1891.

Application filed November 3, 1890. Serial No. 370,218. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SHAW, a citizen of the United States of America, and a resident of New York, State of New York, have invented certain new and useful Improvements in Apparatus for Printing Carpet-Yarns, of which the following is a specification.

My invention refers to improvements in apparatus for printing carpet-yarns such as are used particularly in the manufacture of tapestry carpets.

The purposes of my invention are to produce a high grade of work by applying the coloring substances to the yarn evenly, and to do such work economically by means of proper mechanical appliances, as described hereinafter.

In the accompanying drawings, forming part of this specification, I have shown a part of the printing-drum and of the appliances as now commonly used in connection therewith and also the improvements invented by me. In said drawings, Figure 1 represents a vertical cross-section of the apparatus along line X X of Fig. 3; Fig. 2, a side elevation; Fig. 3, a ground plan, and Fig. 4 a vertical section along line Y Y of Fig. 3.

Corresponding figures throughout the different views indicate corresponding parts.

1 is a box containing liquid coloring substance.

2 2 are a set of wheels fastened to a common axle 3. Likewise 4 4 are a set of wheels fastened to a common axle 5.

6 is an iron frame resting between such wheels on their axles, its under side where in contact with said axles being forked, as shown in dotted lines in Fig. 2, so as to confine axles 3 and 5 in the same positions at all times with reference to said frame. At one end said frame is provided with an upright abutment 7, terminating on top in two lugs 8 8. At the other end said frame has fastened to it a vertical pin 9.

10 is a plate, one end of which is held between lugs 8 8 by set-screws 11 11, provided with lock-nuts 12 12, which set-screws act as an axle, around which such plate swings. The other end of said plate contains a hole through which pin 9 projects.

13 13 are springs fastened to frame 6 and supporting and forcing upward plate 10.

14 14 are iron straps fastened to frame 6 on its under side, so as to form a support for box 1, which is inserted in openings left for such purpose in frame 6 and plate 10.

15 is an axle resting on bearings 16 16, attached to plate 10. On such axle is secured a wheel 17, which is made to revolve within box 1. The side walls of said box are cut out, as shown particularly in Fig. 2, and bearings 16 16 are open on top in order to permit of lifting axle 15, with wheel 17, out of such box when desired.

18 is a grooved pulley fastened to an axle 19, which rests in bearings 20 20. Said pulley revolves within a slot in plate 10.

21 is a sleeve or coupling for joining together axles 15 and 19 and compelling the one to revolve while the other is doing so.

22 is a catch hinged between lugs 23 23, which are fastened to plate 10. Said catch hooks over axle 19, so as to keep sleeve 21 in its position after the coupling has been effected.

24 24 are hooks attached to abutment 7 and pin 9, while 25 25 represent wire ropes attached to such hooks.

26 represents a part of a drum, around which is closely wound an endless thread of carpet-yarn, forming a continuous layer of such yarn one thread thick around such drum and presenting an even surface. Whenever coloring-matter is applied to such layer in a straight line parallel with the axis of drum 26, the yarn when unwound will show at even distances corresponding with the circumference of such drum the coloring substances so applied, and by producing on the yarn wound around such drum lines of various colors it is possible to give to the yarn the coloring which the pattern of the carpet may call for. Such colored lines are produced by means of the outer rim of wheel 17. Pulley 18 being by proper belting or gearing made to revolve, the same will, when coupling 21 is in the position shown in Figs. 1 and 3, also cause wheel 17 to revolve, and as liquid coloring-matter is contained in the lower part of box 1, such color will adhere to said rim until it comes in contact with the yarn on drum 26 and depos-

its such coloring-matter thereon. Usually scrapers (not shown in the drawings) are connected in any proper way with the walls of box 1 near the periphery of wheel 17 and on each side of said wheel, so as to prevent any excess of coloring-matter from reaching said yarn.

In order to produce the longitudinal lines along the layer of yarn wound around drum 26, as mentioned above, it is not only necessary to cause the revolving of wheel 17 around its own axis while partly immersed in the body of liquid coloring-matter within box 1, but also to compel it to travel along drum 26 in close contact with the yarn. As axle 15 of wheel 17 is supported by plate 10, the upward pressure exerted by springs 13 13 against the bottom of said plate will at all times insure such close contact, and the longitudinal movement along drum 26 required is produced by means of proper gearing, with which wire ropes 25 25 are made to connect, wheels 2 2 and 4 4, with their axles 3 and 5, and frame 6, with projections 7, 8, and 9 and with plate 10, forming a carriage which can be moved forward and backward on rails 28 28, which rails are secured to the floor of the room and run parallel with the axis of drum 26. It is customary to maintain drum 26 in the same position until such carriage, and with it wheel 17, has been drawn once along such drum and some distance beyond it, after which the drum is revolved one hundred and eighty degrees around its axis, and the carriage is drawn back again, so as to apply in each case two lines of the same coloring-matter at a distance from each other equal to one-half of the periphery of the drum.

Assuming that box 1 contains blue coloring-matter, after the above-mentioned two colored lines have been applied to the yarn the drum will be partly revolved around its axis, and the operation of running wheel 27 along its surface will be repeated until all the blue lines which the pattern calls for have been applied, when the carriage will be withdrawn along rails 28 28 beyond the body of drum 26, catch 22 be lifted up, coupling 21 moved sidewise so as to free axle 15, and box 1 lifted out of such carriage, axle 15 being thereby brought to rest directly on the side walls of box 1, and consequently being lifted, together with wheel 17 and box 1, off of the carriage. A new box containing a different color and another axle and wheel is then inserted in the carriage, and the operation described above is repeated. As far as described I propose to employ corresponding appliances in the same manner.

My improvements consist in the following additions:

29 is a sprocket-wheel fastened to axle 15.

30 is another sprocket-wheel fastened to an axle 31, on which axle is also fastened a brush-wheel 32, which has bristles extending outward all along its periphery 33 33, being round cheeks attached to both sides of such brush-wheel, so as to guard against the bristles being forced sidewise.

34 34 are two arms adjusted to swing around axle 15. Said arms are rigidly connected with each other by means of a standard 35. These arms also furnish the bearings for axle 31, and as sprocket-wheel 30 is operated from sprocket-wheel 29 by means of chain 36 it will be seen that whenever wheel 17 is revolving brush-wheel 32 will be made to revolve in the same direction, but owing to the proportions of wheels 29 and 30 with greater velocity.

37 and 38 are standards fastened to plate 10 and containing near their upper extremities bearings open on top and fitting axle 31. The positions of said standards and bearings and the distances between axles 15 and 31 are so adjusted that by swinging arms 34 34 toward such standards axle 31 will come to rest on such bearings so as to bring the most elevated part of the periphery of brush-wheel 32 to the same elevation with the most elevated part of the periphery of wheel 17, and hence while the carriage is being moved along the layer of yarn along drum 26, as described above, the bristles of such brush will be in constant contact with said yarn. In Fig. 2 are shown the positions which said brush-wheel and arms are intended to occupy while the carriage is moving to the left, it being my purpose to have the bristles of such brush-wheel forced against the yarn on drum 26 by the action of spring 13 and to have the same follow wheel 17 and force the coloring substance into such yarn, while removing at the same time by means of such brush-wheel any excess of coloring-matter that may have been deposited thereon.

Attached to standard 35 is a blade or scraper 39, which serves to prevent coloring substance which has once been removed from the yarn by the bristles to be again applied to said yarn by arresting such coloring-matter and causing it to drop back into the liquid space of box 1.

After the carriage has traveled along drum 26 in one direction and before it returns over the same course it becomes necessary to reverse the position of arms 34 34 and of the wheels connected therewith and to bring axle 31 to rest on the bearings of standard 38. While this might be done by hand, I prefer to do it automatically, and for such purpose I hinge a Y-shaped piece 40 on a pivot 41, which pivot is shown to project sidewise from plate 10 and to be located half-way between standards 37 and 38.

42 is a pin attached to arm 34 and projecting outward through a suitable slot in the side wall of box 1, so located as to rest on the upper surface of the right fork of piece 40 when axle 31 rests on the bearings of standard 37.

43 is a shoe extending outward from the lower extremity of piece 40.

44 is a projection so located and attached

to the floor of the room in the path of such shoe that after the carriage has passed the full length of and beyond drum 26 such shoe will strike such projection, and while the carriage still for a short distance proceeds in its original course the upper part of Y-shaped piece 40 will thereby be made to swing to the left, and to consequently force pin 42, and with it arms 34 and axle 31 and the wheels connected therewith, in the same direction until axle 31 comes to rest on the bearings of standard 38 38. After this the carriage is made to travel in the opposite direction, piece 40 again assuming a perpendicular position until the axle 31 in a corresponding manner beyond the other end of drum 26 is returned to the bearings on standards 37 37.

I have shown the part of the outer rim of wheel 17 which applies the coloring-matter to the yarn to be provided with a series of ridges and grooves extending along and around the periphery of said wheel, as I find that by using the same I can obtain a comparatively even distribution of the coloring-matter, as a distributing-wheel so grooved is adapted while making a passage along drum 26 to apply the coloring-matter in a number of parallel lines with narrow spaces between them, which lines by contact with the bristles on the periphery of the brush-wheel will first be spread out so as to cover aforesaid spaces evenly, thereby producing a single layer of coloring-matter of uniform depth, and will afterward, owing to the elastic pressure applied to the bristles in contact with the yarn, force such coloring-matter into such yarn uniformly and without affecting injuriously its texture or its strength. However, I do not wish to confine myself to the use of a wheel so grooved. The employment of a brush-wheel for forcing the coloring-matter into the yarn and for distributing the same evenly offers the advantage that the elasticity of the bristles in such brush-wheel, co-operating with the elastic action of spring 13, will guard against any undue pressure being applied to the drum. In place of the brush-wheel, a wheel having its periphery covered with felt might be employed. In addition to the brush or the felt wheel an elastic covering around drum 26 underneath the yarn should be employed.

It will be seen that in having the brush-wheel follow the distributing-wheel 17 at the same speed and at a constant distance the liquid coloring-matter on the yarn will be exposed for a short and constant period to the drying influence of the surrounding atmosphere, and, further, that as soon as the application of the coloring-matter to the yarn has been completed the yarn under my process is ready to be removed from the drum.

While I have shown sprocket-wheels 29 and 30 and the chain connecting the same to be placed within the box 1, I do not propose to confine myself to this arrangement.

I claim as new and desire to secure by Letters Patent—

1. In an apparatus for printing carpet-yarns, the combination of the drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, and a wheel moving over the coloring-matter so deposited and held against the yarn by a spring, substantially as set forth.

2. In an apparatus for printing carpet-yarns, the combination of the drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, and a brush connected with the axle of such wheel and held against the coloring-matter deposited on the yarn, substantially as set forth.

3. In an apparatus for printing carpet-yarns, the combination of the drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, and a revolving brush-wheel held against the coloring-matter deposited on the yarn and having its axle supported by a frame containing bearings for the axle of the distributing-wheel, substantially as set forth.

4. In an apparatus for printing carpet-yarns, the combination of the drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, a box containing such coloring-matter, and a revolving brush-wheel held against the coloring-matter on the yarn and placed within the box containing the coloring-matter, substantially as specified.

5. In an apparatus for printing carpet-yarns, the combination of a drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, a box containing such coloring-matter, and a revolving brush-wheel held against the coloring-matter deposited on the yarn, and a blade for freeing such brush-wheel of coloring-matter taken up by it, substantially as set forth.

6. In an apparatus for printing carpet-yarns, the combination of a drum carrying the yarn, and a wheel for applying liquid coloring-matter to such yarn, and a wheel for forcing such coloring-matter into the yarn, substantially as set forth.

7. In an apparatus for printing carpet-yarns, the combination of a drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, and a wheel for forcing such coloring-matter into the yarn, and having its bearings in a hinged frame for the purpose of placing the latter wheel alternately on opposite sides of the first-named wheel, substantially as set forth.

8. In an apparatus for printing carpet-yarns, the combination of a drum carrying the yarn, a wheel for applying liquid coloring-matter to such yarn, a wheel for forcing such coloring-matter into the yarn, a carriage for guiding said wheels, and axle-bearings for the last-named wheel supported by said carriage and placed forward and backward of the first-named wheel, substantially as set forth.

9. In an apparatus for printing carpet-yarns, the combination of a drum carrying

the yarn, a carriage supporting the axle of the distributing-wheel and containing bearings for the axle of a brush-wheel forward and backward of the axle of the distributing-wheel, an arm connecting the axles of the distributing-wheel and of the brush-wheel, a projection, as 42, on such arm, a Y-shaped lever attached to the carriage and engaging such projection, and an abutment, as 44, for tripping such lever and thereby reversing the position of the brush-wheel with reference to the distributing-wheel, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 31st day of October, 1890.

WILLIAM SHAW.

Witnesses:
HUGO KOELKER,
CHAS. L. HORACK.