

(No Model.)

2 Sheets--Sheet 1.

W. SHAW.

APPARATUS FOR PRINTING CARPET YARN.

No. 514,282.

Patented Feb. 6, 1894.

Fig. 1.

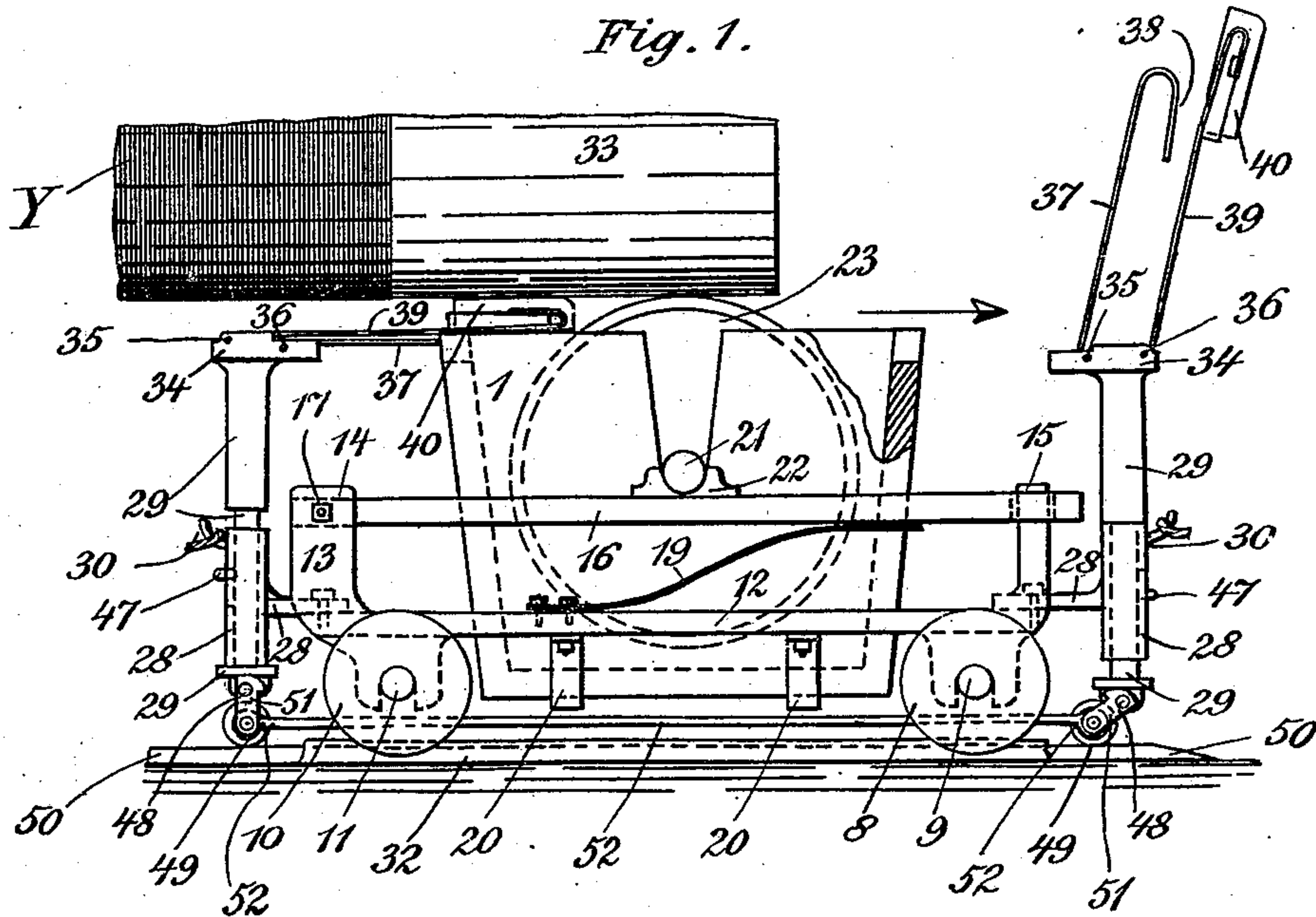


Fig. 2.

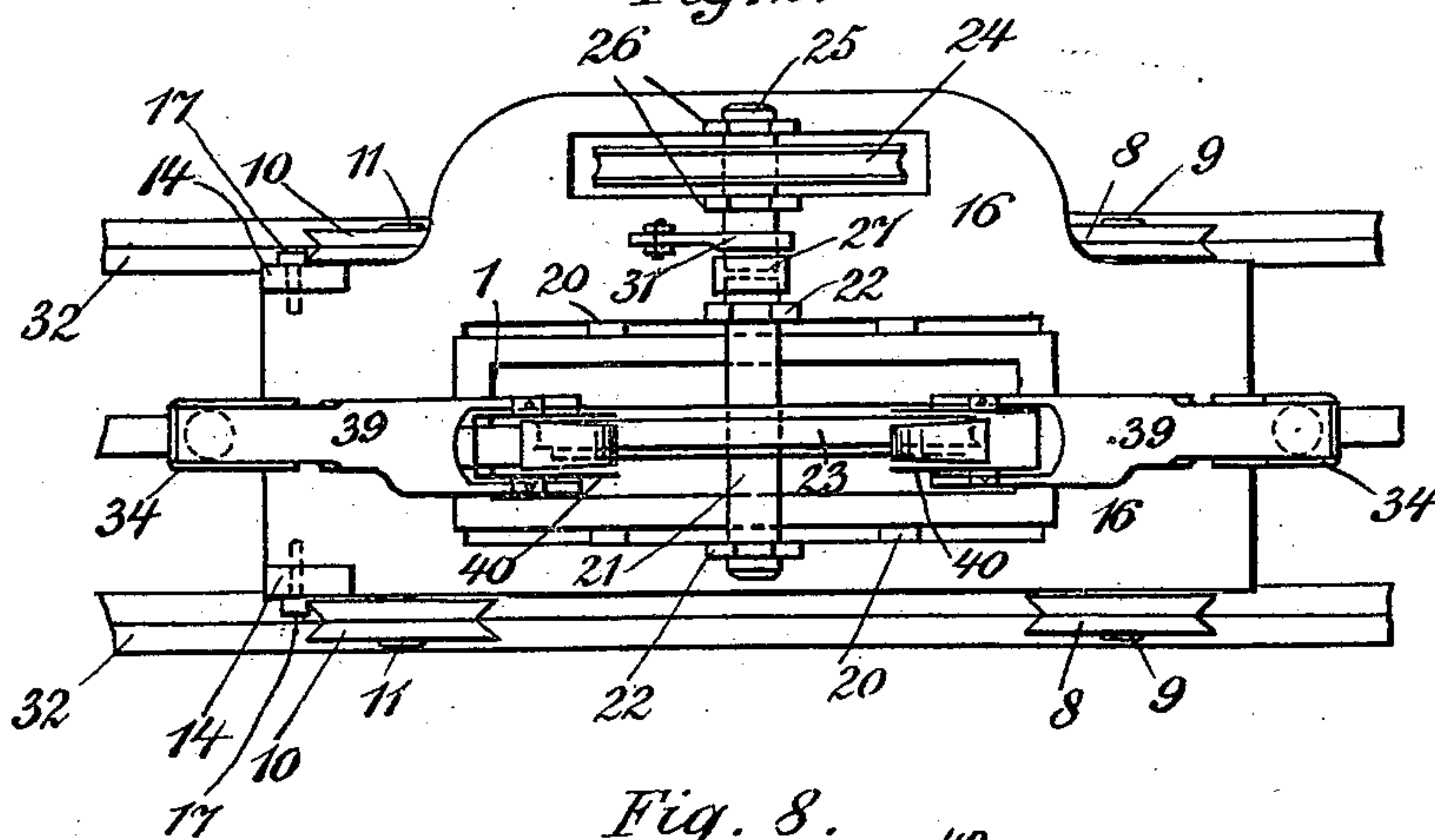


Fig. 8.

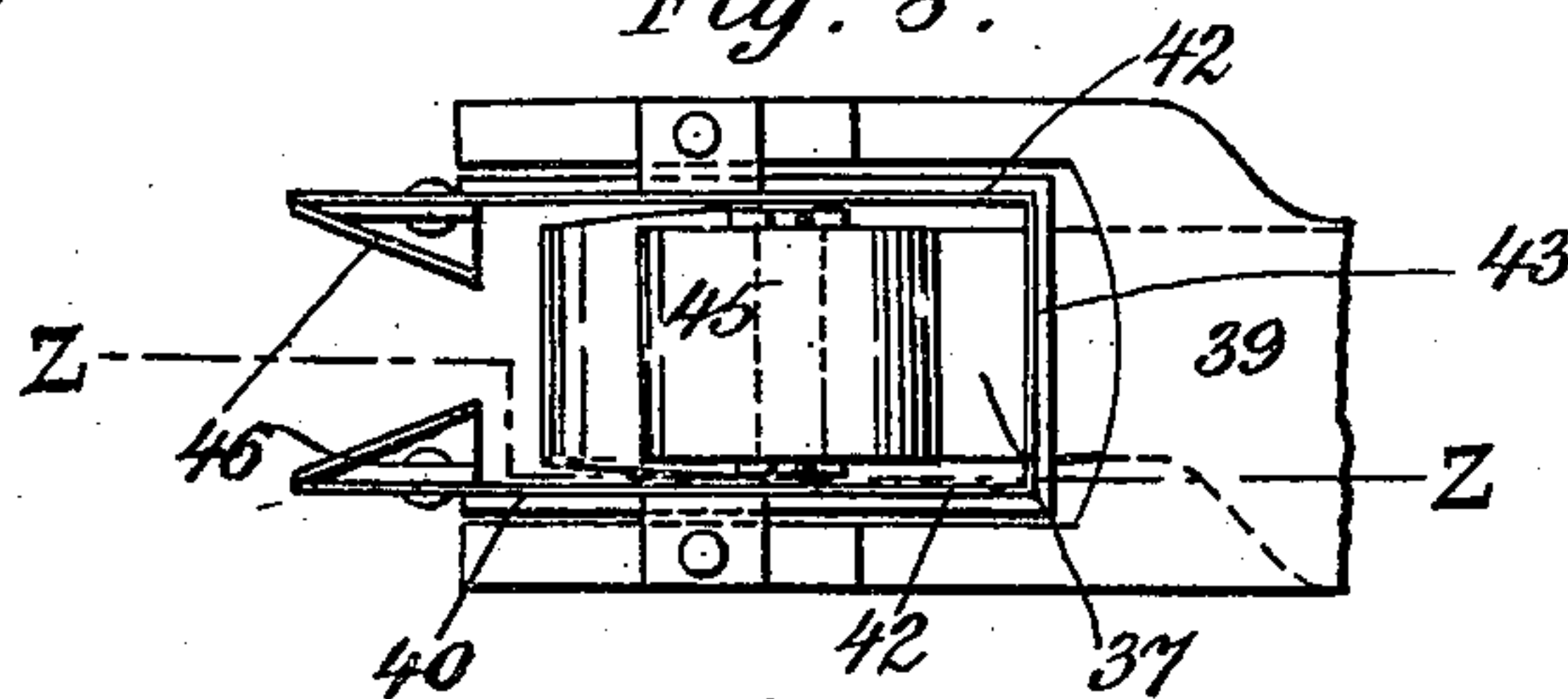
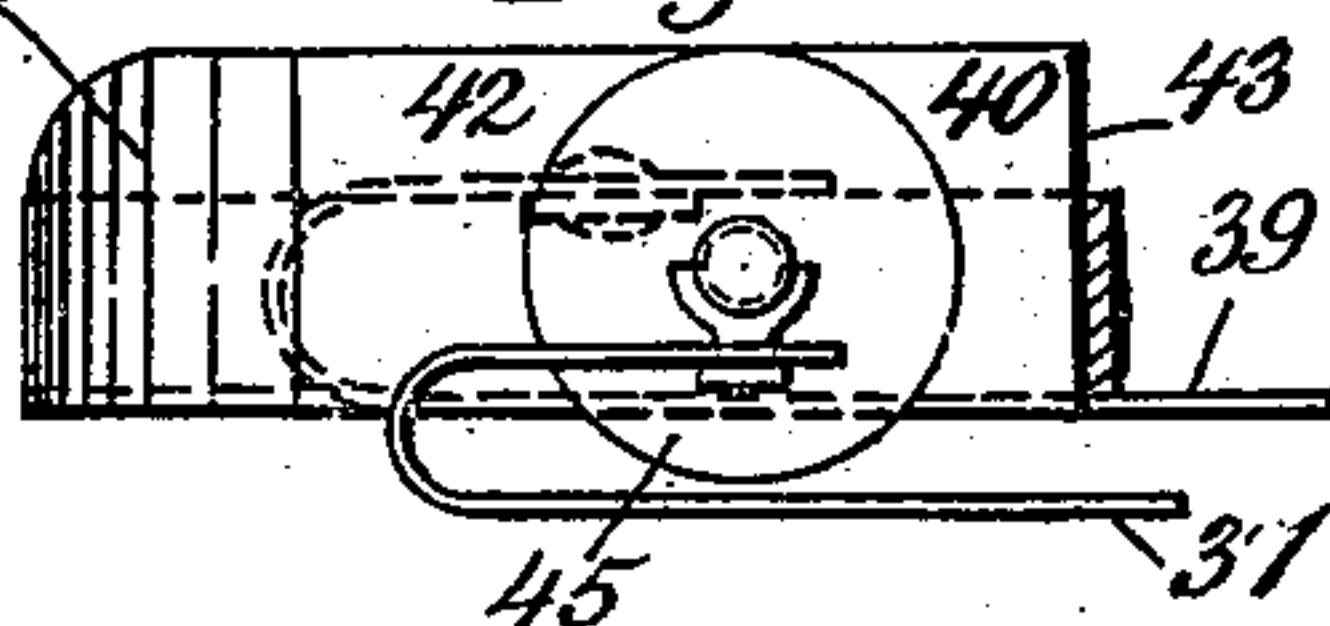


Fig. 9.



Witnesses:

James W. Linn.
A. R. Lyman

Inventor:

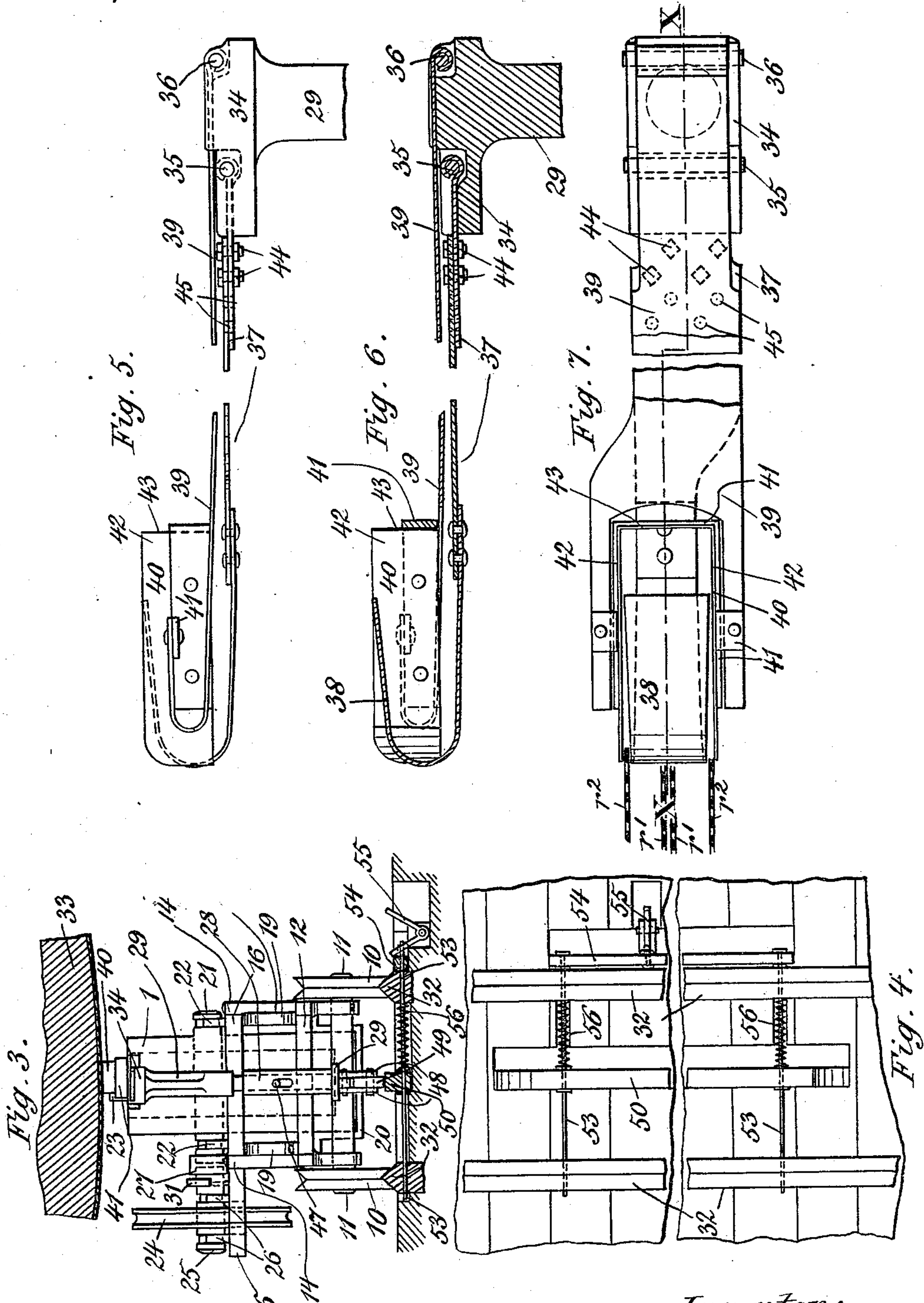
William Shaw
by C. L. Horace
his Attorney.

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APPARATUS FOR PRINTING CARPET YARN.

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Patented Feb. 6, 1894.



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UNITED STATES PATENT OFFICE.

WILLIAM SHAW, OF BROOKLYN, NEW YORK.

APPARATUS FOR PRINTING CARPET-YARN.

SPECIFICATION forming part of Letters Patent No. 514,282, dated February 6, 1894.

Application filed August 16, 1893. Serial No. 483,274. (No model.)

To all whom it may concern:

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

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

The purposes of my invention are to provide simple and efficient means for distributing the coloring matter evenly over and through the yarn and in doing so to not only move or spread the coloring matter along the layer of yarn as usually wound on the yarn-drum, but to also in addition and almost simultaneously slightly turn or revolve the parts of the yarn then under treatment so as to expose other parts of its fiber, which would otherwise not have come in direct contact with the spreading tool, to such contact.

Further purposes of my invention are to provide when equalizing or spreading devices are placed in front as well as in the rear of the distributing wheel (which is the customary arrangement), reliable means for putting and holding such of said devices as temporarily precede the distributing wheel out of contact with the yarn, to cause such spreading devices, where streaks of the same shade of coloring matter are placed side by side, to pass over each of said streaks twice in succession and in opposite directions, and to also make provision, in case an isolated streak of a certain shade of coloring matter be applied to the yarn to leave the same untouched by any spreading devices, as is the common custom at present.

The apparatus employed by one in its general features, particularly as far as the color carriage and the main distributing wheel mounted thereon and the box containing the coloring matter resting thereon, correspond with appliances very generally used heretofore in this line of manufacturing and also described and illustrated in my United States Patent No. 446,299, dated February 10, 1891, and the equalizing and spreading devices employed by me and the means for

placing the same into and out of their operative positions are principally variations and modifications of and additions to devices illustrated and described in my United States Letters Patent No. 510,939, dated December 19, 1893.

In the accompanying drawings forming part of this specification, I show an apparatus embodying my improvements, Figure 1 representing a side elevation partly in section; Fig. 2 a ground plan, and Fig. 3 an end view of the same. Fig. 4 shows a ground plan of a rail intended to serve as a support for the posts carrying the equalizing or spreading appliances and of the means employed for temporarily removing such rail from its operative position. Fig. 5 shows a side elevation; Fig. 6 a longitudinal section, and Fig. 7 a ground plan of the equalizing and spreading appliances and their connections with the supporting posts. Fig. 8 shows a ground plan of a modified form of a spreading device and an equalizer and Fig. 9 a section along line Z Z in Fig. 8. Figs. 5 to 9 inclusive, are drawn on an enlarged scale.

Corresponding figures and letters throughout the various views refer to corresponding parts.

1 is the box containing the liquid coloring matter.

8, 8 are a set of wheels fastened to an axle 9, and 10, 10 another set fastened to an axle 11.

12 is the main body of the carriage its under side being forked where it engages with axles 9 and 11. An abutment 13 at the end of body 12 is provided with two lugs 14, 14, while at the opposite end of said main body a vertical pin 15 is provided.

16 is the lid hinged at one end to lugs 14, 14 by set-screws 17, 17 provided with suitable lock nuts its opposite end being made to loosely surround the upper end of pin 15. On each side of the carriage a spring as 19 is fastened to frame 12; so as to support lid 16 and force it upward. Metallic straps 20, 20 are suspended from frame 12 for the purpose of supporting collar box 1, which is inserted in proper openings in frame 12 and lid 16.

21 is an axle with bearings 22, 22 on lid 16. On said axle is mounted the main distributing wheel 23, so as to place the same within

the color box, the central sections of the walls of such box being cut out and bearings 22, 22, being made open on top, thus permitting of lifting axle 21 and with it color wheel 23 out of such box, when desired.

24 is a grooved pulley fastened to an axle 25 which rests in open bearings 26, 26. Said axle is placed in line with axle 21, a sleeve coupling 27 serving to normally connect said two axles in the usual manner when required.

31 is a catch hinged to lid 16 so as to keep sleeve 27 in position after the coupling has been effected.

28, 28 are castings attached to carriage-body 12 and containing vertical bearings for posts 29, 29 adjusted to slide therein. To such castings there are fastened hooks 30, 30 to which ropes are attached, by means of which the carriage and the printing apparatus supported by it are moved along rails 32, 32 parallel with drum 33, upon which drum the endless thread of carpet yarn indicated by Y in Fig 1 is wound in a continuous uniform layer.

While the main distributing wheel is thus being moved along said drum, it will be held in contact with the yarn by the springs 19 forcing upward lid 16 and with it bearings 22, 22, and the friction so produced between such wheel and such yarn will keep the former revolving while such contact and such movement of the carriage continues, and will cause said wheel thereby to bring up from the bottom of box 1 the coloring matter in which it is to be immersed which is to be applied to the yarn. It is however, necessary to provide means for revolving distributing wheel 23 while it is traveling toward said drum and before it comes in contact with the yarn, so as to have that part of its periphery which at first comes in such contact fully supplied with coloring matter, and this is accomplished by revolving it by means of pulley 24 and axles 25 and 21 coupled together, pulley 24 being revolved by a cord in the usual manner until the coloring wheel comes in contact with the yarn and after it passes from under the drum. The effect of drawing the coloring wheel along the yarn as described will be the production of a "streak" of coloring matter on the yarn about three-eighths of an inch wide and slightly exceeding in width the face of such wheel. Owing to the pressure applied to the distributing wheel by springs 19, the greater part of such coloring matter thus deposited on the yarn will be forced outward by such wheel so as to form two ridges directly adjoining the path of such face of the wheel, while the space between such ridges will be covered by coloring matter, but not as heavily.

Heretofore appliances substantially as described above have been employed. The coloring wheel having traveled once along the drum, the latter was revolved around its axis sufficiently to bring another part of the yarn

which was to receive the same shade in the path of such coloring wheel and after thus all the streaks of the same color and shade required had been made, the color box and coloring wheel were lifted off from the carriage and a different set of them for applying a different color or shade of color were applied. Finally after the entire surface of the yarn had thus been coated, operatives using elastic hand scrapers would force the coloring matter forming the ridges above referred to into the intervening spaces, thus equalizing as far as practicable the distribution of the coloring matter and removing any excess of the same. As this scraping of the yarn under the circumstances, would necessarily take place some time after the application of the coloring matter thereto, such coloring matter would owing to capillary attraction, have in a measure soaked into the yarn and the scraping by hand would be only an auxiliary final step toward printing the yarn in a uniform manner.

It has been the practice heretofore where an isolated streak of a certain color only was applied (the streaks next adjoining being of a different shade or color) to leave such a streak unscraped and to depend upon the scouring process, to which the printed yarn is always subjected after being removed from the drum, to equalize the coloring matter therein, a single streak being so narrow as to make any inequalities in the coloring matter applied thereto inappreciable in the finished fabric. The hand scrapers heretofore employed have been of about double the width of a single streak, the operator in one stroke covering the coloring matter on two adjoining streaks scraping first in one and then in the opposite direction thereby giving a rolling motion to the yarn. My improvements contemplate the same procedure so as to subject adjoining streaks of the same shade twice to the action of the equalizing appliances, except the two extreme outer streaks which are treated only once.

I accomplish these results by means of the following appliances: 34, 34 are platforms in which the upper parts of posts 29, 29 terminate. 35 and 36 are axles secured in bearings on the upper sides of such platforms. To the inner axles 35, 35 there are attached leaf springs 37, 37 extending inward toward the distributing wheels, each carrying near its inner and free end a suitable spreading device. 38 is such a spreader forming substantially an extension of said leaf spring and curved and turned upward in such a manner that when said spring is folded downward so as to make its hinged end rest on top of platform 34, the upper end of said extension will assume a position close to the yarn on the drum and slightly sloping downward from said yarn toward the distributing wheel, the upward pressure of the leaf spring being sufficient to at all times enforce contact between the highest and outer edge of such spreader

and the yarn, after the color carriage has been pushed under the drum. Prior to this, the sending of the spring will be to raise said edge higher than the lowest side of the drum which might cause such edge to catch the yarn at the end of the drum and to damage it or to catch onto the end of the sheet of oil cloth which is generally placed between the body of the drum and the yarn but on account of the slope given to the upper surface of the spreader, as the latter approaches the end of the yarn drum prior to being drawn underneath the same a more depressed and smooth part of its surface will first engage with such yarn and as the spreader is gradually drawn entirely under the drum such difficulties as mentioned above will be avoided. The outer axles 36, 36 also carry leaf-springs, indicated by 39, each of which likewise extends toward the distributing wheel and has mounted near its inner end an equalizer 40, consisting of a thin blade, the upper edge of which is held against the yarn by the spring in a position parallel with the drum. Such equalizer is shown, particularly in Figs. 5 to 9, inclusive, to be connected with the leaf spring by means of an angle piece 41, riveted both to said spring and the equalizer. The latter consists of two arms 42, 42 running parallel with a streak on the yarn and a heel or cross connecting piece 43, joining both such arms at substantially right angles. The clear width of the equalizer between its arms slightly exceeds the aggregate width of two adjoining streaks and its position is so adjusted that when it is folded downward into its operative position, such arms will be placed outside of and close to the outer edges of a double streak. The ends of arms 42 nearest the distributing wheel are rounded on their upper sides, so as not to catch with the yarn or oil cloth at the end of the drum, as mentioned above with reference to the spreaders. The width of the operative edge of spreader 38 is slightly less than the aggregate width of two adjoining streaks and the relative positions of a spreader and an equalizer attached to the same platform are such that when both of them are folded downward into their operative positions the spreader will be placed between, and equidistant from the longitudinal arms of the equalizer, a small space being left on each side between the operative surfaces or edges of the spreader and the arms of the equalizer and a space being also left between such surface of the spreader and the upper edge of the cross connecting piece of the equalizer. I prefer to make the spring supporting the spreader stiffer than that supporting the equalizer.

The operation of the spreader and equalizer while moving along the yarn is as follows: The upper edge of the spreader will engage with yarn extending over the inner space of and covering nearly the full width of two adjoining streaks; in doing so it will cover the two inner adjoining ridges $r' r'$ (see

Fig. 7,) of said streaks and will extend nearly to their two outer ridges r^2, r^2 . Owing to the pressure exerted by it, it will force the coloring matter composing such inner ridges into the yarn as well as laterally over the spaces immediately adjoining the same, producing thereby an approximately uniform distribution of coloring matter on the surfaces over which it passes. At the same time the arms of the equalizer will prevent any coloring matter from being crowded laterally beyond the original width of the two streaks and the cross connection between said arms, where it follows directly in line with the spreader will further equalize the coloring matter which has already been passed over by the same and will remove and drain downward any surplus of it that may still adhere there to the yarn, while the parts of such cross piece directly adjoining the arms will pass over the coloring matter forming the outer ridges and will force the same into the yarn and laterally over the spaces not covered by the spreader removing and draining downward at the same time any excess of coloring matter in such outer streaks. It will be seen that the parts of the heel of the equalizer nearest to and adjoining the arms, are of particular importance, while the intermediate connection might be omitted, in case the spreader performs its function perfectly. In order to give the cross connecting piece of the equalizer an opportunity to act properly a space must be left between it and the operative surface of the spreader. How large such space should be made will depend upon attending circumstances and particularly also upon the thickness of the coloring matter used. For the purpose of regulating such space at will I construct the shank carrying the equalizer in sections secured together by screws 44, 44 and provide a series of holes 45, 45 in the adjoining parts of such sections, whereby such sections may be attached to each other so as to lengthen or shorten the shank, and with it the distance between the spreader and the heel of the equalizer. The spreader while moving along the yarn has a tendency to roll or revolve the yarn around its own axis which further favors the uniform distribution of the coloring matter; an undue movement of the yarn along the drum which might be caused thereby is prevented owing to the simultaneous contact with the yarn of arms 42, 42 held against it under spring pressure.

While I have found in practice that an equalizer in which a straight cross connecting piece joins the arms substantially at right angles gives the best results, I do not propose to confine myself to this particular form. Instead of leaf springs actuating the spreaders and the equalizers any other suitable form of springs or other means might be employed for the purpose of enforcing operative contact between them and the yarn. The edges of the equalizer should be made thin (say of 28 standard gage) in order to ob-

tain the best results and to prevent the coloring matter from lodging on said edges.

In Figs. 8 and 9 a roller 45 is shown substituted for the sliding spreader illustrated in Figs. 5, 6 and 7. The same is journaled in proper bearings attached to leaf spring 37. There are also indicated in said figures, wings 46, 46 attached to the free ends of arms 42, 42 and made flaring inwardly toward roller 45. They are to be employed principally when a distributing wheel of double the ordinary width and producing a streak about one and one-half inches wide having only two ridges along its outer edges, is to be used and they serve to guide inwardly and into the path of roller 45 part of the coloring matter forming such ridges.

The equalizer and the spreader traveling ahead of the distributing wheel should be kept from contact with the yarn and for such purpose the supports 29, 29 are adjusted to slide within bearings 28, 28 as mentioned above.

47, 47 are pins attached to supports 29 and adjusted to move within proper slots in bearings 28, 28, so as to prevent the turning of such supports within such bearings.

48, 48 are joints hinged to proper lugs at the lower extremities of supports 29, 29 with rollers 49, 49 journaled thereto in such a manner, that such rollers will ride on a rail 50 placed underneath drum 33, and that lever 51 forming part of such joint will be compelled to assume a vertical position underneath the support 29 which follows after the distributing wheel, thereby bringing the appliances supported by it in operative contact with the yarn on the drum, as shown on the left hand side of Fig. 1, while the same left hand lever 51 when passing underneath the drum on its return trip and moving ahead of the distributing wheel on rail 50 will assume the inclined position similar to that shown on the right hand side of Fig. 1, its inclination however being in the opposite direction. 52 is a connecting rod hinged to the journals of both rollers 49, 49 and made of such length that when the levers 51, 51 attached to one of the rollers are in a vertical position, those of the other roller are forced into an inclined position and thereby draw downward the post 29 to which they are attached, withdrawing at the same time the spreader and the equalizer supported by such post from contact with the yarn.

The equalizers and spreaders in front of the wheel are placed in line with those in the rear of the wheel, so as to cover not only the streak which is just being made by such wheel, but also the adjoining one previously made. Assuming adjoining streaks of the same color to be indicated in their order by A, B, C, D, &c., when the first streak A is being applied to the yarn the equalizers and spreaders at both ends of the wheel will be kept out of action in a manner described hereinafter. While the distributing wheel is making streak B and moving in the direction indicated by the ar-

row in Fig. 1 the left hand post 29 will be elevated and its spreader and equalizer will pass over the streaks A and B jointly; when streak C is being made on the return trip of the wheel the right hand post will be elevated and its equalizer and spreader will pass over streaks B and C, and thus successively all the streaks of the same series except the two outer ones will be subjected to the action of each of the two equalizers and the two spreaders and in opposite directions.

For the purpose of throwing both spreaders and both equalizers out of action while an isolated streak, or the first streak of a series is being made I use the following appliances: Rail 50 is capable of sliding laterally within a depression in the floor. Cross rods 53, 53 are secured to it and made to pass through rails 32, 32 which rails serve to guide such rods. Their right hand ends are attached to a beam 54 likewise capable of lateral movement within a depression in the floor, a bell crank lever 55 being so attached to a projection on said beam that when the operator desires to move rail 50 from underneath both rollers 49 and to thereby cause both equalizers and both spreaders to keep clear of the yarn on the drum, he has only to depress with his foot the free outer end of such lever. After the distributing wheel has made the streak, the operator only removes his foot from the lever and springs 56, 56 interposed between rail 50 and one of the rails 32 and placed around rods 53 will force the center rail back into its normal position.

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

1. In an apparatus for printing carpet yarns in combination with the drum carrying the yarn, a distributing wheel and an equalizer adjusted to follow in the path of such wheel and constructed as a blade having two arms with substantially vertical inner surfaces, and a cross connecting piece joined to such arms by angular connections, such angles being substantially right angles, all as set forth.

2. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, an equalizer constructed as a blade having two arms and a suitable cross-connection and a spreader placed between the distributing wheel and the cross-connection, substantially as set forth.

3. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, an equalizer constructed as a blade having two arms and a suitable cross-connection, and a spreader placed between the distributing wheel and the cross-connection and having a surface facing the yarn on the drum sloping downward from it toward the distributing wheel, substantially as set forth.

4. In an apparatus for printing carpet yarn in combination with the drum carrying the yarn, a distributing wheel, an equalizer constructed as a blade having two arms substan-

tially parallel with and outside of the outer edges of a streak of coloring matter on the yarn, and a spreader placed between such arms, its operative surface being narrower than the space between the parts of the arms facing such operative surface, substantially as set forth.

5. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, a spreader adjusted to follow in the path of such wheel and movable bars with thin edges held in contact with the yarn and having their inner surfaces facing such spreader, substantially as set forth.

6. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn a distributing wheel, a spreader adjusted to follow in its path and movable bars with thin edges extending along the path of such spreader their ends being deflected toward each other, substantially as set forth.

7. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, an equalizer adjusted to follow in the path of such wheel constructed as a two armed blade and held in contact with the yarn by spring power and a spreader placed between the distributing wheel and the equalizer and having its operative surface held against the yarn by spring power exceeding that exerted upon the equalizer, substantially as set forth.

8. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, an equalizer adjusted to follow in the path of such wheel and hinged to a suitable support and a spreader secured to such support by an independent hinge, substantially as set forth.

9. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, an equalizer constructed as a blade having two arms with suitable cross-connection, and a spreader, and means for varying the relative distance between the spreader and said cross-connection, substantially as set forth.

10. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel and two spreaders, one placed in front and the other in the rear of such wheel, each made of a width approximately double that of the operative surface of such wheel, the spreaders being adjusted in line with each other and their edges on one side of the central longitudinal plane of the wheel being approximately in line with an outer operative edge of the distributing

wheel, and means for raising and lowering such spreaders, substantially as set forth.

11. In an apparatus for printing carpet yarns in combination with the drum carrying the yarn, a distributing wheel and two equalizers constructed as two armed blades with proper cross-connections, one placed in front and one in the rear of such wheel, each made of a width slightly exceeding the combined width of two adjoining streaks said equalizers being adjusted in line with each other and their edges on one side of the central longitudinal plane of the wheel being approximately in line with an outer operative edge of the distributing wheel, and means for raising and lowering such equalizers, substantially as set forth.

12. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel and a device for equalizing the coloring matter on the yarn mounted on an adjustable support, a guide for conducting such support vertically, a rail on which such support rides and means for displacing such rail laterally, substantially as set forth.

13. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel and a device for equalizing the coloring matter on the yarn mounted on an adjustable support, a guide for conducting such support vertically, a rail on which such support rides, means for drawing such rail sidewise, and a spring for afterward returning it to its position, substantially as set forth.

14. In an apparatus for printing carpet yarns, in combination with the drum carrying the yarn, a distributing wheel, and two devices, one forward and one backward of such wheel for equalizing the coloring matter on the yarn each mounted on a sliding support guides for conducting such supports vertically, a rail on which such supports ride, arms hinged to the lower ends of the supports and adjusted to tilt in opposite directions and a connecting rod attached to the lower parts of such arms, whereby when one arm is held in an elevated position the other arm is forced into an inclined position, 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 10th day of August, 1893.

WILLIAM SHAW.

Witnesses:

CHAS. L. HORACK,
JAMES McLAIN.