

(No Model.)

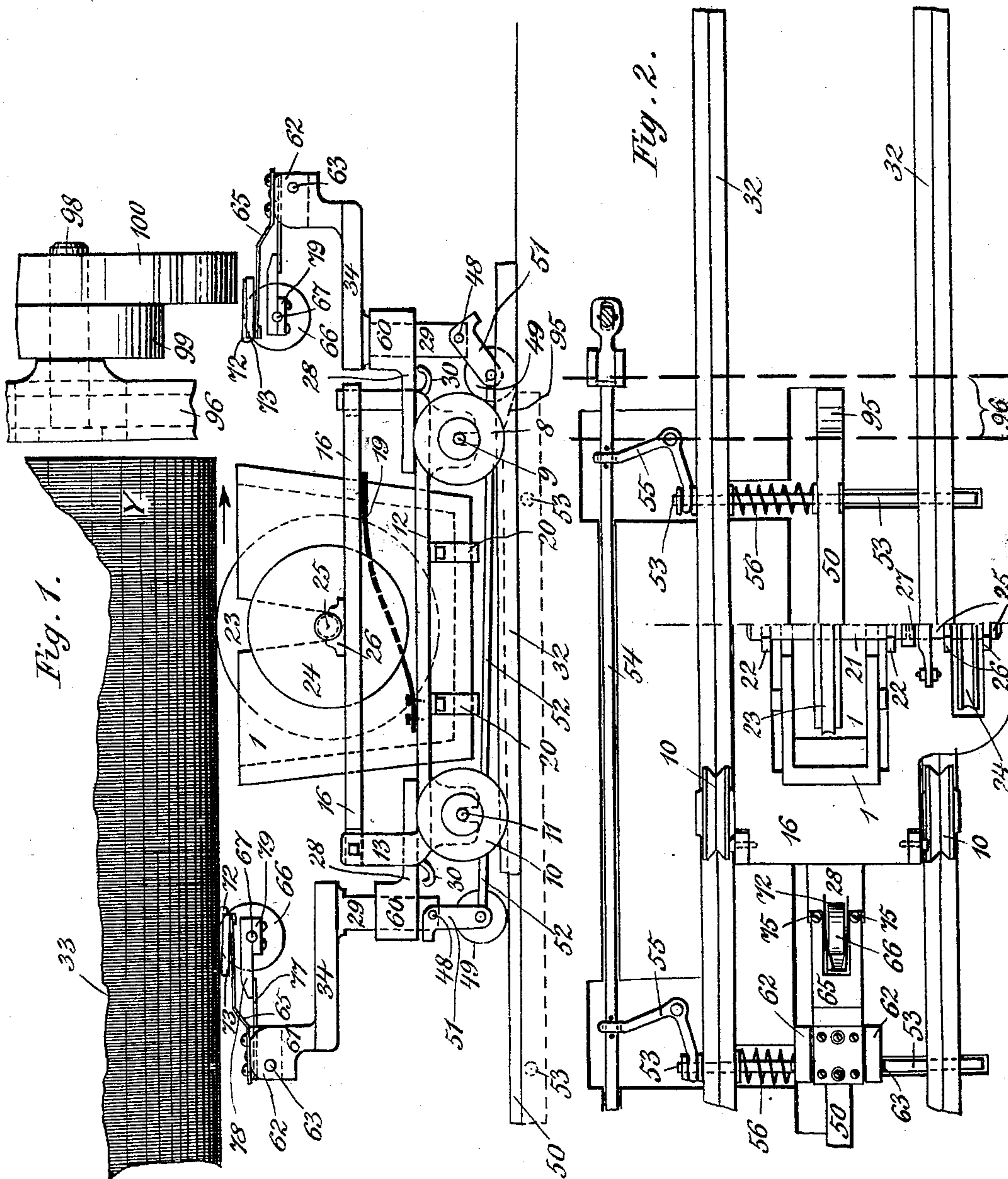
3 Sheets—Sheet 1.

W. SHAW.

APPARATUS FOR PRINTING CARPET YARNS.

No. 543,510.

Patented July 30, 1895.



Witnesses:
James McLain
Geo. H. Farness

Inventor:
William Shaw
By Chas. L. Horack
his Attorney.

(No Model.)

3 Sheets—Sheet 2.

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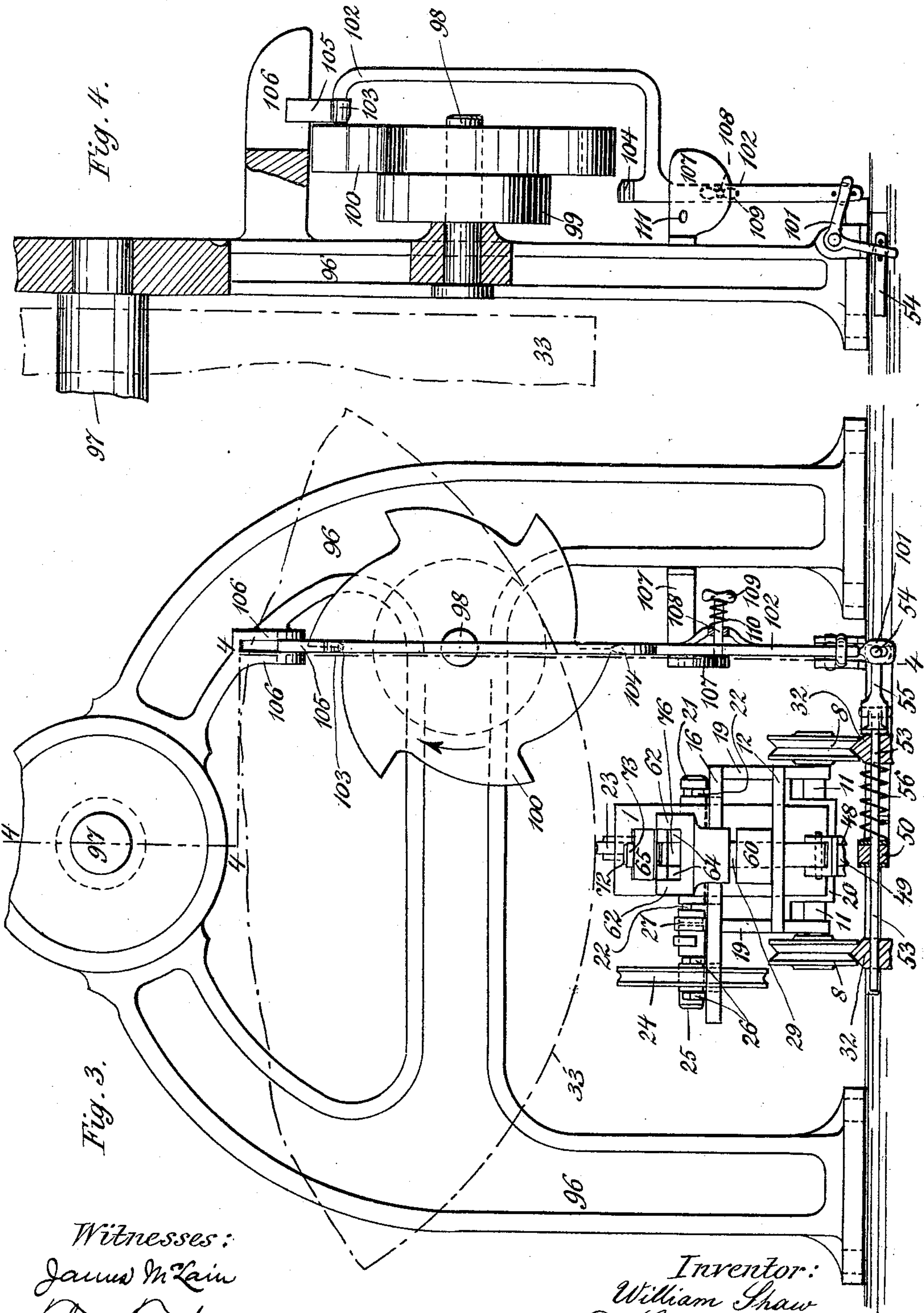


Fig. 3.

Fig. 4.

Witnesses:
James McLain

Chas. F. Yarness

Inventor:
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By Chas. L. Horack
his Attorney.

(No Model.)

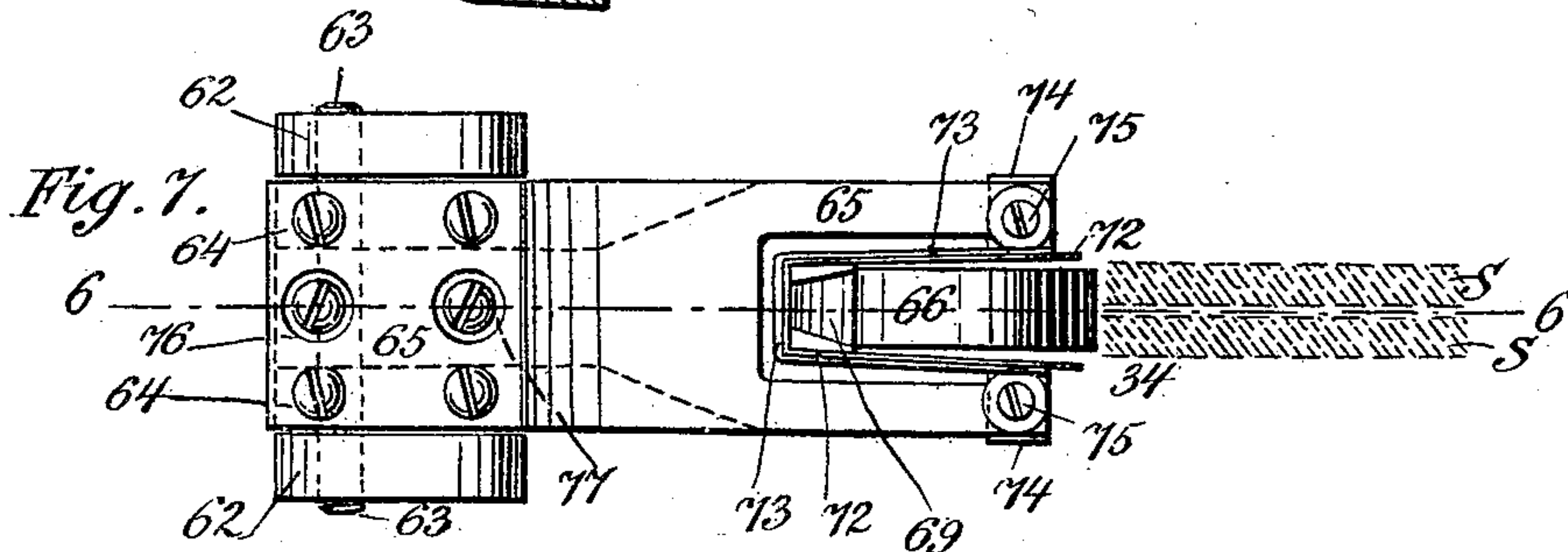
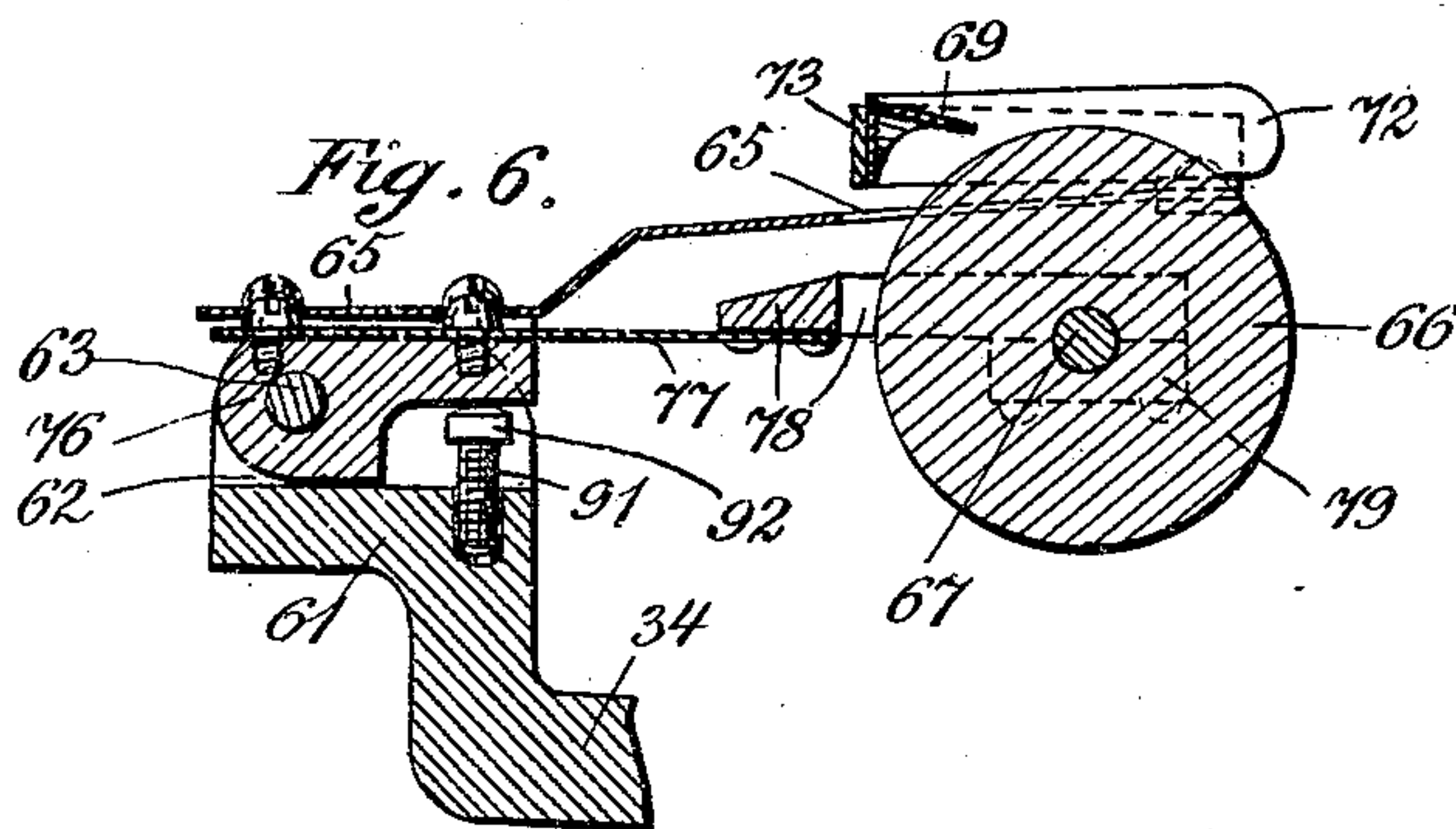
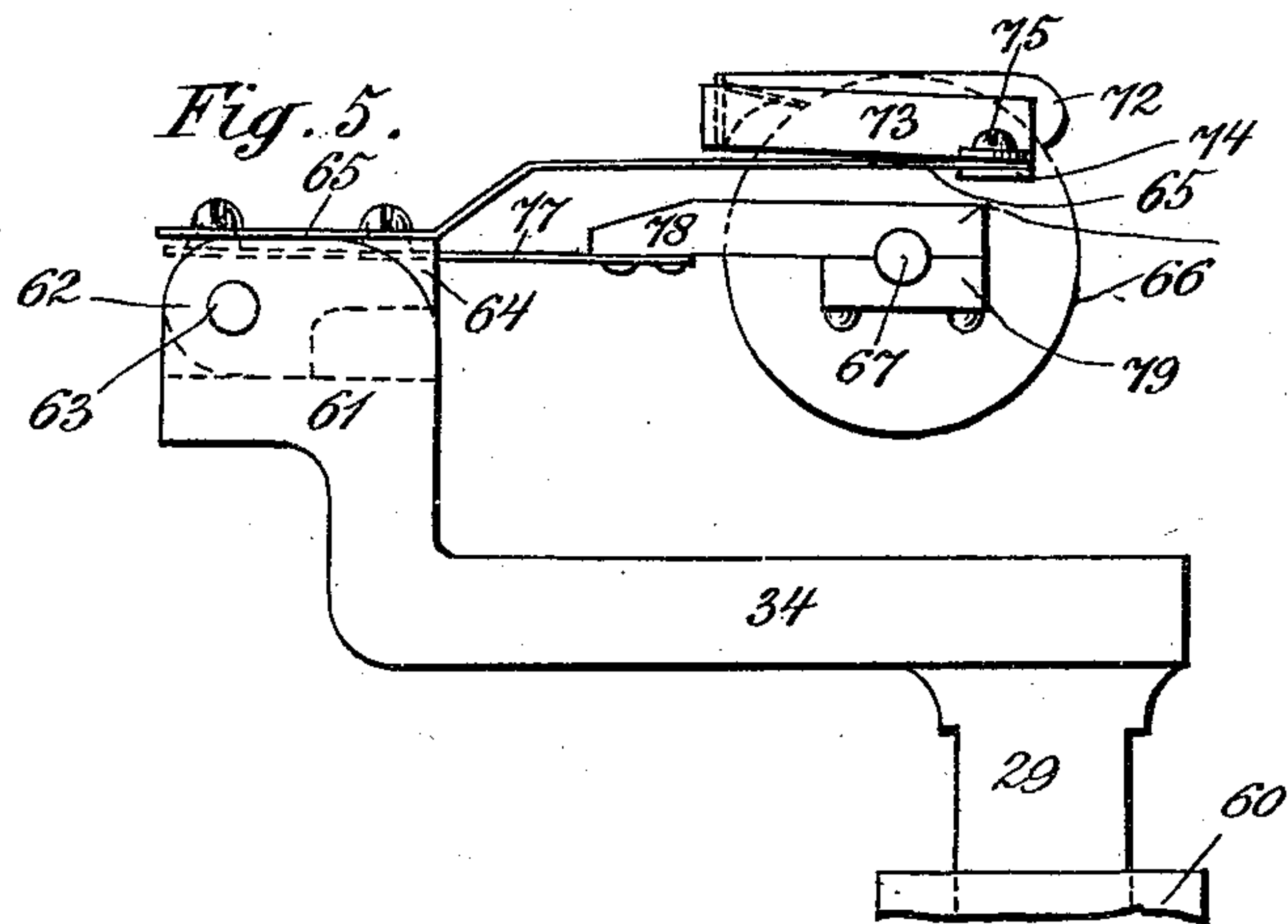
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UNITED STATES PATENT OFFICE.

WILLIAM SHAW, OF BROOKLYN, NEW YORK.

APPARATUS FOR PRINTING CARPET-YARNS.

SPECIFICATION forming part of Letters Patent No. 543,510, dated July 30, 1895.

Application filed August 27, 1894. Serial No. 521,409. (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, in the county of Kings and 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 more particularly in the manufacture of tapestry and velvet carpets.

The principal purpose of my invention is to provide simple mechanical means for efficiently distributing coloring-matter over and through the yarn, so that after the same shall have been treated by my improved appliances and shall afterward have been subjected to the usual steaming and washing process such yarn shall show uniform shades throughout, so as to equal or excel work done in the most careful manner with hand-scrapers.

Further purposes of my invention are to provide suitable means for cleaning a pressure-roller used in forcing the coloring-matter into the yarn; also, to 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.

In carrying out my invention I employ an apparatus of the general outline and construction shown in my United States Patent—an apparatus for printing carpet-yarn—No. 514,282, dated February 6, 1894, particularly as far as the color-carriage, the main distributing wheel, and the movable supports are concerned, which carry the appliances for equalizing the color on the yarn, the changes, improvements, and additions covered by my present invention being specified hereinafter, and set forth more particularly in the claims.

In the accompanying drawings, forming part of this specification, I illustrate an apparatus embodying my improvements.

Figure 1 represents a side elevation of a color-carriage provided with my improved appliances, the color-carriage being represented as traveling in the direction of the arrow toward the right, the rubbing and equalizing appliances in the rear of the distributing-wheel being still in operative contact with the

yarn, those in front of such wheel appearing in their lowered position. Fig. 2 shows on the left-hand side a ground plan of the color-carriage and of the appliances mounted thereon, and on its right side a ground plan of the track on which the color-carriage is made to ride, and of a center-rail which serves as a support for the posts carrying the equalizing or spreading appliances, and of means employed for temporarily removing such rail from its operative position. Fig. 3 shows an end elevation of these devices in combination with the main frame supporting the yarn-drum and of a color-carriage. Fig. 4 shows a vertical section along line 4 4 in Fig. 3. Fig. 5 is a side elevation of my improved rubbing and equalizing apparatus while in operative position and condition; and Fig. 6, a vertical longitudinal section of the same, but while in their lowered and inoperative condition and position, such section being laid along line 6 6 in Fig. 7, which latter figure represents a ground plan of Fig. 5. Figs. 5, 6, and 7 are drawn on an enlarged scale.

Corresponding reference numbers and letters throughout the different views refer to corresponding parts.

1 is the color-box for feeding the main distributing-wheel with liquid coloring-matter.

8 8 and 10 10 are wheels attached to axles 9 and 11, respectively. The main body 12 of the color-carriage engages with such axles in the usual way.

16 is the upper lid pivoted to abutment 13 at one end and receiving yielding or elastic upward pressure through two leaf-springs 19, attached to main carriage-body 12, one on each side. Color-box 1 is seated within proper openings in lid 16 and main body 12, and rests on straps 20 attached to the latter. Main distributing-wheel 23 is mounted on an axle 21 resting in open bearings 22 on lid 16, so as to be capable of revolving within color-box 1 and to be removed from the color-carriage, together with its axle, when the color-box is lifted from the same.

24 is a grooved pulley mounted on an axle 25, which latter rests in open bearings 26 26, and is placed in line with the main axle of the distributing-wheel and normally connected therewith by a suitable sleeve-coupling 27 in the usual manner.

30 30 are hooks fastened to the carriage-body to which the ends of a continuous rope are attached for the purpose of thereby drawing the color-carriage and the equalizing and spreading and rubbing devices supported thereby forward and backward along rails 32 32 and parallel with drum 33, which latter carries the carpet-yarn Y, which is to be printed and which is wound around said drum in a continuous uniform layer in a manner indicated particularly in Fig. 1. Said continuous rope runs around suitable pulleys placed near both ends of the track, and one of said pulleys usually receives its revolving motion from a gear-wheel or pulley driven from some main shaft and attached to the main frame on which the drum is mounted. 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 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.

With my improvement I likewise treat two adjoining streaks of the same color and shade at a time and omit to equalize by mechanical appliances the coloring-matter in single streaks, throwing in the latter case such appliances in front as well as in the rear of the distributing-wheel temporarily out of operation. The means for accomplishing this are illustrated more particularly in Figs. 3 and 4 and are described hereinafter.

28 28 are brackets having their horizontal arms fastened to the upper face of main carriage-body 12 and extending beyond the same, so as to bring their vertical arms in front and in the rear of the color-carriage. These vertical arms (indicated by 60) form bearings, within which posts 29, made of rectangular cross-sections, are made to slide. From the upper ends of these posts extend horizontally platforms 34, having at their outer ends brackets 61, provided with outer lugs 62, between which extend an axle or pivot 63, carrying two swinging lugs 64, adjoining said stationary lugs 62. To the upper surfaces of lugs 64 there is attached the rear end of a leaf-spring 65, which spring is made to extend over platform 34 and is made forking near its free end and toward the distributing-wheel, and on the inner free end and over the space between its forking arms there is mounted an equalizer 72 of a substantially U-shaped ground plan and secured to an outer shoe 73, the lateral lugs 74 of which are secured to spring 65 by screws 75. Between lugs 64 64 a central lug 76 is pivotally secured to the same axle 63. The

upper surface of this lug is approximately parallel with but lower than those of lugs 64, and from said surface there extends a leaf-spring 77 in the same direction as and underneath leaf-spring 65. Leaf-spring 77 is shorter and stiffer than spring 65 and has its inner end attached to a forked block 78, which, together with blocks 79, secured thereto, forms the bearings of an axle 67, carrying a pressure-roller 66, made of wood, rubber, brass, or similar material. It is the function of this roller to follow in the path of the distributing-wheel, so as to force the coloring-matter deposited by the latter into the yarn. Said roller is so located as to be placed between the arms of equalizer 72 and equidistant therefrom, such arms being made of thin sheet metal placed vertically and extending along and close to the outer edges of two adjoining streaks of coloring-matter on the yarn, and the width of the roller being made approximately equal to but slightly less than the width of such two combined streaks. The arms of the equalizer extending toward the distributing-wheel, while being placed approximately parallel with, outside of, and close to the outer edges of two adjoining streaks of coloring-matter, are made slightly slanting outward, so as to very gradually collect and force inward any coloring-matter that may have accidentally spread beyond the normal alignment of the streak.

The upper edge of the equalizer, before it passes underneath the yarn-drum, will be held slightly above the upper surface of roller 66 by the action of spring 65; but as its forward ends are rounding and said spring is made of slight stiffness such upper edge will gradually be forced underneath the end of the drum while first coming in contact with the same, and will then be and remain in contact with the yarn thereon, and will then have the same elevation as the upper surface of roller 66. As these appliances are drawn along the yarn part of the coloring-matter with which they come in contact will adhere to the surface of the roller, and for the purpose of re-applying the same to the yarn I provide a tongue or slope 69 in the rear of said roller and attached to equalizer 72 and adjust the same so that while the roller is in operative contact with the yarn the forward and lower end of such slope will be in contact with the periphery of the roller and will pick up the bulk of the coloring-matter adhering to it and will carry the same upward toward its rear end, which latter is joined to the heel of equalizer 72 slightly below its upper edge, and which, being held against the yarn by spring 65, forces such coloring-matter into the yarn while gliding over the same, thus completing the operation as far as such set of appliances following the distributing-wheel is concerned.

In Fig. 7 the two streaks to be acted upon simultaneously by the aforesaid appliances are indicated by S S.

91 is a screw let into bracket 61, with its

head 92 so resting against the under side of swinging lug 76 that thereby leaf-spring 77 may be either forced upward or allowed to assume a lower position, and the pressure of roller 66 against the yarn may be increased or decreased accordingly. It will be seen that outer swinging lugs 64 64, and through the same leaf-spring 77 which carries equalizing-rubber 72, might be combined with such set-screws for like purposes in a corresponding manner. I have found from practical experience that it is of vital importance to be able to so adjust the upward pressure, particularly of said roller and also of said rubber, as to adapt them to do their work properly, as the more or less fluid condition of the coloring-matter employed calls for varying degrees of pressures on said devices.

The roller and the equalizing-rubber traveling ahead of the distributing-wheel are held from contact, and those traveling in the rear of said wheel are held in contact with the yarn by means of the following appliances, which are connected with the vertically-sliding supports 29 29.

48 48 are pins or pivots extending outward from the lower extremities of posts 29, to which are hinged levers 51, carrying at their lower ends 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 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 roller and equalizing-spreader supported by such post from contact with the yarn.

The right-hand lever 51, in Fig. 1, with its roller are shown to have passed down an inclined plane 95 which terminates rail 50. Before reaching such incline the position of said lever while of the same general direction will be almost level. Such an incline 95 is provided at each end of rail 50 and near the end of drum 33 for the purpose of thereby gradually elevating the post 29 following after the color-wheel and the appliances supported by it for the purpose of bringing the latter in operative contact with the yarn.

The rollers and equalizing-rubbers in front

and in the rear of the distributing-wheel are placed in line with each other for the same reasons which govern like locations of spreaders and equalizers shown in aforesaid Letters Patent No. 514,282.

For the purpose of throwing the rollers and equalizing-rubbers in front as well as in the rear of the distributing-wheel out of action while an isolated streak or the first streak of a series is being made, I employ the following appliances:

Rail 50 is capable of sliding laterally within a depression in the floor. Cross-rods 53 53, secured to it, are made to pass through and thus to be guided by rails 32 32.

54 is a bar placed parallel with rail 50 in a depression in the floor and is made capable of longitudinal movement, and 55 55 are bell-crank levers having their ends so connected to said bar 54 and to the ends of rods 53 that longitudinal movement of the former will compel lateral movement of rail 50 toward said bar.

56 56 are springs interposed between rail 50 and one of the rails 32 and so coiled around rods 53 that when bar 54 is allowed to assume its original position (indicated in Fig. 2) said springs will force back rail 50 into its normal position.

In Figs. 3 and 4 I show more particularly the preferred means which I employ for giving to bar 54 the longitudinal movement above referred to.

96 is the vertical supporting-frame to which one end of drum 33 (shown in broken lines in said figures) is attached in the usual manner by a series of horizontal connections (not shown in the drawings) and which also carries the main shaft 97 of said drum. Said frame also supports a pivot 98 on which a suitable pulley 99 is mounted, and also a cam-wheel 100, which is attached to and moves with said pulley in the direction indicated by the arrow in Fig. 3.

101 is a vertical bell-crank lever at the end of bar 54, and 102 an actuating-bar, having an upper shoe 103 capable of co-operating with the cams on the upper side of cam-wheel 100, and also a lower shoe 104 capable of co-operating with the cams on the lower side of said wheel. The configuration of bar 102, as shown in Fig. 4, is such that by throwing or swinging the same to the left the lower edge of upper shoe 103 will, as cam-wheel 100 revolves, be brought in contact with the lowest part of the surface of the cam which is then approaching it on the upper part of such wheel and engaging with it will be carried upward along and by the cam-surface, thus raising up the horizontal arm of bell-crank lever 101, thereby removing rail 50 laterally from its normal position, as heretofore mentioned. When it is desired to move such rail back into its normal position, actuating-bar 102 will have to be swung from the position last described into the opposite position. This will bring the upper edge of shoe 104 in

contact with that part of the surface of one of the lower cams which is nearest to the axle of the cam-wheel, and such shoe will thereby be caused to slide outward along the cam-surface, carrying down the horizontal part of bell-crank lever 101, and through the instrumentality of the connecting parts will, so aided by springs 56, move rail 50 back into its normal position.

105 is a tongue extending upward from shoe 103 and adjusted to move between two cheeks 106 106 provided on frame 96. The tongue, and through it bar 102, is guided between said cheeks so as to maintain the same in a vertical plane and prevent one of the shoes from adhering to one of the cam-surfaces and being carried around thereby as cam-wheel 100 revolves. The parts of shoes 103 and 104 which first engage with the cams are made slightly sloping so as to facilitate their taking hold of said cams. In order to counteract the tendency of springs 56 to bring rail 50 back into its normal position before the operator desires this to occur, I provide a spring-actuated locking device for temporarily keeping actuating-bar 102 in its elevated position. For such purpose I provide a bracket 107 on frame 96, along which bar 102 is made to slide as it is being moved upward and downward, owing to contact of one of its shoes with the cams.

108 is a pin, with proper handle 109, mounted on bar 102 and operating through a hole therein, and 110 a spiral tension-spring, inserted between said bar and handle and attached to the latter, which spring has a tendency to draw said handle toward bar 102.

111 is a short horizontal slot in bracket 107, so located that whenever shoe 103 reaches its most elevated position the position of pin 108 will coincide with said slot, and said pin, actuated by its spring, will enter said slot, thereby locking the apparatus in apposition corresponding with the position of rail 50 side-wise from its normal position.

Heretofore, particularly when using the corresponding apparatus described in my Patent No. 514,282, the operator was required to keep his foot on a lever through which rail 50 had been displaced laterally until the carriage had traveled the full length of the drum, so as to counteract the tendency of the springs resting against it to replace it in its normal position. This, of course, made it practically impossible to simultaneously attend to other portions of the apparatus and kept him confined in one place. It will therefore be seen that the means for locking the movable rail in its inoperative position greatly facilitates the operation of the apparatus.

It will be seen that the mechanism can be operated in either direction simply by the operator giving actuating-bar 102 a slight movement to the right or left, as may be required, and that the source of power applied to the general operation of the machine can then be utilized to place rail 50 in the desired

position without further attention by the operator. Shaft 98 and pulley 99 may either be specially provided for the purposes specified above or may be part of other mechanism integral with the general apparatus, such, for instance, as the pulley from which motion is transferred to the two pulleys carrying and guiding the rope which moves the color-carriage along its track.

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

1. In an apparatus for printing carpet yarns in combination with a yarn drum, a distributing wheel, a roller and a rubber adjusted to follow in the path of the roller, having its upper surface sloping downward to the periphery of the roller, and means for holding the roller and the rubber against the yarn and the end of the slope against the roller, substantially as set forth.

2. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel, a roller, and a sloping rubber extending from the periphery of the roller upward and outward and springs for holding roller and rubber against the yarn, substantially as set forth.

3. In an apparatus for printing carpet yarns, in combination with the yarn drum, a distributing wheel and an equalizer constructed as a two armed blade with a substantially vertical drainage channel between the inner surfaces of the arms, and a tongue sloping from its heel toward or to such roller, and having its slope widening toward the roller, substantially as set forth.

4. In an apparatus for printing carpet yarns, in combination with the yarn drum, a distributing wheel, and an equalizer constructed as a two armed blade with a substantially vertical drainage channel between the inner surfaces of the arms, a roller inserted between its arms and a sloping tongue extending forward from the heel of the equalizer to the periphery of such roller, substantially as set forth.

5. In an apparatus for printing carpet yarns, in combination with the yarn drum, an appliance for forcing the coloring matter into the yarn mounted on a leaf spring an adjustable support carrying said spring, and means for varying the extreme elevation of such spring with reference to said support, substantially as set forth.

6. In an apparatus for printing carpet yarns, in combination with the yarn drum, an appliance for forcing the coloring matter into the yarn, a leaf spring fixedly supported

near its end and supporting said appliance, and a set screw for adjusting the tension of said spring, and resting against it between its fixed and its free end substantially as set forth.

7. In an apparatus for printing carpet yarns, in combination with the yarn drum, a color distributor, and a device for forcing the coloring matter into the yarn mounted on an adjustable support, a guide for directing said support upward and downward, a movable rail on which said support rides, a pulley, and mechanism for converting revolving motion of the same into lateral motion of said rail, substantially as set forth.

8. In an apparatus for printing carpet yarns, in combination with the yarn drum, a color distributor and a device for forcing the coloring matter into the yarn mounted on an adjustable support, a guide for directing said support upward and downward, a movable rail on which said support rides, a bar adjusted to move longitudinally parallel with the position of said rail and mechanism for converting such movement of said bar into lateral movement of the rail, substantially as set forth.

9. In an apparatus for printing carpet yarns, in combination with the yarn drum, a color distributor, and a device for forcing the coloring matter into the yarn mounted on an adjustable support, a guide for directing said support upward and downward, a movable rail on which said support rides, cam mechanism connected with said rail, and means for converting its motion into movement of said rail, substantially as set forth.

10. In an apparatus for printing carpet yarns, in combination with the yarn drum, a color distributor, and a device for forcing the coloring matter into the yarn mounted on an adjustable support, a guide for directing said support upward and downward, a movable rail on which said support rides, a cam wheel, shoes engaging therewith at different points, and connections between said shoes and said rail whereby said rail may be moved alternately in opposite directions, 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 28th day of July, 1894.

WILLIAM SHAW.

Witnesses:

C. L. HORACK,
JOHN C. GULICK.