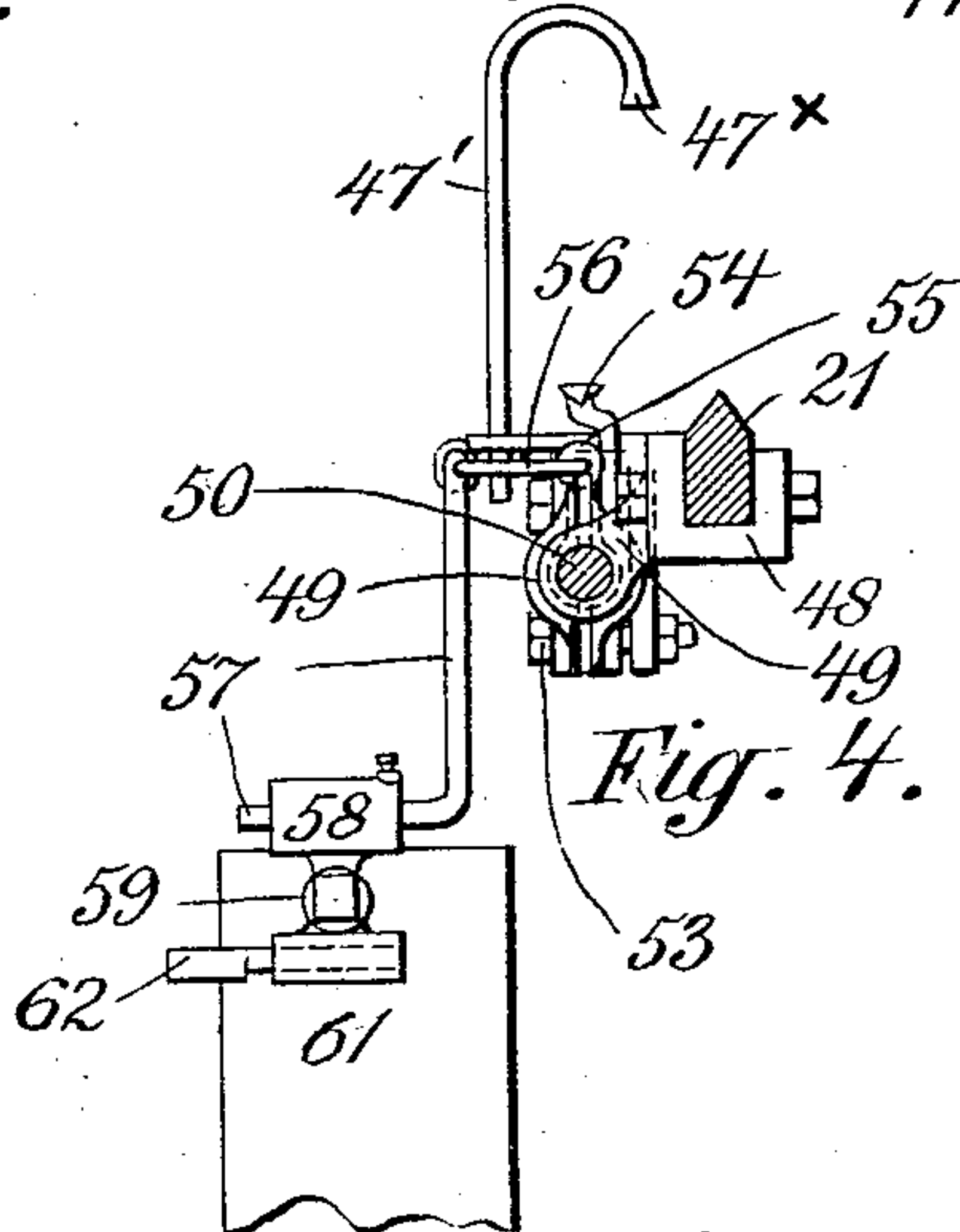
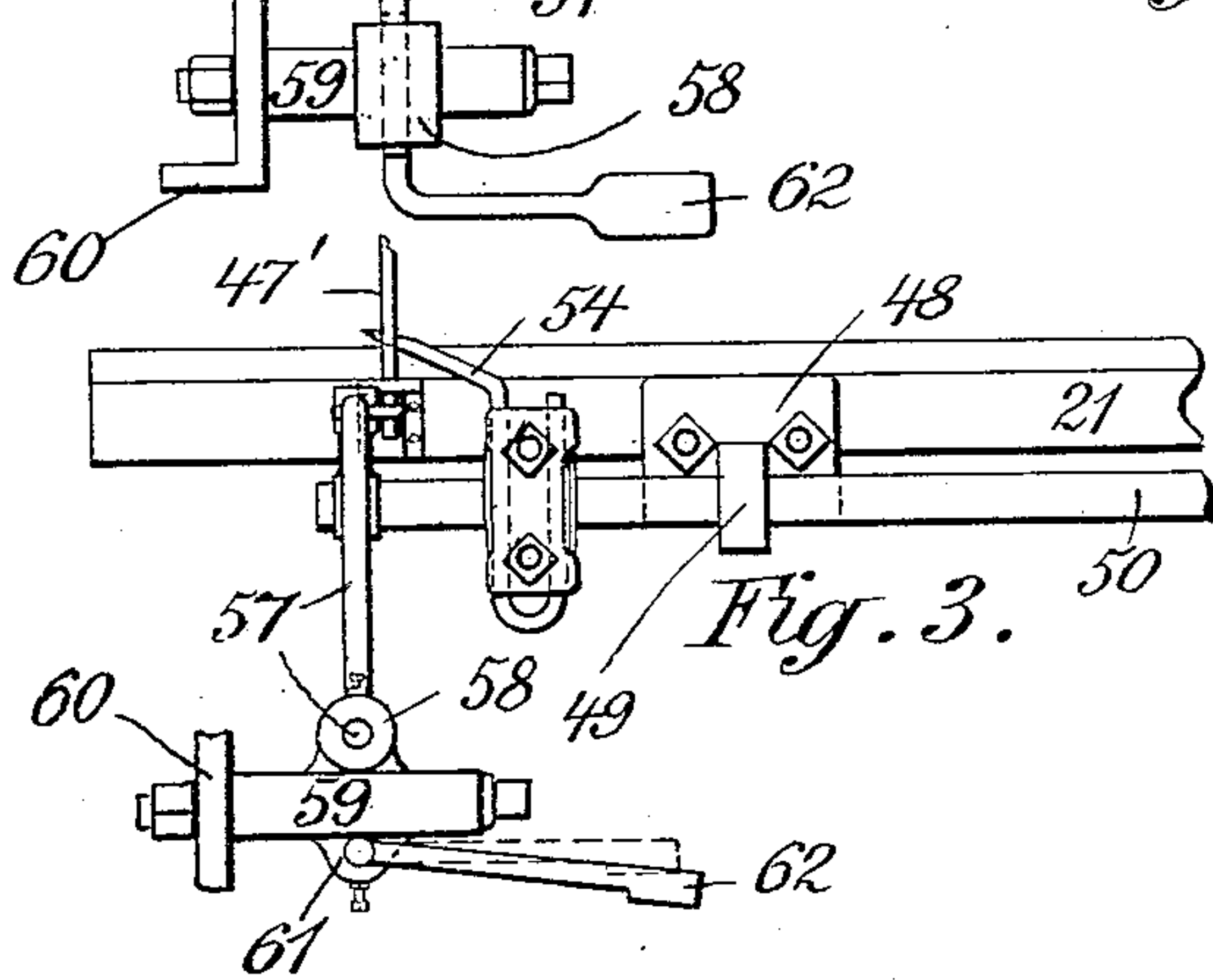
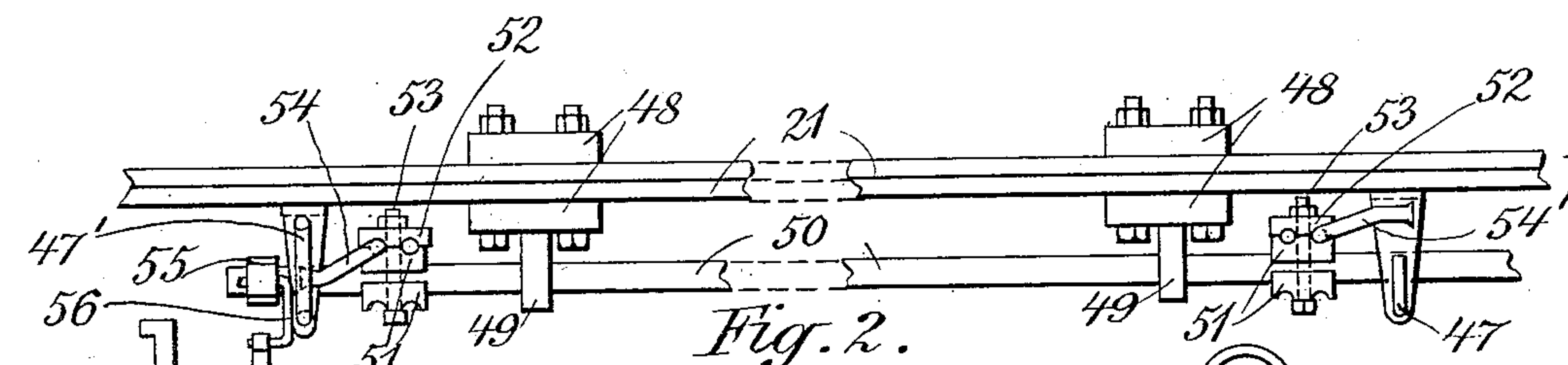
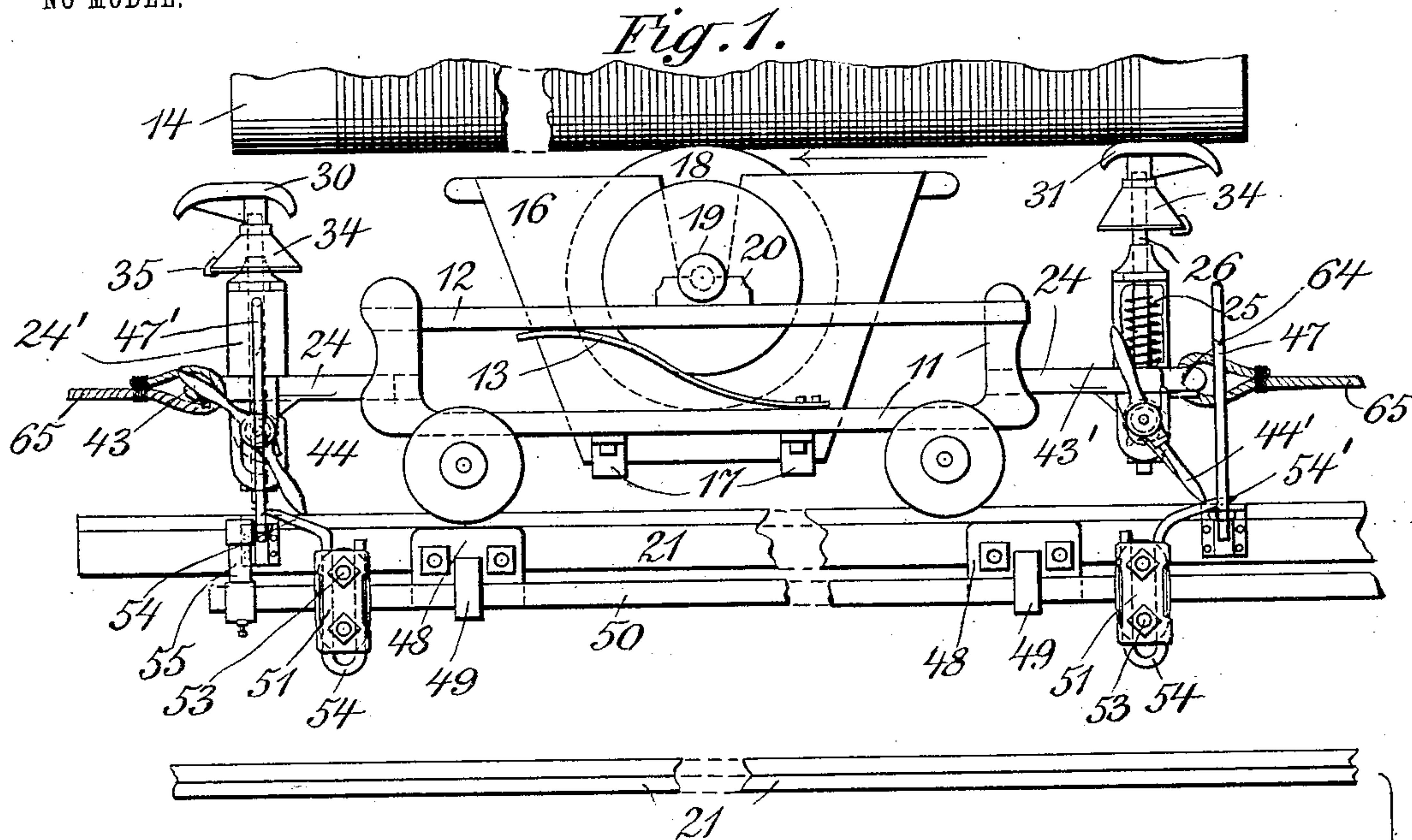


A. FORNANDER.
APPARATUS FOR COLORING YARNS.

APPLICATION FILED MAR. 30, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
William Shaw
James McLean

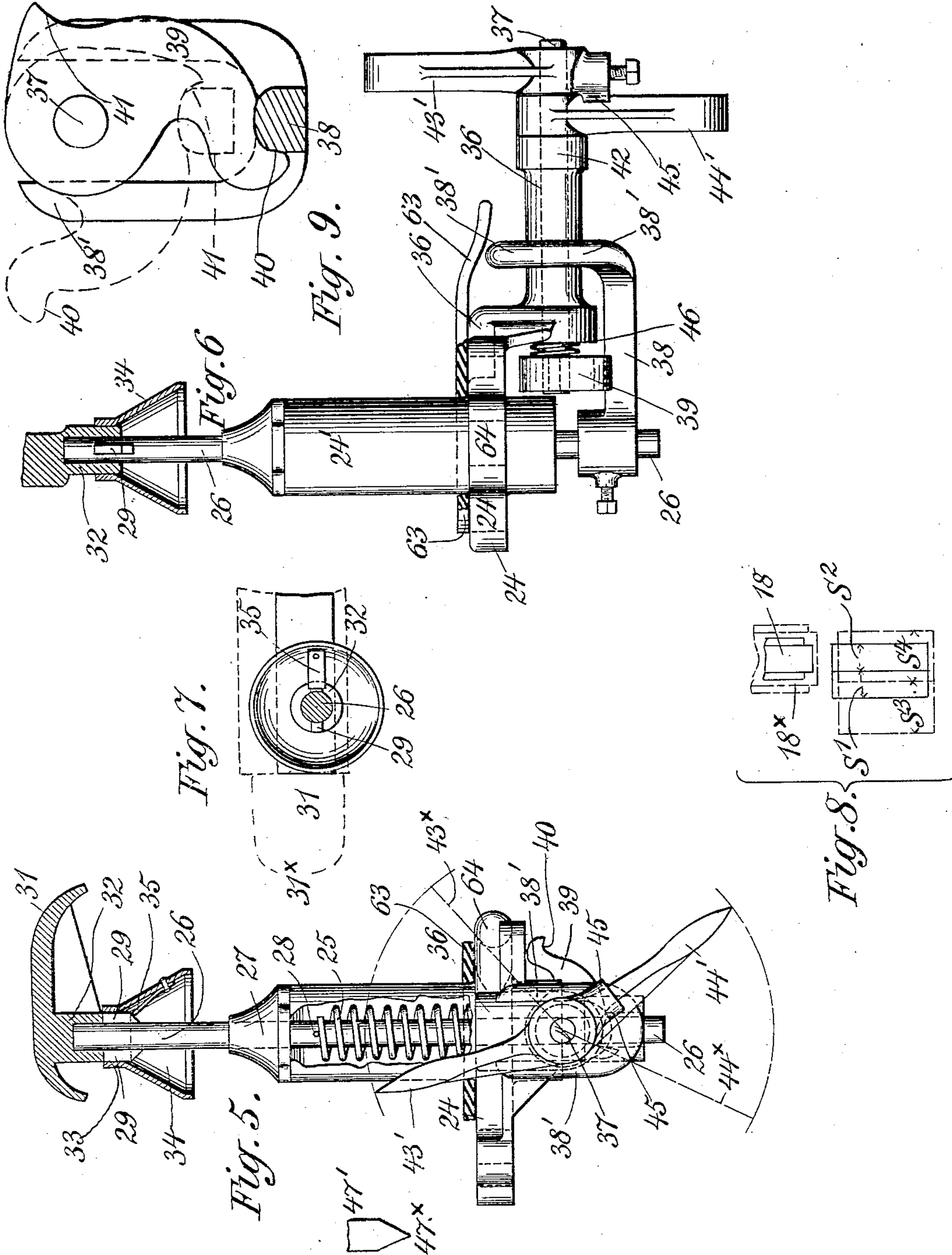
Inventor
Alfred Fornander
By his Attorney
C. L. Horack

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ALFRED FORNANDER, OF NEW YORK, N. Y., ASSIGNOR TO THE CARPET
YARN PRINTING COMPANY, A CORPORATION OF NEW YORK.

APPARATUS FOR COLORING YARNS.

SPECIFICATION forming part of Letters Patent No. 750,758, dated January 26, 1904.

Application filed March 30, 1903. Serial No. 150,126. (No model.)

To all whom it may concern:

Be it known that I, ALFRED FORNANDER, a subject of the King of Sweden and Norway, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Apparatus for Coloring Yarns, of which the following is a specification.

My invention refers to improvements in apparatus for printing yarns, and more particularly yarns employed in the manufacture of tapestry and velvet carpets.

The purposes of my invention are to provide simple and efficient means for readily attaching mechanical scrapers to suitable supports and for detaching the same therefrom and for alternately employing scrapers of different widths upon the same supports and in proper relations to their respective color-wheels; also, to provide, in connection with printing appliances of usual or other proper construction, when equalizing or scraping devices are placed in front as well as in the rear of the color-wheel improved 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.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of an apparatus embodying my improvements, portions of the same appearing broken away; Fig. 2, a ground plan of parts of the apparatus for shifting the scrapers or spreaders into and out of their operative positions; Fig. 3, a side elevation of the left-hand portion of the apparatus illustrated in Fig. 2, and Fig. 4 a cross-section of the mechanism employed by me for shifting the scraping devices into and out of their operative positions. Figs. 5 and 6 are detail views, on an enlarged

scale, of one of the appliances supporting a spreader, which appliances are attached to the color-carriage, Fig. 5 being a side elevation and Fig. 6 an end view, parts appearing in section in both cases. Fig. 7 is a section through one of the posts supporting a scraper looking upward; and Fig. 8, a diagrammatic representation of the horizontal positions of color-wheels of different widths and of streaks of color covered by corresponding scrapers, all in their proper relative positions. Fig. 9 is a rear view of a cam mechanism as illustrated in Fig. 5 on a scale double that of Figs. 5, 6, and 7.

Corresponding characters of reference throughout the different views refer to corresponding parts.

In the drawings, 11 is the main body of the color-carriage, and 12 a lid hinged to one end of said carriage. On each side of the carriage a spring, as 13, is fastened to the main body of the carriage, so as to support said lid and force it upward toward drum 14, around which the yarn is wound in usual manner in a continuous uniform layer.

16 is the color-box containing the liquid coloring-matter, supported upon iron straps 17, attached to the main body of the color-carriage.

18 is the color-wheel, its shaft 19 revolving in proper bearings 20 on lid 12, said wheel being so placed within the color-box and so revolved by proper means that as the carriage is moved along rails 21 21 it will revolve in contact with the yarn and will bring up portions of the contents of the color-box and will apply the same in form of a streak to the yarn on the drum, and by giving to the drum successive partial revolutions the entire surface of said yarn will be covered with adjoining streaks, a different color-box, with color-wheel, being inserted every time a new shade or color is to be applied in accordance with the design which is to be printed. The color-wheel can be put into and out of its operative position without moving the color-box.

The appliances above described and the mode of employing the same referred to are not part of my invention, as they are now and have been for many years in common use,

even when it was ordinary practice to equalize the color in the various streaks by means of scrapers in the hands of employees.

My improvements will be equally applicable and are intended to be used, as hereinafter described, where modified means for supporting the yarn and for applying streaks of color to the same may be employed.

My improvements refer to the means for equalizing the color contained in the streaks on the yarn and are described below, and set forth more particularly in the claims.

A bracket 24 is fastened to each end of the carriage. The vertical arm 24' of each such bracket forms a socket within which a spiral compression-spring 25 is seated. Said spring surrounds a vertical post 26, which extends through the bottom of said socket and also through a cap 27, screwed to the top of the bracket, and said spring is fixedly secured to the post at 28. The perforation in the bottom of bracket 24 and that in cap 27 jointly serve to guide post 26 in a vertical direction whenever the scraper is to be moved, by the agencies hereinafter described, into and out of its operative position.

29 29 are two keys fixedly attached to and extending along opposite sides of the upper portion of post 26, said post being so guided on the bracket as to prevent it from revolving around its axis, whereby the alinement of a scraper mounted thereon might be changed. The two scrapers are indicated by 30 and 31, each having for its under portion a shank 32, provided with a socket closely fitting the upper end of post 26, the keys on the post sliding within and closely conforming to slits 33 in the walls of said shank, so that after said socket has been placed in position on the upper end of post 26 no lateral displacement of the scraper will be possible.

34 is a metallic cap soldered to or otherwise made integral with shank 32 directly underneath the main body of the scraper, so as to entirely cover the joint formed between post 26 and its keys 29 and the slotted portion of said shank, whereby liquid coloring-matter that may drip down from the scraper will be prevented from reaching and clogging up said joint, as well as the portion of the device where said post contacts with cap 27.

As it is desirable to guard against upward movement of the scraper and its shank along post 26, which movement might be produced when spring 25 forces said post upward, I attach a leaf-spring 35 to cap 34, so as to have its free end press against the sloping under side of one of the keys 29, whereby the scraper will be locked into its proper position. While attaching the scraper spring 35 will automatically assume its locking position, and in detaching the scraper it will only be necessary to at first deflect said spring upward, so as to permit of moving the scraper upward, and the locking device will be fully protected against

coloring-matter dripping down from the scraper, as the same is placed in a position underneath the rubbing-surface of the scraper and in addition is protected by cap 34.

It frequently becomes necessary in carpet-mills, particularly where both tapestry and velvet carpets are being manufactured, to alternately employ color-wheels of different widths, and in consequence to vary the widths of the scrapers in proportion, and the construction of the joints between the scrapers and the posts supporting the same, as described above, permits of making such substitutions readily, while also making it possible to always secure under such varying conditions proper relative alinements of the color-wheel and the scrapers.

In automatic scraping as commonly practiced at present and while printing a series of streaks of the same shade or color the scraper following in the path of the color-wheel is made of substantially double the width of the face of the color-wheel, so as to make it cover not only the streak in course of application, but also the adjoining streak of the same color previously printed, and in Fig. 8 there is shown a color-wheel 18 and two streaks S' and S² simultaneously covered by its corresponding scraper and also in broken lines wheel 18^x substituted for the former one, and likewise in broken lines two wide streaks S³ and S⁴, covered by its corresponding scraper, the supporting-post 26 being placed in each case central with reference to the color-wheel.

In Fig. 7 the positions of the two scrapers 31 and 31^x of different widths are shown in their proper positions relative to a post 26.

36 is an arm integral with bracket 24 and extending laterally therefrom beyond the limit of one of the rails 21, its outer portion forming a bearing for a shaft 37.

38 is an arm having one end fixedly but adjustably secured to the lower end of post 26 and extending toward the free end of and along and underneath arm 36, the free outer end of arm 38 being made forking and extending upward, so as to embrace arm 36 and to be guided by the same in its up-and-down movements. The prongs of said fork are indicated by 38'.

On the inner end of shaft 37 I mount a cam 39 in such manner that its under side will bear against the upper surface of arm 38, so as to either force said arm, and thereby scraper 31, into their lowest positions, the corresponding position of the cam being illustrated in full lines in Fig. 9, or to force said parts into their highest positions, in which the scraper will be held under yielding pressure against the yarn on the under side of the drum, the cam in that case occupying the position indicated in Figs. 5 and 6 and in dotted lines in Fig. 9.

40 is a shoulder on said cam contacting with arm 38 when the scraper is in its extreme

lower position, and 41 such a shoulder contacting with said arm when the scraper is in its elevated operative position, and the surfaces of the cam on which the same bears when the scraper occupies such extreme positions are made receding, so as to guard against the accidental displacement of the cam, and are made to fit the upper convex surface of arm 38.

42 is a collar on shaft 37, and beyond the same there are mounted on said shaft adjoining each other two levers, one of which extends upward and is stationary with reference to said shaft and fixedly attached thereto, while the other extends downward and is permitted to slightly oscillate around said shaft, the two levers being made to swing simultaneously when swinging movement is imparted to either of them beyond a vertical plane at right angles to the travel of the color-carriage. The stationary lever so connected with scraper 30 is indicated by 43 and the corresponding oscillating lever by 44, while the stationary lever connected with scraper 31 is indicated by 43' and the corresponding oscillating lever by 44'. Two checks, as 45 45, are provided on each of said stationary levers on opposite sides of the adjoining oscillating lever for the purpose of limiting the movement of the latter with reference to the former.

46 is a short spiral spring interposed between arm 36 and cam 39 so as to bear against the latter with sufficient pressure to prevent the cam from revolving too freely and unless actuated by the tripping means hereinafter described. When post 26 is placed in its lower position, spring 25 will thereby be further compressed, and such increased compression thereon will firmly hold the scraper mounted on said post from contact with the yarn. The widths and the alinements of the two scrapers are such as to make each of them capable of covering the streak of color which is in course of application (indicated in Fig. 8 by S^2) and the streak directly adjoining and previously printed and indicated by S' . While printing streak S^2 the carriage moves in the direction of the arrow in Fig. 1. When a series of adjoining streaks of the same shade or color are being printed, it is desirable to have the scraper which follows after the color-wheel travel in contact with the yarn and to hold the other scraper out of contact with the yarn, while when a single streak only is being printed or the first one in a series of streaks it is necessary to keep both scrapers out of contact with the yarn, so as to avoid the rubbing of the color in said streak into an adjoining streak of different color, and I employ the following devices for accomplishing these results.

47 and 47' are stationary trippers near the opposite ends of the drum placed to one side of the track and out of alinement with each other, tripper 47, however, being placed in alinement with lever 43 and tripper 47' in alinement with lever 43', and said levers are

so adjusted that when they are swung toward the color-carriage as far as practicable their upper ends will be elevated sufficiently to be adapted to contact with their corresponding trippers, as indicated in Fig. 5, where lever 43' is shown to extend above the operative end 47^x of the corresponding tripper 47', while when they are swung away therefrom as far as they will swing in that direction, as indicated by 43^x in Fig. 5, they will pass underneath said tripper and will clear the same.

48 48 are shoes securely fastened to one of the rails 21, from which shoes extend lateral lugs 49, upon which a longitudinal shaft 50 is revolvably mounted. 51 51 are clamping-checks secured to said shaft, and 52 52 checks secured to aforesaid checks by bolts 53.

54 and 54' are trippers having their lower ends made U-shaped and having the straight and parallel branches forming said U's inserted in corresponding grooves in said clamping devices in such manner that after temporarily loosening bolts 53 the tripper may be adjusted upward or downward sufficiently to give to its upper operative end the proper elevation. Each of said trippers slopes upward and away from the middle portion of the drum. Said trippers 54 and 54' are placed out of alinement with each other, tripper 54, however, being placed in alinement with oscillating lever 44 and tripper 54' in alinement with such lever 44', and I prefer to place tripper 47 in line with tripper 54 and tripper 47' in line with tripper 54', although different alinements might be given to each of the four trippers.

The elevations and the positions and the oscillations of levers 44 and 44' on shafts 37 are so adjusted and cams 39 are made of such configurations that said levers will occupy positions sloping downward from their shafts 37 away from the color-carriage when the scrapers are in their elevated and operative positions, as illustrated in the right-hand portion of Fig. 1 and in Fig. 5, and will so slope toward the color-carriage after the scrapers have been lowered, as shown in the left-hand portion of Fig. 1. Broken line 44^x in Fig. 5 indicates the position of lever 44' after scraper 31 has been lowered.

As the color-carriage proceeds in the direction of the arrow in Fig. 1 scraper 31 will equalize the streak of color which color-wheel 18 is applying to the yarn and also the streak previously applied until lever 43 as the rear portion of the carriage passes from underneath the drum strikes tripper 47' and is thereby swung rearward, and scraper 31 is thereby lowered to the same elevation with scraper 30, lever 44' being swung forward by this movement. Prior to this, however, lever 44 will have contacted with tripper 54, so as to oscillate upward, and thereby be permitted to pass over said tripper.

After the color-carriage has passed from

beneath the drum the direction of its movement is reversed in usual manner, so as to be from left to right thereafter, Fig. 1, and during this return trip scraper 31 will remain in its lowered position; but lever 44 will contact with tripper 54 and will be swung away from the color-carriage, so as to raise scraper 30 to its operative elevation, lever 43 being at the same time swung toward the color-carriage. Upon the color-carriage reaching the right-hand end of the drum, Fig. 1, lever 44, which will then be sloping downward toward the color-carriage, will pass over tripper 54' while oscillating and without raising scraper 31, lever 43' passing underneath tripper 47 without contacting therewith, and directly afterward lever 43, then sloping upward and toward the color-carriage, will strike tripper 47, and scraper 30 will thereby be lowered.

When the direction of the travel of the carriage is again reversed, scraper 31 will be raised as lever 44' contacts with tripper 54'.

Trippers 47 and 47' may be provided with means for adjusting their elevations similar to those used in connection with trippers 54 and 54'.

When a single streak or the first of a series of streaks is to be printed, I place both of the scrapers out of action by means of the following appliances:

55 is a crank fixedly mounted upon shaft 50. The same by means of a link 56 connects with an angular rod 57, fixedly but adjustably inserted in a socket 58 integral with a sleeve 59, which is revolubly mounted upon a part 60 of the frame supporting the drum. 61 is another socket also integral with sleeve 59.

62 is a treadle which is firmly but adjustably held in socket 61. When both scrapers are to be placed in their inoperative positions, treadle 62 is depressed, as shown in full lines in Fig. 5. This will cause the movement of link 56 toward the left in Fig. 4, and in consequence will revolve shaft 50 toward the left in Fig. 4 and will swing trippers 54 and 54' sidewise, so as to bring said trippers out of alinement with levers 44 and 44', respectively, in which positions they are not capable of enforcing upward movements of scrapers 30 and 31. It will thus be seen that while trippers 47 and 47' remain stationary at all times the trippers 54 and 54', being made movable, may by actuating treadle 62 be readily thrown into positions which will cause both scrapers to remain out of contact with the yarn while the carriage is traveling underneath the drum.

It is desirable to protect cam 39 and arm 38 against color that may drip down from the scraper, and for that purpose I place a shield between the scraper and cap 34 on one side and said appliances, so as to guard against reaching the latter. Such a shield 63 is shown more particularly in Fig. 6, where it appears placed around and made to fit the vertical

part 24' of bracket 24. I prefer to make the same elastic, so that it may closely fit said part 24'.

64 64 are eyes on brackets 24, to which the rope 65 is attached, by means of which the carriage is drawn forward and backward.

It will readily be seen that many of the details and of the detail combinations herein set forth may be varied materially without departing from the spirit of my invention. Hence I do not wish to confine myself to the use of such details as herein set forth.

I claim—

1. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a support for said scraper, a guide for moving said scraper along said support in a direction substantially at right angles to and away from the axis of the drum, a spring for forcing the scraper and guide toward the axis of the drum, and automatic means for locking the scraper against movement along its guide in the direction in which said spring acts.

2. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a support for the same, and automatic locking means interposed between the scraper and its support for locking the scraper against movement in a direction substantially at right angles to the printing-surface on the drum.

3. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a support for the same, means for preventing movement of the scraper with reference to said support in the direction of the travel of the carriage along the drum and automatic locking means for preventing movement of the scraper along its support at right angles to the direction of such travel.

4. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a support for said scraper, and means for automatically locking said scraper to said support, said locking means being placed underneath the rubbing-surface of the scraper.

5. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a support for a scraper mounted upon the carriage, a scraper, a device for automatically locking the scraper to said support, and a cap or shield interposed between the scraper and said locking device and inclosing the latter.

6. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a post upon which it is mounted, a spring placed around said post and adapted to actuate the same, a casing surrounding said spring and a portion of said post, a cap fitted around said

post and secured to the upper portion of said casing and serving as a guide for said post, and a hood integral with the scraper and interposed between the same and the guiding-surfaces between cap and post and firmly locked to said post.

7. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a support for the same to which it is detachably secured, a guide for said support, a shield between the scraper and the surfaces along which the support is guided, and a spring attached to said shield and in engagement with said support for guarding against detachment of the scraper.

8. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, a spring having a seat stationary with reference to the color-carriage for forcing the scraper toward the drum and means for withdrawing the scraper from the drum and thereby increasing the strain upon the spring while said color-carriage is passing from underneath the drum.

9. In an apparatus for printing yarns, the combination with the yarn-drum, the color-carriage, the carriage-track, and the color-wheel, of a scraper mounted on the carriage and between the rails of the track, a tripper placed to one side of said track, and a mechanism having a revoluble shaft extending above and across one of the rails of the carriage-track and interposed between said scraper and tripper for varying the elevation of the scraper while said mechanism contacts with the tripper.

10. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage, the carriage-track and the color-wheel, of a scraper mounted on the carriage and between the rails of the track, a tripper placed above and to one side of said track, a revoluble shaft placed crosswise with reference to one of the rails of the track, a lever on said shaft adapted to engage with said tripper and means interposed between the shaft and the scraper for actuating the latter while the lever engages with the tripper.

11. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a bracket on the carriage extending therefrom transversely with reference to the direction of its travel, a scraper, a support for the same movably mounted upon said bracket, a rocking lever for varying the elevation of the support, a tripper for actuating said lever, and a cam mounted upon said bracket and having its operative bearing-surface in engagement with said support for raising and lowering the same.

12. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-

carriage and the color-wheel, of a bracket on the carriage, a scraper, a support for the same movably mounted upon said bracket, a rocking lever for raising the support, another rocking lever for lowering the same, a shaft upon which said levers are mounted, trippers for actuating said levers, and means for converting revolving movement of the shaft into movement of said support.

13. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a bracket on the carriage, a scraper, a support for the same movably mounted upon said bracket, a rocking lever for raising the support, another rocking lever for lowering the same, a shaft upon which one of said levers is mounted rigidly and the other is mounted revolubly, stops for limiting such revoluble movements, and trippers for actuating said levers.

14. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a bracket on the carriage, a scraper, a support for the same movably mounted upon said bracket, a rocking lever for raising the support, another rocking lever for lowering the same, a shaft upon which one of said levers is mounted rigidly and the other is mounted revolubly, means for limiting such revoluble movements attached to the rigidly-mounted scraper, and trippers for actuating said levers.

15. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a bracket on the carriage, a scraper, a support for the same movably mounted upon said bracket, a shaft, a rocking lever for lowering the support fixedly mounted upon and extending upward from said shaft, a second rocking lever for raising the support mounted upon and adapted to partly revolve around said shaft and extending downward therefrom, and trippers for actuating said levers.

16. In an apparatus for coloring yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a bracket on the carriage, a scraper, a support for the same movably mounted upon said bracket, a shaft, a rocking lever for lowering the support fixedly mounted upon said shaft, a fixed tripper for actuating said lever, a second rocking lever for raising said support mounted upon said shaft and adapted to partly revolve around the same, a second tripper for actuating said second lever, and means for throwing said second tripper into and out of its operative position.

17. In an apparatus for printing yarns, the combination with the yarn-drum, the color-carriage and the color-wheel, of a scraper, means mounted upon the carriage for varying the elevation of the same, a tripper-bar for actuating said means and a clamp for holding

said tripper-bar in position, the portion of
the tripper-bar in engagement with said clamp
being made U-shaped and the branches of said
U-shaped portion being capable of sliding
5 along the members forming said clamp.

In testimony whereof I have signed my name
to this specification, in the presence of two sub-

scribing witnesses, this 27th day of March,
1903.

ALFRED FORNANDER.

Witnesses:

CHAS. L. HORACK,
M. TURNER.