No. 862,549. PATENTED AUG. 6, 1907.

G. A. FREDENBURGH.

THREAD DRESSING MACHINE.

APPLICATION FILED OCT. 3, 1906.

5 SHEETS—SHEET 1.

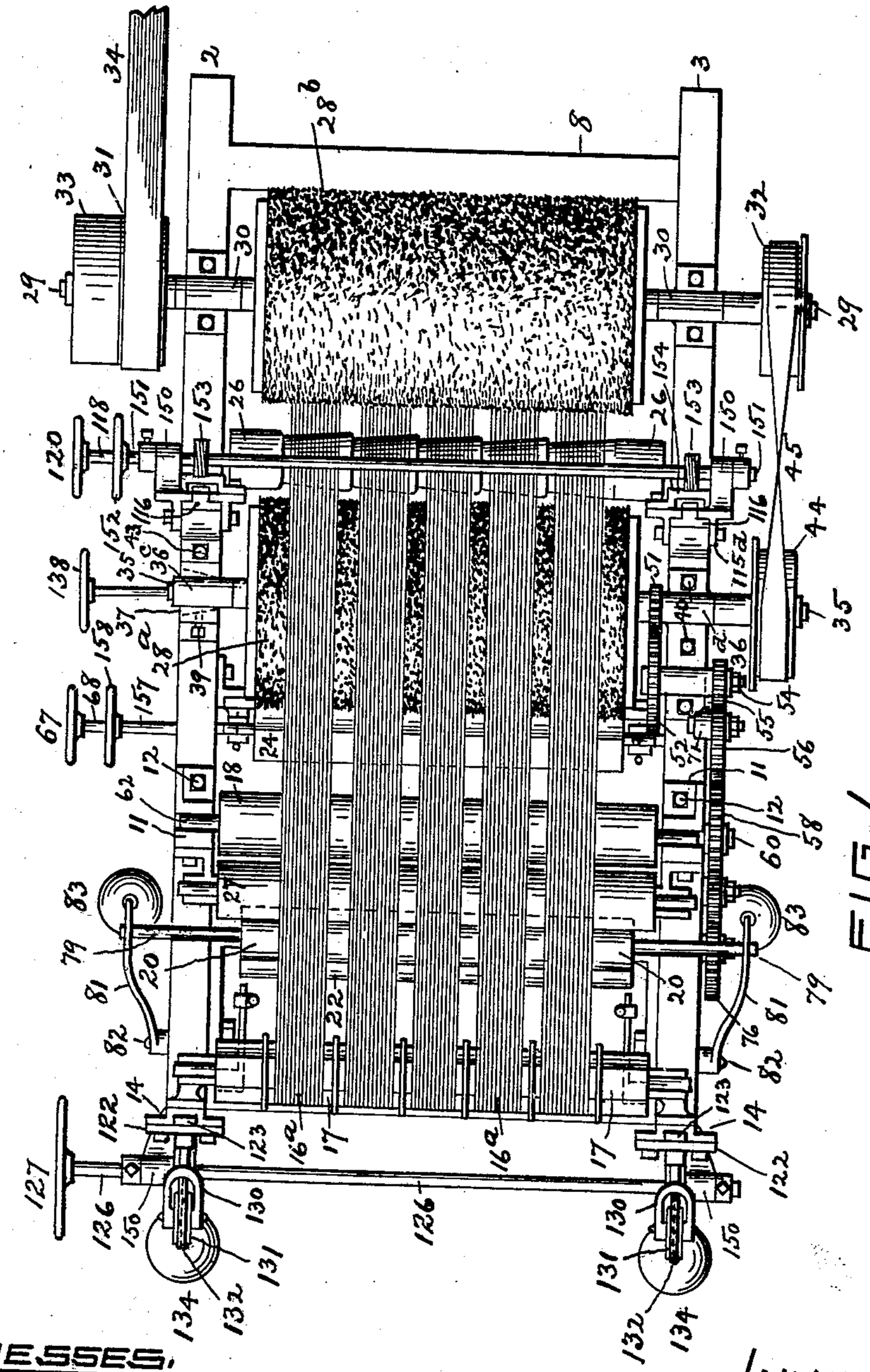

FIG. 1.

WITNESSES.

A. E. Coombs

S. N. Manning

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By Charles S. Hannigan,

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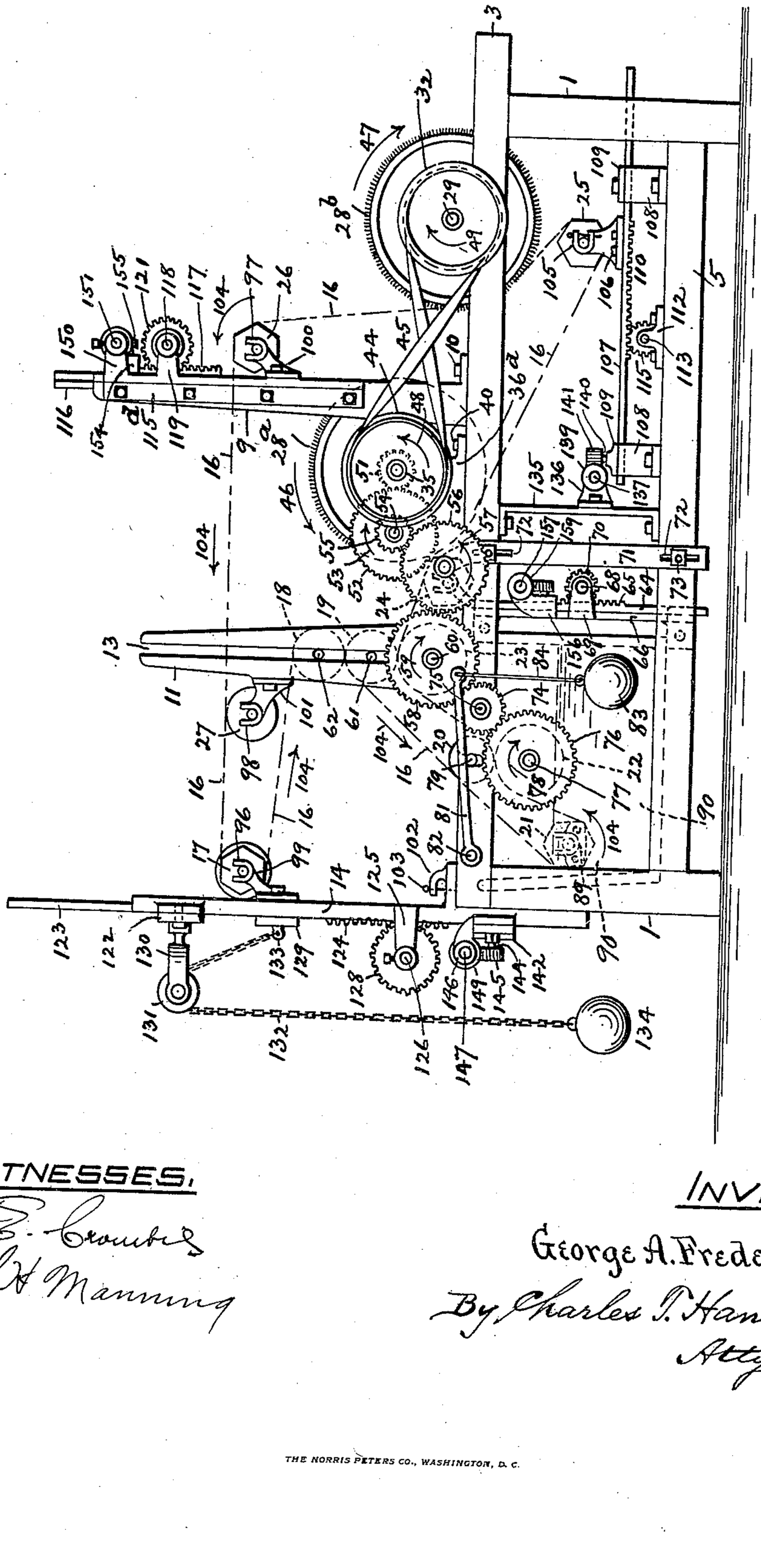

FIG. 2.

WITNESSES.

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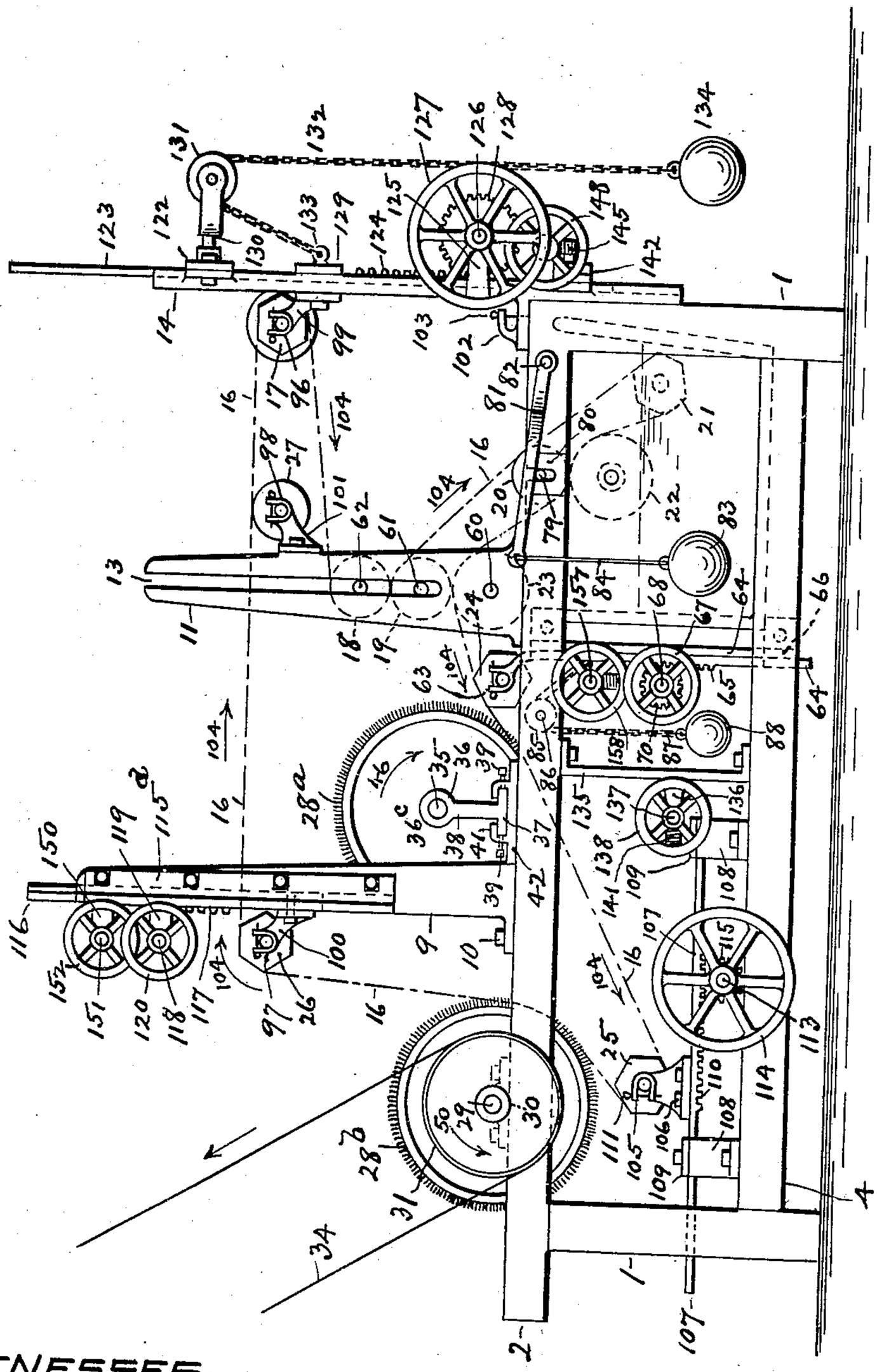

FIG. 3.

WITNESSES

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5 SHEETS—SHEET 4.

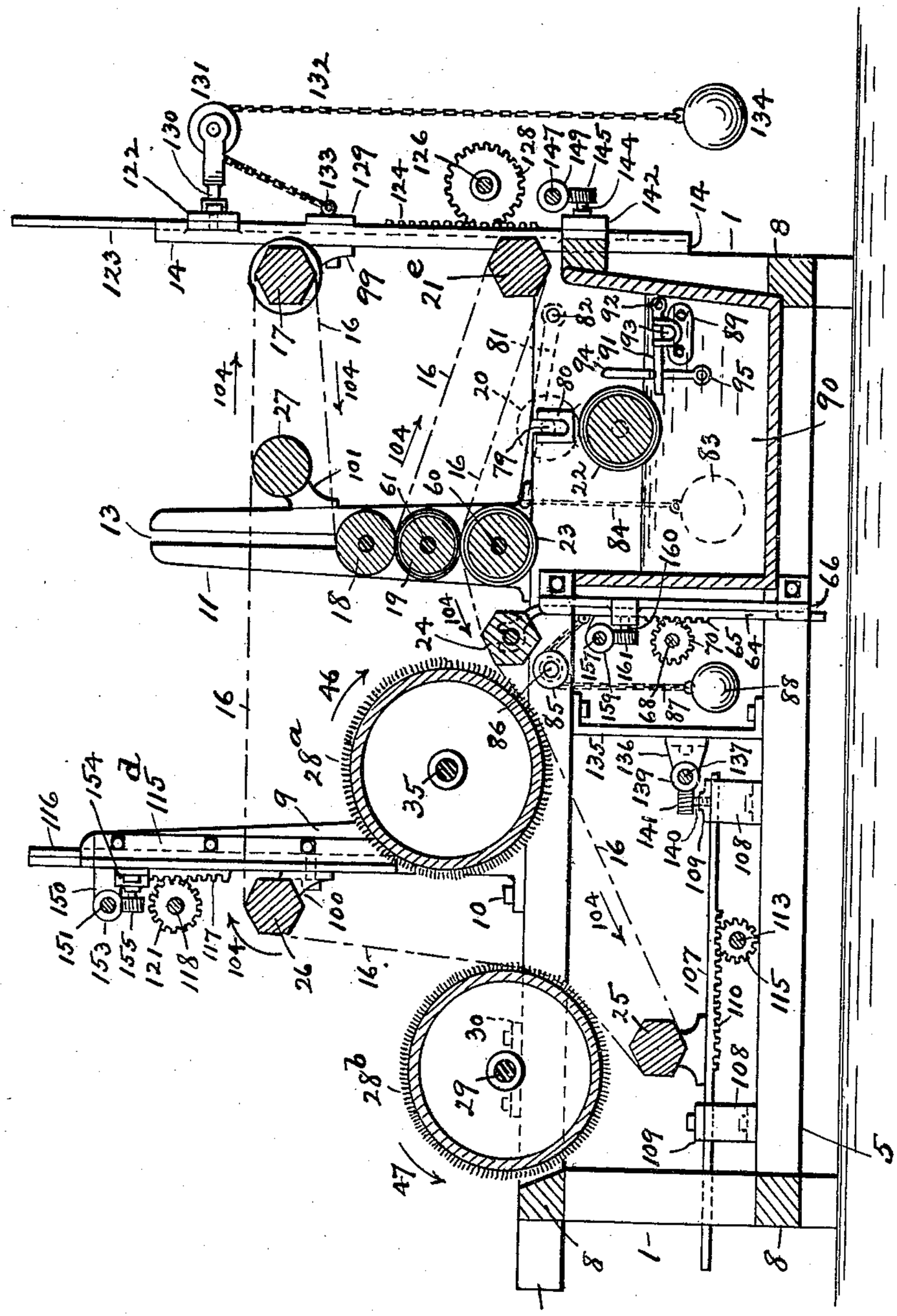

FIG. 4.

WITNESSES:

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5 SHEETS—SHEET 5.

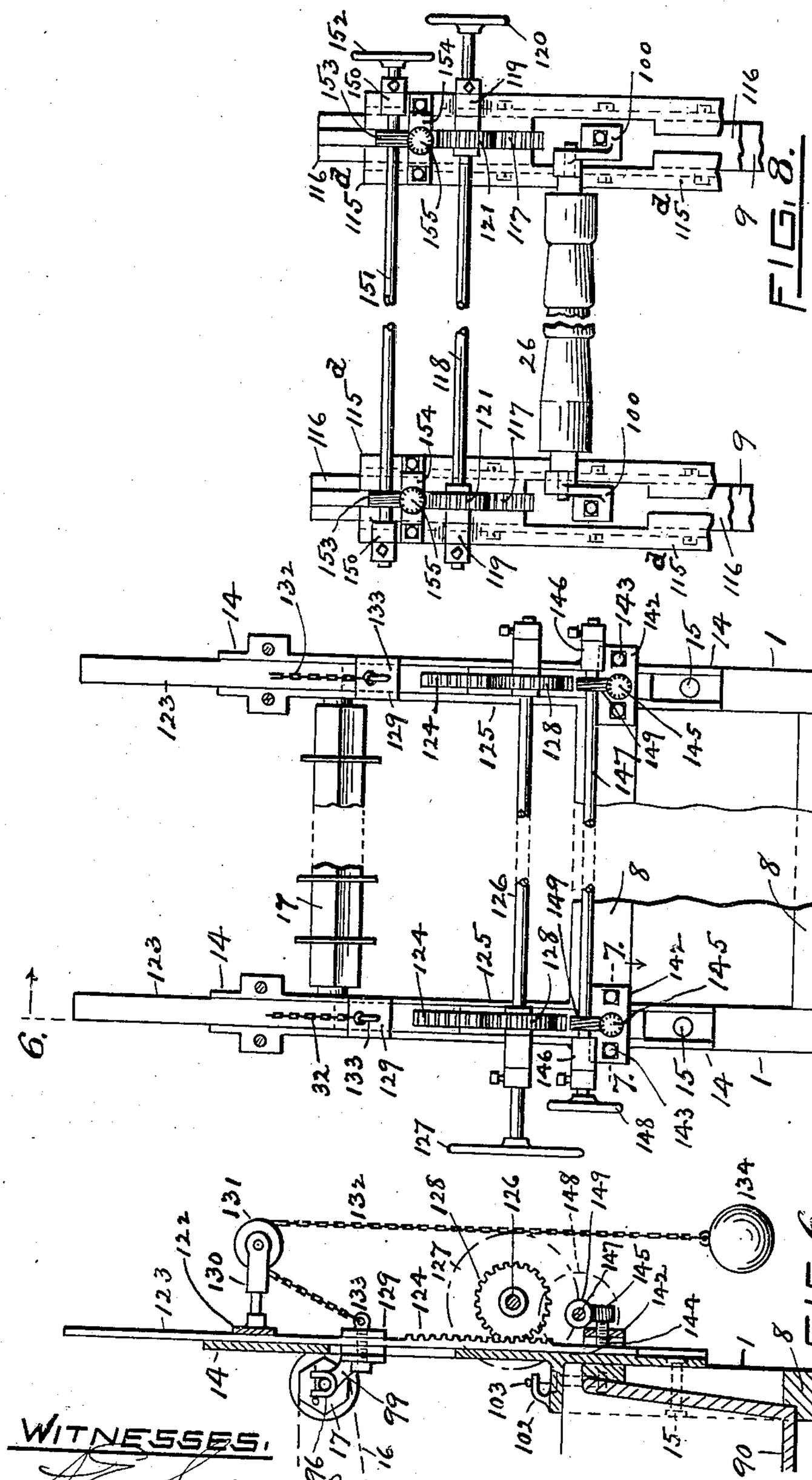

FIG. 8.

FIG. 5.

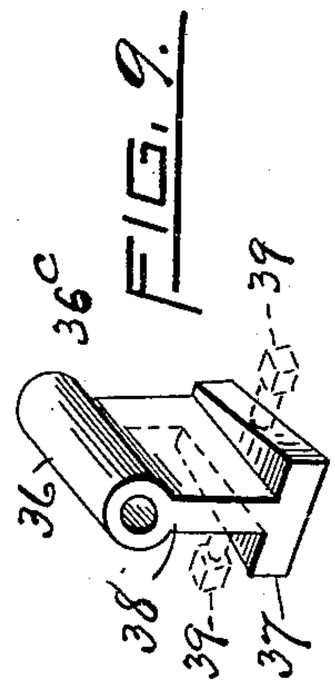

FIG. 9.

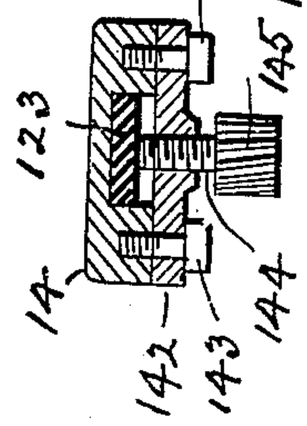

FIG. 7.

FIG. 6.

WITNESSES.

A. E. Knowles

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UNITED STATES PATENT OFFICE.

GEORGE A. FREDENBURGH, OF PAWTUCKET, RHODE ISLAND.

THREAD-DRESSING MACHINE.

No. 862,549. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed October 3, 1906. Serial No. 337,326.

To all whom it may concern:

Be it known that I, GEORGE A. FREDENBURGH, a citizen of the United States, residing at the city of Pawtucket, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Thread-Dressing Machines, of which the following is a specification.

My invention relates to the class of thread dressing machines, and consists of the novel construction and combination of parts, or elements, as hereinafter described and specifically set forth in the claims.

The purpose of my invention is to construct a machine which operates to size, dress and polish a skein of yarn or thread, while said skein is carried from one end of the machine to the other, without removal from said machine.

One object of my invention is to produce a machine, which, when in operation, will cause each thread of a skein to separate from the others while moving over rolls and brushes, in order that each thread may be thoroughly saturated with the liquid sizing, and which readily permits the withdrawal of the saturated threads from the sizing liquid and the bringing of them into position to receive the finishing operation of the brushes.

Another object of my invention is to provide means by which the yarn or thread is sized and brushed on all exterior surfaces thereof at each portion of the yarn or thread and in one continuous operation of the machine.

Another object of my invention is to provide means for taking up the stretch of the yarn or thread during the operation and to vary at will the tension of the same.

Other objects and purposes of my improved machine will appear in the course of the specification of the parts and operation of the machine.

In the accompanying drawings, Figure 1 is a top plan view of my improved thread dressing machine. Fig. 2 is a rear elevation of said machine, the parts being shown in the same position as in Fig. 1. Fig. 3 is a front elevation of the machine, the parts being shown in the same position as in Fig. 1. Fig. 4 is a central longitudinal view of said machine, the parts being shown in the same position as in Fig. 1. Fig. 5 is an end elevation of the machine, being the left hand end thereof as seen in Figs. 1 and 2 and the right hand end as seen in Figs. 3 and 4. Fig. 6 is a view partly in elevation and partly in vertical section, as seen on line 6.—6. of Fig. 5. Fig. 7 is a detail view as seen on section line 7.—7. of Fig. 5. Fig. 8 is an elevation of the upper portion of the machine, as seen from the right hand end of Fig. 2. Fig. 9 is a perspective view of a removable support of the inner brush-roll.

Like reference characters indicate like parts.

My improved thread dressing machine is supported by a suitable frame, which consists of four posts 1, the upper front and rear rails 2 and 3, the lower front and rear rails 4 and 5, and the upper and lower end rails 8. Two upright posts 9 rest upon the upper rails 2 and 3, respectively, and are bolted or secured thereto as shown at 10. Two upright posts 11 rest upon said upper rails and are bolted or secured thereon as shown at 12, and said posts 11 are each provided with a long vertical slot 13. Two upright posts 14 are secured in position at one end of the machine, as best seen in Figs. 5 and 6, and are fastened to the posts 1, by bolts 15.

The skein of thread or yarn is indicated by the dotted lines 16 in Figs. 2, 3 and 4, and by the parallel lines 16^a in Fig. 1, in which latter figure are shown five skeins under operation at the same time.

The thread or yarn to be sized and dressed by my machine comes from the manufacturer in skein form and are anywhere from 24 inches to 72 inches in length and already dyed the desired color. Prior to mounting these skeins upon my machine, each skein is wound upon a reel-machine (not shown), in order that when taken from the latter each skein will be about 25 feet in length.

For giving the proper movement to the skeins in my machine I use a series of rolls and brushes, which I will now describe. The rolls are designated in the drawings by the reference numerals 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 and 27, and the brushes by the characters 28^a and 28^b. The brush-roll 28^b is made fast upon and rotates with the shaft 29, which is mounted in bearings 30. On the shaft 29 are two fast pulleys 31, 32 and the lower loose pulley 33. The shaft 29 with its brush-roll 28^b is rotated by power communicated by the belt 34, when passing over the fast pulley 31. The brush-roll 28^a is made fast upon and rotates with the shaft 35. The shaft 35 is mounted in a support 36^c, having a journal bearing 36 which is provided with a flanged base 37, and said support having an integral web 38 between its journal bearing and its base, as shown in detail in Fig. 9. This support 36^c is arranged to be removed from the machine-frame at the time of mounting the skeins upon the machine, said support having its flanged base 37 tapering on its longitudinal edges to fit between guides 41 integral of a base-plate 42, which is bolted at 43 to the upper rail 2 of the machine-frame. Two set-screws 39, in the guides of the base-plate 42, impinge against the latter in holding said support firmly in place upon the machine-frame. The other support 36^b, for the brush-roll 28^a, is permanently secured to the upper rail 3 of the machine-frame by bolts 40. A pulley 44 is mounted fast on one end of the shaft 35, and is rotated in a direction opposite to the direction of rotation of the pulley 32 by means of a crossed-belt 45. The directions of the movements of the brush-rolls 28^a and 28^b are indicated by the arrows 46, 47, and the corresponding movements of the pulleys 32 and 44 are indicated by the arrows 48, 49, and the movement of the pulley 31 is indicated

by the arrow 50. These brushes 28[a] and 28[b] are provided with suitable bristles as represented in the drawings.

The rotary movements of the several rolls hereinbefore numbered from 17 to 27, inclusive, are caused in the manner following. The shaft 35 has a pinion 51 thereon, which meshes with the gear 52 and rotates it in the direction shown by the arrow 53. The gear 52 is mounted on a rotatable stud-shaft 54, on which is made fast a pinion 55. The pinion 55 meshes with the gear 56 and turns it in the direction indicated by the arrow 57. The gear 56 is loose on a fixed stud-shaft and meshes with the gear 58, and turns the latter in the direction shown by the arrow 59. The gear 58 is mounted on a shaft 60, which carries and rotates the roll 23. On the shaft 61 is secured the roll 19, and said shaft has its end portions loosely mounted in the slots 13 of the upright posts 11. On the shaft 62 is secured the roll 18, and said shaft has its end portions loosely mounted in the slots 13 of the posts 11. The roll 19 rotates by its frictional contact with the roll 23, and the roll 18 rotates by its frictional contact with the roll 19, such frictional contact being maintained by the gravity of the roll 18 on the roll 19, and of the roll 19 on the roll 23. The roll 24 has its shaft mounted in the U-shaped bearings 63, formed on the upper end of a rack-bar 64. The bar 64 has teeth 65 and is slidably mounted in a guide-bar 66, which is fastened between the upper and lower rails of the machine-frame. This rack-bar 64 is vertically adjustable by means of a hand-wheel 67, which is fastened on a shaft 68, the latter being mounted in a bracket 69 integral with the guide-bar 66. The shaft 68 has a pinion 70, which meshes with the teeth 65 of the rack-bar 64. When in its adjusted position the rack-bar 64 is held securely in place by a device like that shown in Fig. 7, and which will be described later. The gear 56 is adjustable in position by means of a bar 71 (Fig. 2), having two vertical slots 72, through which set-screws 73 pass into the rails 3 and 5 to hold said bar 71 in its adjusted position. The upper end of the bar 71 is slightly curved and supports a fixed stud-shaft for the gear 56. A gear 74 mounted on a stud 75 from the upper rail 3 meshes with both the gear 58 and the gear 76, and so the gears 58 and 76 rotate in the same direction, as indicated by the arrows 59 and 78. The gear 76 is fast upon the shaft 77, upon which the roll 22 is secured. The roll 20 is secured on a shaft 79 whose end portions are loosely mounted in slots formed in bearing blocks 80 (Fig. 4) and is in frictional contact with the roll 22. To give increased frictional contact of the roll 20 upon the roll 22, a lever 81 is pivotally mounted on the upper rails 2 and 3 upon fulcrum pins 82, and bears downward upon the shaft 79 of the roll 20. From the free end of the lever 81 a weight or ball 83 is suspended by a chain 84. Friction pulleys 85 are mounted on studs 86 from the upper rails 2 and 3, and over each pulley passes a chain 87, one end of which is fastened to the rack-bar 64, as seen in Figs. 3 and 4, and the other end of which is fastened to a weight or ball 88.

The roll 21 is secured upon a shaft whose end portions are held detachably in bifurcated portions formed in a plate 89, as seen in dotted lines in Fig. 2. One of these plates is best shown in Fig. 4, where it is seen that the roll 21 is detached from said plate. Each plate 89 is fastened to each side of the tank 90, and arms 91, fulcrumed at 92, are arranged to have their free ends project over the bifurcated portions 93 of each plate and engage beneath lugs integral of latches 94, fulcrumed at 95 on each side of said tank, in holding the shaft of said roll in the bifurcated portions of the plates, when said roll is mounted in the tank. The rolls 17, 21, 24, 25 and 26 are hexagonal in cross-section, as illustrated in Figs. 2, 3, 4, 5 and 6. The rolls 17, 26 and 27 have spindles by which they are loosely mounted in bearings 96, 97 and 98, respectively of brackets 99, 100 and 101, the brackets 99 being fastened to the rack-bar 123 of the upright posts 14, the brackets 100 to the rack-bar 116 of the upright posts 9, and the brackets 101 to the upright posts 11.

As shown in Fig. 2, there are U-shaped bearings 102 on the tank end of the upper rails, and a pin 103 passes through holes therein to close the apertures and to hold the spindles of a roll 21[e] to be inserted therein.

The arrows 104 indicate the progressive movement of the skein along and through my machine.

The roll 25 is mounted by its spindle in U-shaped bearings 105 bolted at 106 on sliding rack-bars 107. A pin 111 confines the spindle of the roll 25 within its bearing 105. The rack-bar 107 is slidably mounted in channels upon the top of supports 108 and is covered by the cap pieces 109. The rack-bar 107 has teeth 110.

Upon a bearing block 112 (Fig. 2) is mounted a shaft 113, upon which are fastened a hand-wheel 114 and a pinion 115, the latter meshing with the teeth 110 of the rack-bar 107.

On each upright post 9 guide-bars 115[d] are bolted, within which a rack-bar 116 is slidable. The rack-bar 116 is provided with teeth 117. A shaft 118 is rotatably mounted in hubs 119 integral with the guide-bars 115[d] and a hand-wheel 120 and a pinion 121 are fastened on said shaft 118, and said pinion 121 meshes with the teeth of the rack-bar 116. Each upright post 14 is recessed to receive a sliding rack-bar 123, and at the upper portion of each post is bolted a saddle-plate 122, which extends over each rack-bar 123. Each rack-bar 123 is provided with teeth 124. In a hub 125, integral with each rack-bar 123, a shaft 126 is rotatably mounted. A hand-wheel 127 and two pinions 128 are fastened on the shaft 126 and mesh with the teeth of each rack-bar 123. A block 129, movable in the slotted openings of the upright posts 14, is fastened on each rack-bar 123. A bracket 130 is fastened on each saddle-plate 122. A pulley 131 is rotatably mounted in each bracket 130. A chain 132 is fastened at one end to an eye 133 of the block 129 and passes over the pulley 131. A ball weight 134 is fastened to the free end of the chain 132. A truss 135 is secured between each pair of side rails of the machine-frame and has a journal block 136, in which a shaft 137 is rotatably mounted. On the shaft 137 is a hand-wheel 138 and a worm-gear 139. In the adjacent cap piece 109 a set screw 140 is mounted and has a worm 141 for a head, which meshes with the worm-gear 139. The inner end of the set-screw 140 impinges on the sliding rack-bar 107. A similar device is used in connection with the sliding rack-bar 123, shown in Fig. 5, and said device is shown in detail on an enlarged scale in Fig. 7. In Fig. 7, 123 is the sliding rack-bar in the post 14. A saddle-block 142 is secured to the post 14 by bolts 143

and is provided with a screw-threaded hole in which a set-screw 144 is engageable. The inner end of the set-screw 144 is in contact with the sliding rack-bar 123. The set-screw 144 has a worm 145 for a head. In a hub 146 integral of each upright post 14 a shaft 147 is mounted, on which shaft is a hand-wheel 148 and a worm-gear 149, the worm-gear 149 being engageable with the worm 145. On the upright posts 9 are a similar device. Brackets 150, integral of the guide-bars 115^d support a rotatable shaft 151, on which a hand-wheel 152 and a worm-gear 153 are fastened. Saddle blocks 154, bolted on the guide-bars 115^d, have each a set-screw mounted therein and each set-screw having a worm for a head, which is engageable with the gear 153.

All the rolls except the roll 19 (and the brush rolls 28^a and 28^b) are made of wood, preferably rock maple. The roll 19 is preferably made of soapstone. The rolls 20, 22 and 23 are preferably covered with cloth, as indicated in Fig. 4, for the purpose of making the skeins move more evenly.

Brackets 156, integral with the guide-bars 66, furnish bearing for the shaft 157. The shaft 157 has a hand-wheel 158 and a worm-gear 159 fastened thereon. In a saddle-block a set-screw 160 is mounted and has a worm 161 for a head, which is engaged by the worm-gear 159.

The tank 90 is filled to a proper depth with the sizing liquid, as represented in Figs. 2, 3 and 4.

The roll 26 is formed as shown in Figs. 1 and 8, in a series of pyramidal frustums.

The gear 55 (Fig. 2) is interchangeable, so that a gear of such diameter may be used to mesh with the gear 56, as may be required by the degree of fineness or the strength of the thread or yarn, which is to be treated.

Having thus described the several parts of this machine, I will now explain its operation. The side of the machine shown at the upper portion of Fig. 1 in top plan and represented in Fig. 3, is the work-side of the machine. The skeins of thread or yarn are placed in position in the machine as follows: The rolls 17, 18 and 27 are taken out of their respective journal bearings and withdrawn from the machine, together with the support 36^c, the latter being taken from the machine by unscrewing the set-screws 39 in the base-plate 42. Each skein is then laid upon the rolls 19, 20, 21, 24 and 25 with its folded ends extending toward the ends of the machine respectively. The rolls 19, 20, 21 and 25, which are now outside the skeins are withdrawn from the machine, then inserted through each of the skeins and replaced in their respective bearings. The skeins are then carried beneath the suspended brush-roll 28^a, after which the support 36^c is brought to its former fixed position on the machine-frame. The rolls 17, 26 and 27 are then inserted through all the skeins and mounted in their respective bearings. The roll 18 is replaced in position, but outside of all the skeins. It is thus seen that the thread or yarn passes over the upper surface of the roll 27; then half-round the roll 17; then half-round the roll 18; then between the rolls 18, 19; then in contact with the roll 20; then half-round the roll 21; then between the rolls 20 and 22; then over the roll 23, between said roll and the roll 19; then over the roll 24 into contact with the brush-roll 28^a; then half-round the roll 25; then in contact with the brush-roll 28^b; then quarter-around the roll 26 to the roll 27 again, and so on. The thread or yarn is then brought to proper tension. The hand-wheel 114 is turned over to the left (Fig. 3) thereby turning the spur-gear 115 and sliding the rack-bar 107 outwardly. Thus the roll 25 draws the thread or yarn into the position beneath the brush-roll 28^b. When the proper position of the roll 25 has been thus determined, the hand-wheel 138 is turned and thereby causing its companion worm-gear 139 to turn its worm 141 of the set-screw 140, so that said screw 140 holds the rack-bar 107 securely in such adjusted position. The hand-wheel 67 is turned and thereby causing its companion spur-gear 70 to slide the rack-bar 64 to the requisite extent, and then the hand-wheel 158 is turned and by its companion worm-gear 159 turns the worm 161 of the set-screw 160, and so holds securely the sliding rack-bar 64 in its adjusted position. The hand-wheel 127 is turned and by its companion spur-gear 126 moves the sliding rack-bar 123, and so elevates the roll 17 to the requisite position. The hand-wheel 148 is then turned, which by its companion worm-gear 149 turns its worm 145 of the set-screw 144, and so holds the sliding rack-bar 123 in its adjusted position. The hand-wheel 120 is turned, which by its companion spur-gear 121 slides the rack-bar 116 to the desired position, thereby elevating the roll 26. Then the hand-wheel 152 is turned, which by its companion worm-gear 153 turns its worm 155 of the set-screw and thereby holding in place the rack-bar 116 when so adjusted. Thus the thread is brought to a proper tension to pass the rolls respectively and to be in proper contact with the brush rolls 28^a and 28^b. The ball or weight 83 on the chain 84 draws downward the lever 81, and the downward pressure as executed by the weighted lever 81 upon the spindle of the roll 20 forces the thread or yarn against the cloth covering of the roll 22 and equalizes the sizing which the thread or yarn has taken while passing through the tank 90.

To counterbalance the manual power to move the rolls 17, 24 as above described, the weight or balls 134 and 88 on the chains 87 and 132 respectively are useful until the rack-bars 64 and 123 can be locked in position by the hand-wheels 148 and 158, as already explained.

As shown in Figs. 2 and 3, the roll 21 is submerged in the sizing liquid, and as the thread or yarn passes around the roll 21, it is thoroughly saturated by said liquid. When the thread or yarn has absorbed a sufficient amount of the sizing, the roll 21 is detached from its bearings by moving the latch-levers 94 (Fig. 4) and raising the arms 91, whereupon the roll 21 is detachable from the journal plate 89. A clean dry wood roll 21^e (Fig. 4) is then inserted through the skeins and is mounted by its spindle in the bearings 102 (Figs. 2, 3 and 6) and secured in place by the pins 103. The hand-wheels 114 and 67 are then operated to increase the tension of the skeins and to bring them into close contact with the brush-rolls 28^a and 28^b. The bristles of the brush-rolls 28^a and 28^b lay the wet fibers of the saturated yarn or thread longitudinally thereof and dress and polish the yarn or thread to a proper smoothness and finish.

The wood-rolls 17, 21, 24, 25 and 26, by their angularly disposed surfaces, give consecutive stretches to the wet yarn or thread and produce the desired tension thereof between the several rolls, and also cause the

skeins to keep flat during the operation, and prevent the skeins from slipping on the rolls.

The speed of the travel of the yarn or thread through the machine is regulated by means of the gear 55, which, as before stated, is interchangeable, and selected according to the degree of fineness or strength of the yarn or thread. As the yarn or thread comes from the manufacturer already twisted, the degree of fineness is known, and the proper change gear 55 for such degree is selected and mounted and put in mesh with the gear 56. To admit of proper adjustment of the gear 55, the slotted adjusting bar 71 is provided, and when the proper vertical position of the gear 56 has been found, the set-screws 73 hold said bar 71 in place and cause the gear 56 to keep in mesh with the gear 55.

By my improved machine the thread or yarn is sized, dressed and polished, on all sides, at the same time, and while it remains in skein form, and any desired number of skeins may be operated upon at the same time. Fig. 1 shows five skeins undergoing operation at once. Each thread or yarn, although in skein, is separately treated, as the longitudinal surfaces of the roll 26 are formed into pyramidal frustums, as shown in Figs. 1 and 8. In this manner the threads or yarn are separated and spread apart, one from the others, as illustrated, so that the brush bristles of the roll 28^a and 28^b get into contact with the thread or yarn all around the same, on the entire exterior surfaces thereof, those of the brush-roll 28^a inside the skeins and those of the brush-roll 28^b outside the skeins.

Threads and yarns, whether single, two-ply, three-ply or more plies, are successfully operated upon by this machine, and the output of the machine is large because of its ability to treat so many skeins at once and with so quick and easy operation.

In practice I prefer to dip and brush the thread or yarn four times. This results in perfectly laying the loose ends of fibers and giving to the thread or yarn a good finish and polish. By this repetition of the sizing and polishing operations, increased strength is given to the yarn or thread, as well as a superior finish. I prefer to speed the machine so that four dips and brushings are effected in one minute.

I claim as a novel and useful invention and desire to secure by Letters-Patent:

1. In a thread dressing machine, the combination of a plurality of rolls adapted to give movement to a skein of thread or yarn through the motion and in contact with the skein; two brush-rolls mounted in contact with the skein; bearing supports for all of said rolls respectively; a removable bearing support for one of said brush-rolls; a tension device for stretching the skein between the rolls; a tank to contain a sizing liquid; means for submerging the skein in said liquid in the tank in the course of said skein movement, and means for rotating said rolls.

2. In a thread dressing machine, the combination of a plurality of rolls adapted to give movement to a skein of thread or yarn through the machine, which rolls are inside the skein; a brush-roll within the skein in contact therewith; a plurality of rolls in contact with the skein on the outside of the skein; a brush-roll outside of the skein and in contact therewith; a device adapted to give tension to the skein between the rolls respectively; bearing supports for all of said rolls; a fixed bearing support for one of said brush-rolls and arranged to be easily removed therefrom; means for rotating said rolls; a tank for containing a sizing liquid, and means for passing the skein into and out of said liquid in the tank during the progress of the skein through the machine.

3. In a thread dressing machine, the combination of a brush-roll having a shaft secured therethrough, a support secured upon the machine-frame and having a journal bearing to receive one end portion of the shaft; a base-plate secured upon the machine-frame and having integral guide-flanges; set-screws through the flanges of said plate; a support having an integral flanged base to enter between the flanges of said plate, and said second support having a journal bearing to receive the other end portion of the shaft.

4. In a thread dressing machine, the combination of two supports having a channel provided in each; a sliding rack-bar having teeth and mounted longitudinally in said channels; a cap-piece over one of said supports; a saddle-plate over the other of said supports; means for moving the rack-bar; a bearing block on the rack-bar; a thread-roll mounted in the bearing block, and a set-screw passing through the saddle-plate into contact with the rack-bar.

5. In a thread dressing machine, the combination of two supports provided with a channel in each; a sliding rack-bar having teeth and mounted and longitudinally movable in said channels; a cap-piece over one of said supports; a saddle-plate over the other of said supports; means for moving the sliding bar in said channels; a bearing block on the sliding bar; a thread-roll mounted on the sliding bar; a shaft mounted on a fixed support; a set-screw passing through the saddle-plate into contact with the sliding bar; a worm secured at the outer end of the set-screw; a hand-wheel on said shaft, and a worm-gear on said shaft engaging with the worm of the set-screw.

6. In a thread dressing machine, the combination of a bar movable on a base; a bearing block; a shaft mounted in said block; a set-screw mounted in a fixed support and having its inner end in contact with the movable bar; a worm on the outer end of the set-screw; a hand-wheel on said shaft, and a worm-gear fast on said shaft and engaging the worm of the set-screw.

7. In a thread dressing machine, the combination of a guide-bar having flanges; a rack-bar slidable in the flanged guide-bar; a hub integral of the guide-bar; a shaft rotatably mounted in the hub of said guide-bar; a hand-wheel on the shaft; a spur gear fast on the shaft and engageable with the teeth of the rack-bar; a saddle-plate secured on the guide-bar and carrying a bracket; a friction pulley rotatably mounted on the bracket of said saddle-plate; a cross piece on the rack-bar provided with an eye; a chain fastened to the eye of the cross piece and passing over the pulley, and a weight ball upon the end of said chain.

8. In a thread dressing machine, the combination of a frame having two top rails; a journal bearing support fixed on one rail; a plate secured on the other of said rails and having integral guide-flanges; a second journal bearing support having an integral flanged-base to enter between the guide-flanges of said plate; set-screws passing through the guide-flanges of said plate to contact with the base of second mentioned support, and a brush-roll secured on a shaft whose ends are rotatably mounted in the journal bearing of each of said supports.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. FREDENBURGH.

Witnesses:
A. E. CROMBS,
S. H. MANNING.