

No. 892,911.

G. STONE.

PATENTED JULY 7, 1908.

APPARATUS FOR TREATING WOOLEN YARNS.

APPLICATION FILED JULY 14, 1906.

2 SHEETS—SHEET 1.

Fig. 2.

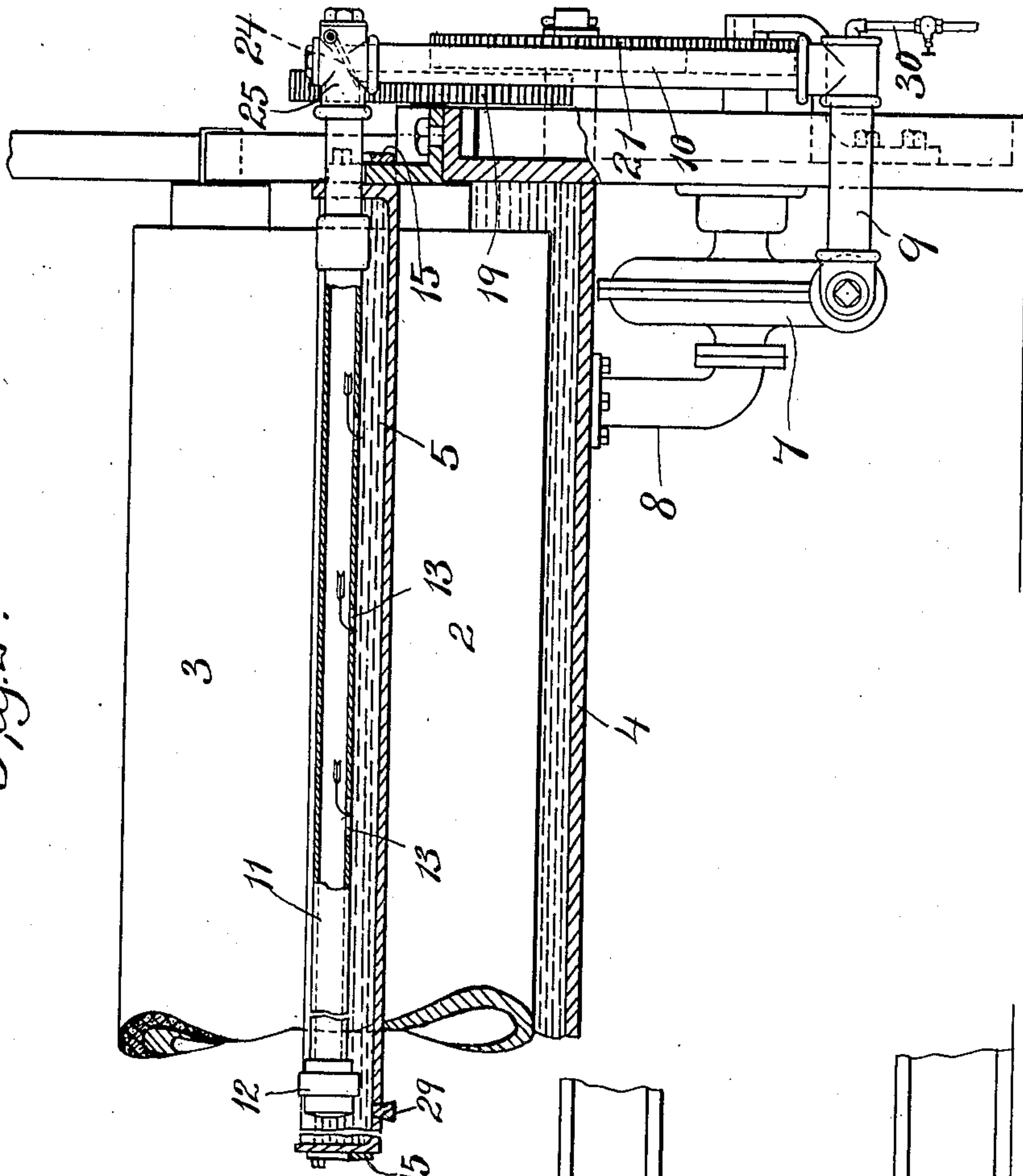
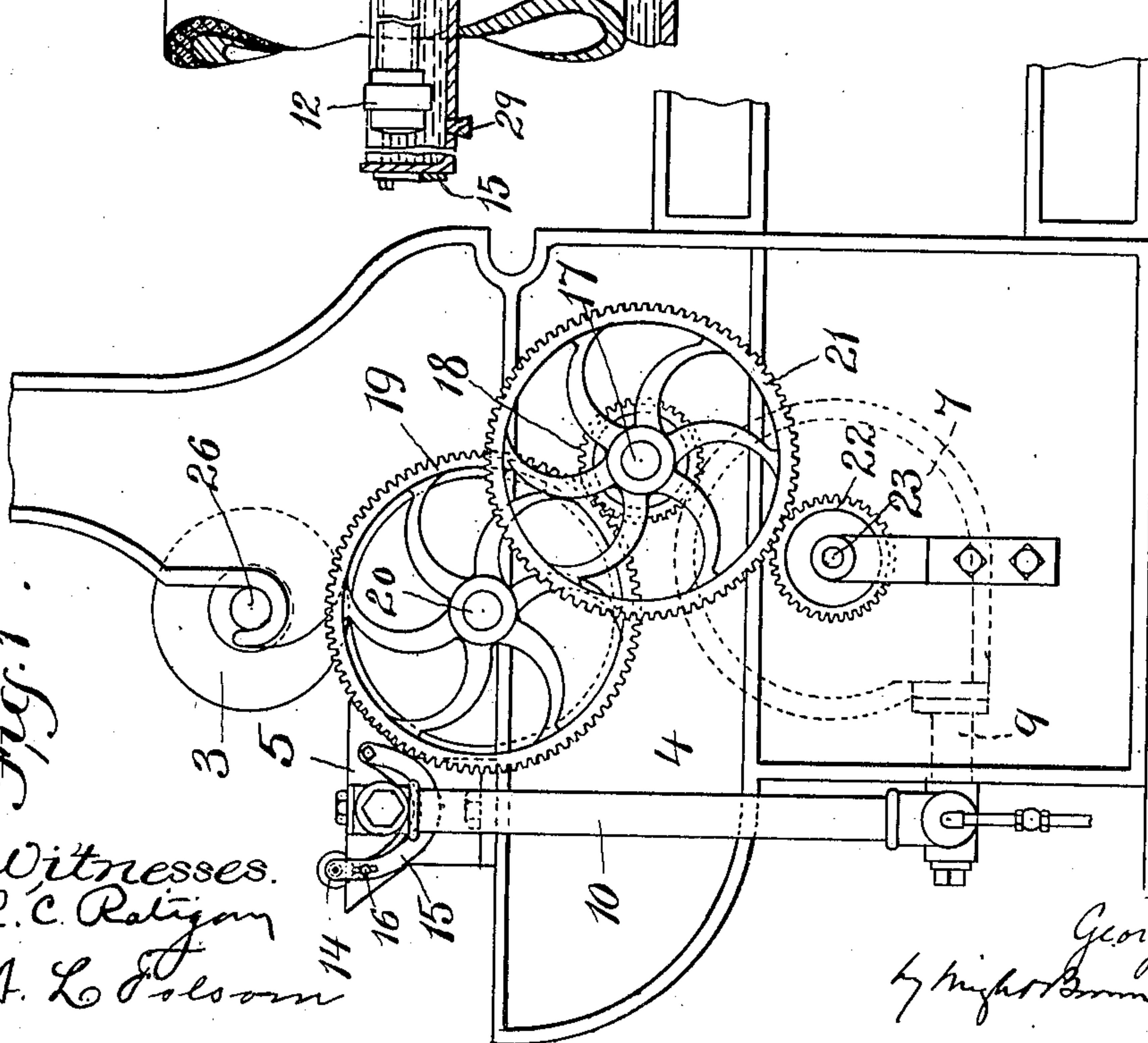


Fig. 1.

Witnesses.
A. C. Ratigan
A. L. Folsom



Inventor.
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By Wright Brown Quincy May
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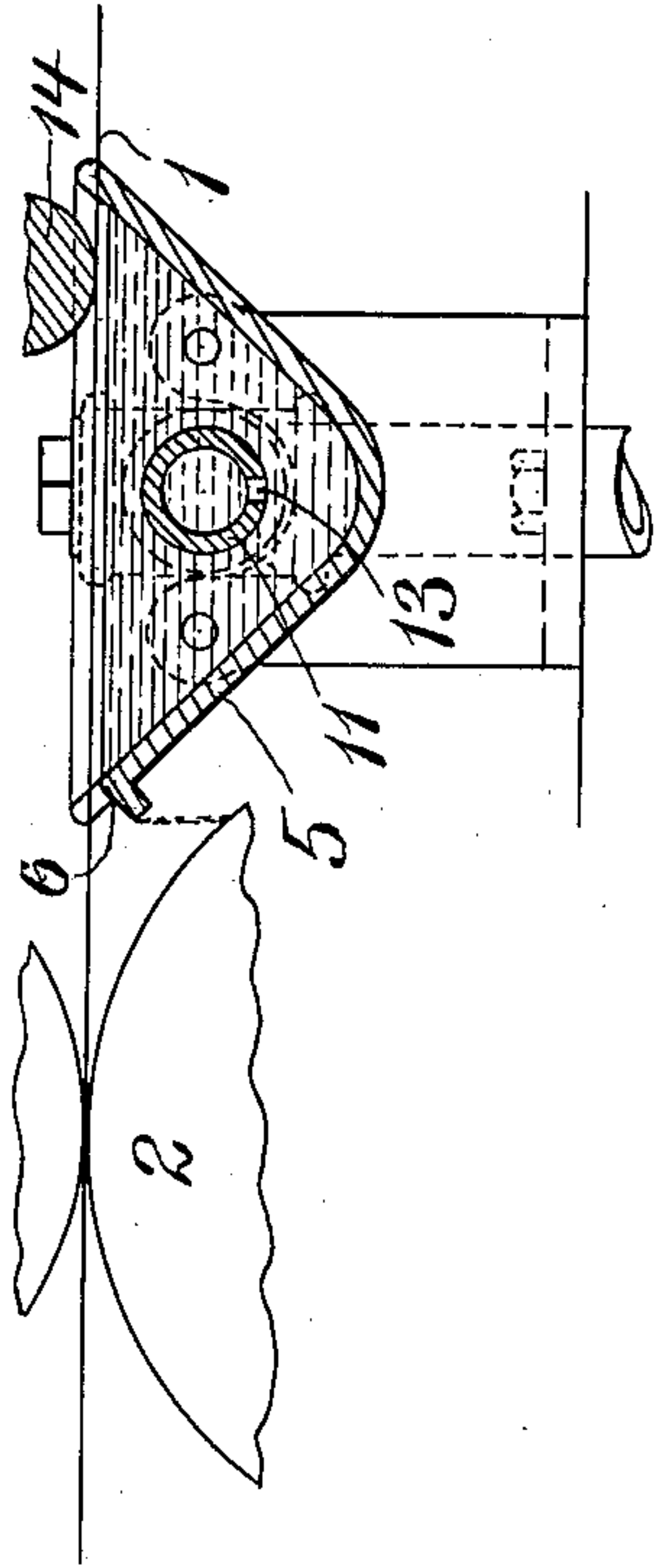


Fig. 4.

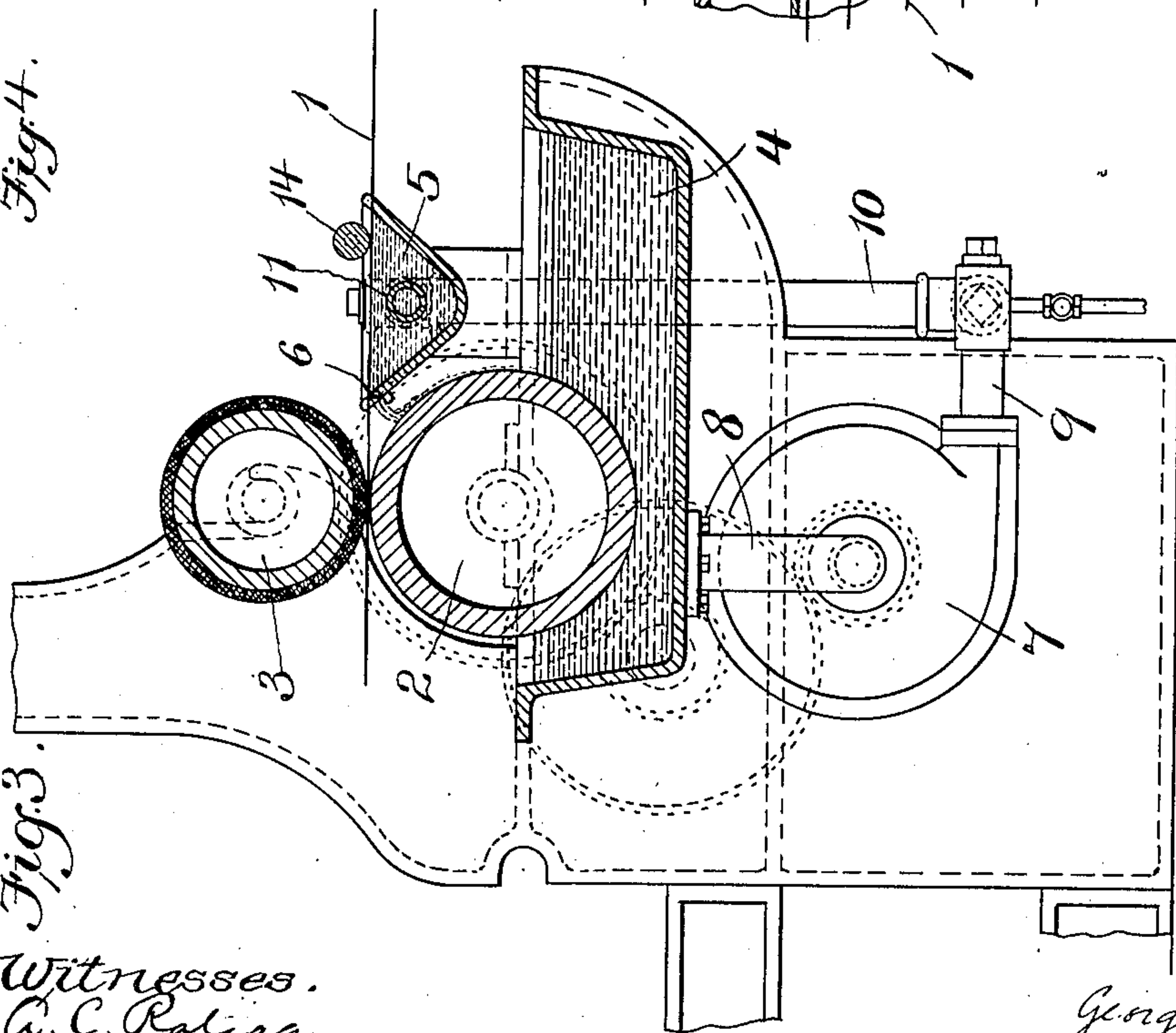
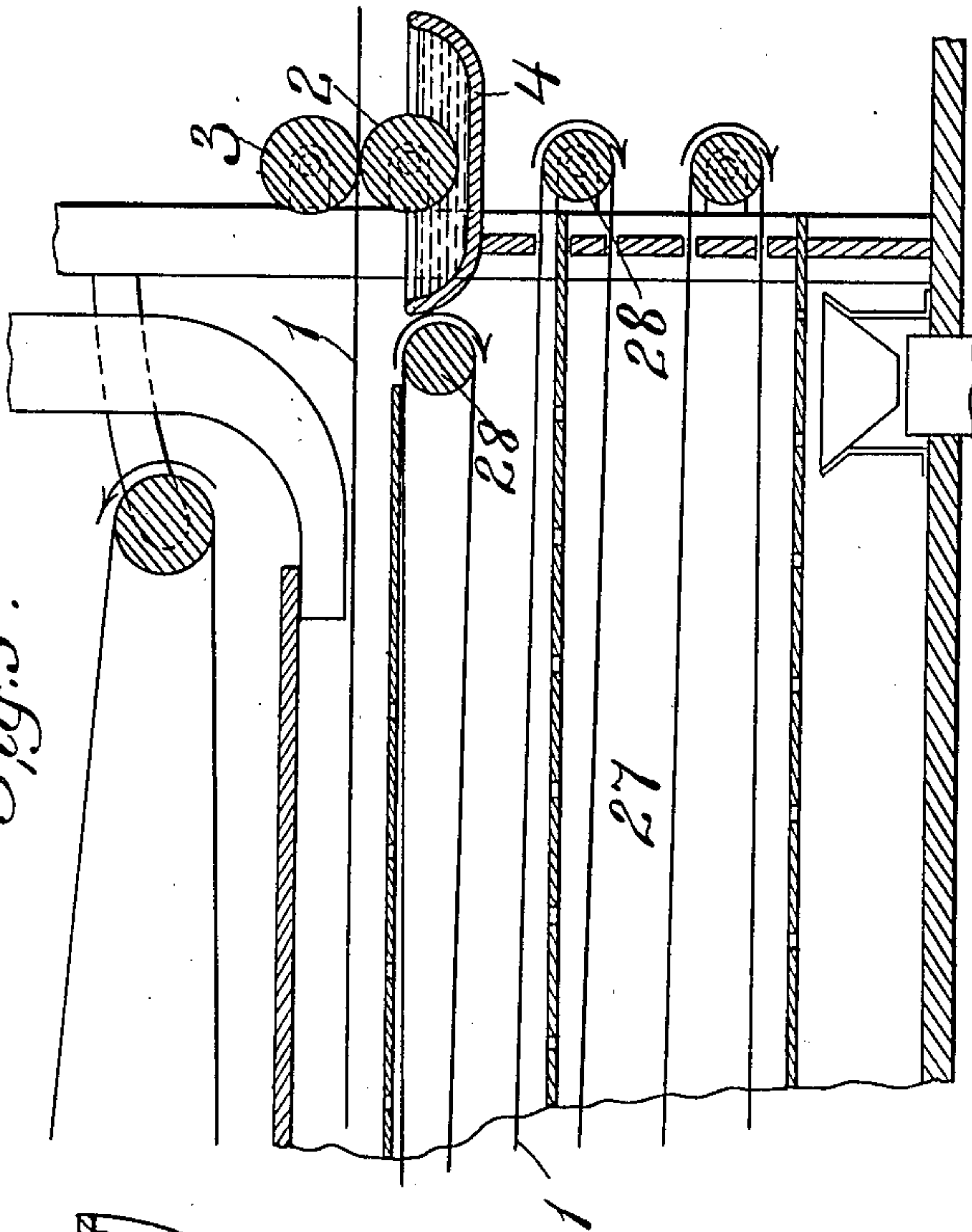


Fig. 3.

Witnesses.
A. C. Ratigan
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Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE STONE, OF NORTH ANDOVER, MASSACHUSETTS, ASSIGNOR TO M. T. STEVENS, NATHANIEL STEVENS, S. D. STEVENS, AND M. T. STEVENS, JR., OF NORTH ANDOVER, MASSACHUSETTS, A FIRM.

APPARATUS FOR TREATING WOOLEN YARNS.

No. 892,911.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed July 14, 1906. Serial No. 326,289.

To all whom it may concern:

Be it known that I, GEORGE STONE, of North Andover, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Treating Woollen Yarns, of which the following is a specification.

The present invention is an improvement in machines for treating yarn with a dressing or sizing composition, and has for its object to size woollen yarn as it is drawn from spools, and prepare it for weaving. In thus treating yarn, a large number of strands are drawn from spools and led side by side through a reed to the sizing apparatus and drying chamber. The yarn in being thus drawn from the spools frequently breaks and necessitates stopping of the machine to tie together the separated ends, and while the apparatus is thus stopped and the yarn stationary, it is necessary to remove it from the dressing composition or size. To avoid this necessity is the object of my invention, in carrying out which I provide an apparatus in which the yarn is fed at a certain predetermined level, and arrange means for raising a quantity of the dressing so that it will act on the yarn when the latter is moved, and will subside below the yarn when the latter stops, and thereby leave the yarn above and out of the dressing.

Of the accompanying drawings,—Figure 1 represents a side elevation of a machine embodying the principles of the invention. Fig. 2 represents a cross section of the same, showing one end. Fig. 3 represents a longitudinal section. Fig. 4 represents a similar section on an enlarged scale, of the auxiliary vat containing the dressing composition through which the yarn is drawn. Fig. 5 represents a longitudinal section of one end of the drying box into which the yarn is led after being treated.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 represents one of a series of strands of yarn which are led from a spool-stand through a reed (not shown) to rolls 2 and 3 which squeeze the yarn between them and feed it. The lower roll 2 dips into the vat 4 containing a dressing composition or size so that it may lift a quantity of the size and deposit it on the

yarn. As woollen yarn is composed of fibers which are so close together that the size cannot work thoroughly into them during the short time the yarn is gripped by the rolls, it is necessary to provide additional means for depositing the dressing on the yarn and more evenly sizing the latter. This means consists of an auxiliary vat 5 located above the main vat 4 slightly below the plane in which the strands of yarn are carried. One of the sides of the auxiliary vat is of less height than the other sides, and has an edge 6 located slightly lower than the nip of the rolls and above a portion of the lower roll 2. When the vat 5 is full and more of the dressing is supplied to it, the excess overflows the edge 6 and drops upon the surface of the roll 2, and this edge accordingly determines the level of the composition in the vat when the supply thereto is interrupted. The yarn to be treated is led over the auxiliary vat, as shown in Fig. 4, at a slight distance above the edge 6 and the level of the dressing determined thereby.

To supply the dressing to the auxiliary vat, I provide a pump 7 to which the composition is supplied through a pipe 8 leading from the bottom of the main vat 4, and from which it is forced through pipes 9 and 10 to a delivery pipe 11 passing horizontally through one end of the auxiliary vat and extending the length of the latter. The pipe 11 is closed at its further end by a cap 12 and has a number of outlet openings 13 in its lower portion through which the liquid size is discharged downward simultaneously at a number of points. When the pump is operated the auxiliary vat is filled to overflowing, and the level of the composition therein is raised above the normal minimum level established by the edge 6. The discharge capacity of the pump is sufficient to raise the level in the auxiliary vat a considerable distance above the minimum, and an adjustable guide roll 14 locates the yarn so that it will be reached by the sizing when the level thereof is thus raised. This guide roll is adjustable, being mounted upon arms 15 pivoted to the opposite ends of the vat 5 which can be raised and lowered and locked in position by clamping nuts 16 passing through slots near the free ends of the arms. The guide roll is adjusted so that the yarn will be submerged to the re-

quired extent in the sizing when the level of the latter is thus raised.

The roll 2 and pump are both operated simultaneously from the same drive shaft 17, the latter having a pinion 18 meshing with a gear 19 on the shaft 20 of the roll, and also having a gear 21 in mesh with a pinion 22 on a shaft 23 of the pump, which is preferably a rotary centrifugal one. Thus when it is necessary to stop the machine for piecing together a broken strand of yarn or for any other purpose, the driver 17 is stopped, which causes the feed roll 2 to become stationary, and also immediately renders the pump inoperative. Thereupon the excess of fluid in the auxiliary vat overflows the edge 6, and its level quickly subsides to that shown in Fig. 4, below the yarn, leaving the yarn clear. The dressing is prevented from flowing back through the supply pipe by means of a check valve 24 mounted in the coupling 25 which unites the pipes 10 and 11. Thus the dressing cannot be lowered below the level of the edge 6, and so it can be quickly raised again to the yarn as soon as the machine is once more started. The pump by producing a variation in the level of the sizing composition, not only performs a function similar to lowering and raising the yarn into and out of the vat in a more rapid and efficient manner, but it also agitates the composition and keeps it in a uniform condition throughout, thereby overcoming the tendency which the material has of separating into its thin and viscous constituents. This insures a uniform treatment of all parts of the yarn.

The upper roll 3 has trunnions 26 which are retained in sockets in the frame of the machine, and rests upon the lower roll by which it is turned. It has a yielding covering by which the yarn is pressed against the hard lower roll to squeeze out the excess of the sizing composition, and to furnish the grip necessary to feed the yarn.

From the squeezing rolls the yarn passes into a drying chamber 27 to which heated dry air is supplied, and in which the yarn is led back and forth several times over rolls 28 at each end of the chamber (the rolls at one end only of the chamber being shown in the drawings), and finally passes to winding reels whereon it is wound.

When the machine is put out of use for any extended length of time, the composition is drawn off from the auxiliary vat through a hole in the bottom, which is normally kept closed by a plug 29, and is forced out from the pump and piping by steam blown through a pipe 30 which leads from a boiler. By means of the steam blow-out, the sizing composition, which becomes stiff when cold, is expelled and prevented from clogging the pump.

I claim:—

1. An apparatus for sizing yarn, comprising means for feeding yarn, a receptacle over which the yarn is fed containing liquid dressing at a normal level lower than the yarn, and means connected with said feeding means, so as to be operable simultaneously therewith, for raising the level of the dressing up to the yarn only when the feeding means and yarn are moving.

2. An apparatus for sizing yarn, comprising mechanism for advancing yarn progressively, and means and provisions associated therewith for raising a quantity of liquid dressing sufficiently high to immerse the yarn while said feeding mechanism and yarn are in motion, and causing said dressing to subside below the yarn when the same are stationary, the yarn being maintained meanwhile at a constant level.

3. In an apparatus of the character described, a vat containing liquid dressing and having an overflow, a device for drawing yarn over the vat slightly above the overflow level, and automatic means for raising the liquid up to the level of the yarn to act on the yarn when said device is active and the yarn is in motion and for permitting the liquid to subside away from the yarn when the same is stationary.

4. In an apparatus of the character described, a vat, devices for guiding and drawing yarn over the vat above the normal quiescent level of liquid therein, and means operable simultaneously with said devices for supplying a fluid dressing composition to the vat faster than it can drain away, whereby the level of the dressing is raised to that of the yarn when said device is active.

5. In an apparatus of the character described, a vat containing a fluid dressing composition, rolls turning oppositely in contact, one of which dips into the vat, for squeezing and feeding yarn, a second vat above the first vat over which yarn passing to the squeeze rolls is carried, and means for supplying an excess of dressing to the second vat only while the squeeze rolls are active, whereby the level of dressing therein is raised at such times sufficiently to moisten the yarn passing thereover and is permitted to subside when the yarn is stationary.

6. In an apparatus of the character described, a vat containing a fluid dressing composition, rolls turning oppositely in contact, one of which dips into the vat, for squeezing and feeding yarn, a second vat above the first vat in such position that excess of dressing therein may overflow into the first vat over which yarn passing to the squeeze rolls is carried, and means for supplying an excess of dressing to the second vat only while the squeeze rolls are active, whereby the level of dressing therein is raised

at such times sufficiently to moisten the yarn passing thereover and is permitted to subside when the yarn is stationary.

7. In an apparatus of the character described, a vat containing a fluid dressing composition, rolls turning oppositely in contact, one of which dips into the vat, for squeezing and feeding yarn, a second vat above the first vat in such position that excess of dressing therein may overflow into the first vat over which yarn passing to the squeeze rolls is carried, and means for pumping dressing from the first to the second vat while said rolls are active at such a rate as to raise the level in the second vat above the overflow up to the yarn, the pumping means being inoperative when the rolls and yarn are stationary.

8. A yarn-treating machine comprising a vat containing a dressing composition, a roll dipping into the composition, a second vat above the first vat having one side lower than the others arranged to discharge the overflow therefrom upon said roll, a pump for lifting dressing from the first to the second vat, means for driving said roll and pump simultaneously, and a second roll cooperating with the first roll to feed yarn over the second vat at a slightly higher level than the overflow edge thereof and to squeeze excess of dressing from the yarn, the pump having a discharge capacity sufficient to raise the level of the dressing in the second vat up to that of the yarn when the latter is being fed.

9. A yarn-treating apparatus comprising a vat, means for supplying an excess of fluid dressing composition to the vat to raise its level above an overflow outlet of the vat, means for giving a continuous feed movement to yarn to draw it over the vat; and connections between the feeding and fluid-supplying means to cause the supply of excess dressing to cease when the feed movement of the yarn is stopped; the yarn being guided at a height above the overflow level such that it is immersed in the dressing when the level thereof is raised.

10. A yarn-treating apparatus comprising a vat, means for supplying an excess of fluid dressing composition to the vat to raise its level above an overflow outlet of the vat, means for giving a continuous feed movement to yarn to draw it over the vat; the parts arranged and connected so that the supply of excess dressing will cease when the feed movement of the yarn is stopped, and a guide roll in advance of said feed means adjustable to vary the height of the yarn above the vat overflow and secure the proper amount of submergence of the yarn in the dressing when the latter is raised.

11. A yarn-treating apparatus comprising a vat, a pump for supplying a fluid dressing composition to the vat, feed rolls for gripping and drawing yarn across the vat, and a driver

connected to said feed rolls and pump for operating them simultaneously, the vat having a normal minimum level below the yarn, the level being raised by the pump above the yarn only while the feed rolls and yarn are in motion.

12. An apparatus of the character described comprising a vat containing a fluid dressing, an auxiliary vat above the main vat, a pump for lifting the dressing from the main to the auxiliary vat and causing it to overflow from the latter, whereby the dressing is kept agitated and of a uniform consistency, means for feeding yarn over the auxiliary vat in contact with the overflowing dressing, and means for stopping the pump when the yarn is stationary, whereby the dressing may subside below the yarn.

13. An apparatus of the character described comprising a vat containing a fluid dressing, an auxiliary vat above the main vat, a pump for lifting the dressing from the main to the auxiliary vat and causing it to overflow from the latter, whereby the dressing is kept agitated and of a uniform consistency, and cooperating rolls for gripping, feeding and squeezing the yarn to remove the excess dressing, one of said rolls dipping into the main vat and located to receive the overflow from the auxiliary vat, said rolls being also located to draw the yarn through the dressing overflowing from the auxiliary vat.

14. An apparatus of the character described comprising a vat containing a fluid dressing, an auxiliary vat above the main vat, a pump for lifting the dressing from the main to the auxiliary vat and causing it to overflow from the latter, whereby the dressing is kept agitated and of a uniform consistency, means for feeding yarn over the auxiliary vat in contact with the overflowing dressing, means for stopping the pump when the yarn is stationary, whereby the dressing may subside below the yarn, and a check valve in the delivery of the pump for preventing return therethrough of the dressing from the auxiliary vat when the pump is at rest.

15. An apparatus of the character described comprising a vat containing a fluid dressing, an auxiliary vat above the main vat, a pump for lifting the dressing from the main to the auxiliary vat and causing it to overflow from the latter, whereby the dressing is kept agitated and of a uniform consistency, and a pipe connected to the pump for admitting steam to clear the dressing from the pump and connected delivery pipe.

16. In a machine for treating yarn, in combination with a vat for sizing composition and a lifting roll, an auxiliary vat in advance of the lifting roll arranged adjacent the yarn so as to apply composition thereto before the latter is engaged by the lifting roll.

17. In combination with the receptacle for sizing composition and the applying roll of a

yarn-sizing apparatus, an auxiliary vat located above said receptacle and adapted to contain a body of the sizing composition with its surface at the level of yarn led over the
5) applying roll, said auxiliary vat being arranged to discharge the overflow of the sizing composition upon the lifting roll.

In testimony whereof I have affixed my signature, in presence of two witnesses.

GEORGE STONE.

Witnesses:

MARGARET G. HURLEY,
HARRY R. DOW.