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W. H. CLOUGH & H. O. MANNING.

GIG MILL.

No. 465,345. Patented Dec. 15, 1891.

Fig. 1.

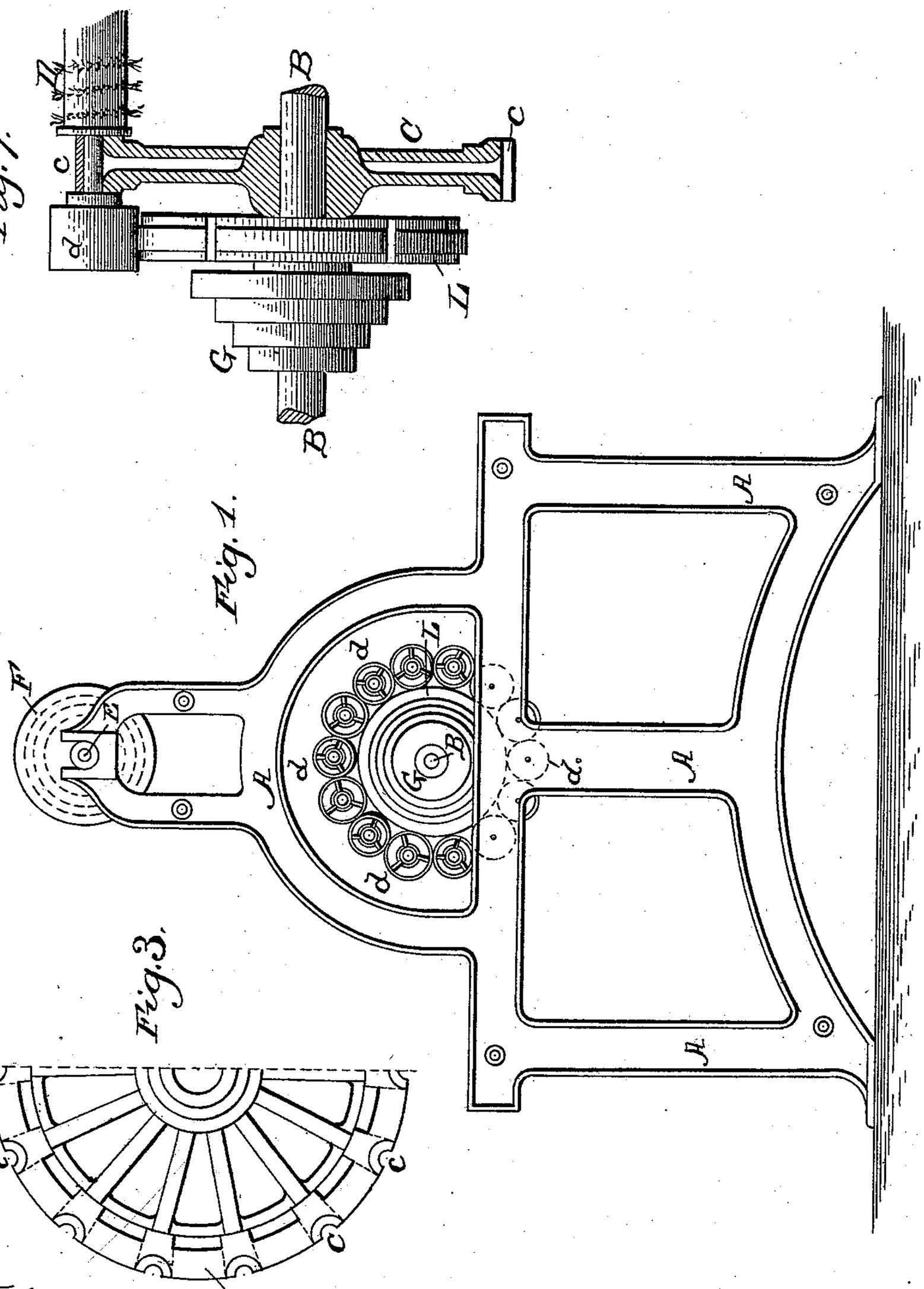

Fig. 3.

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Fig. 5

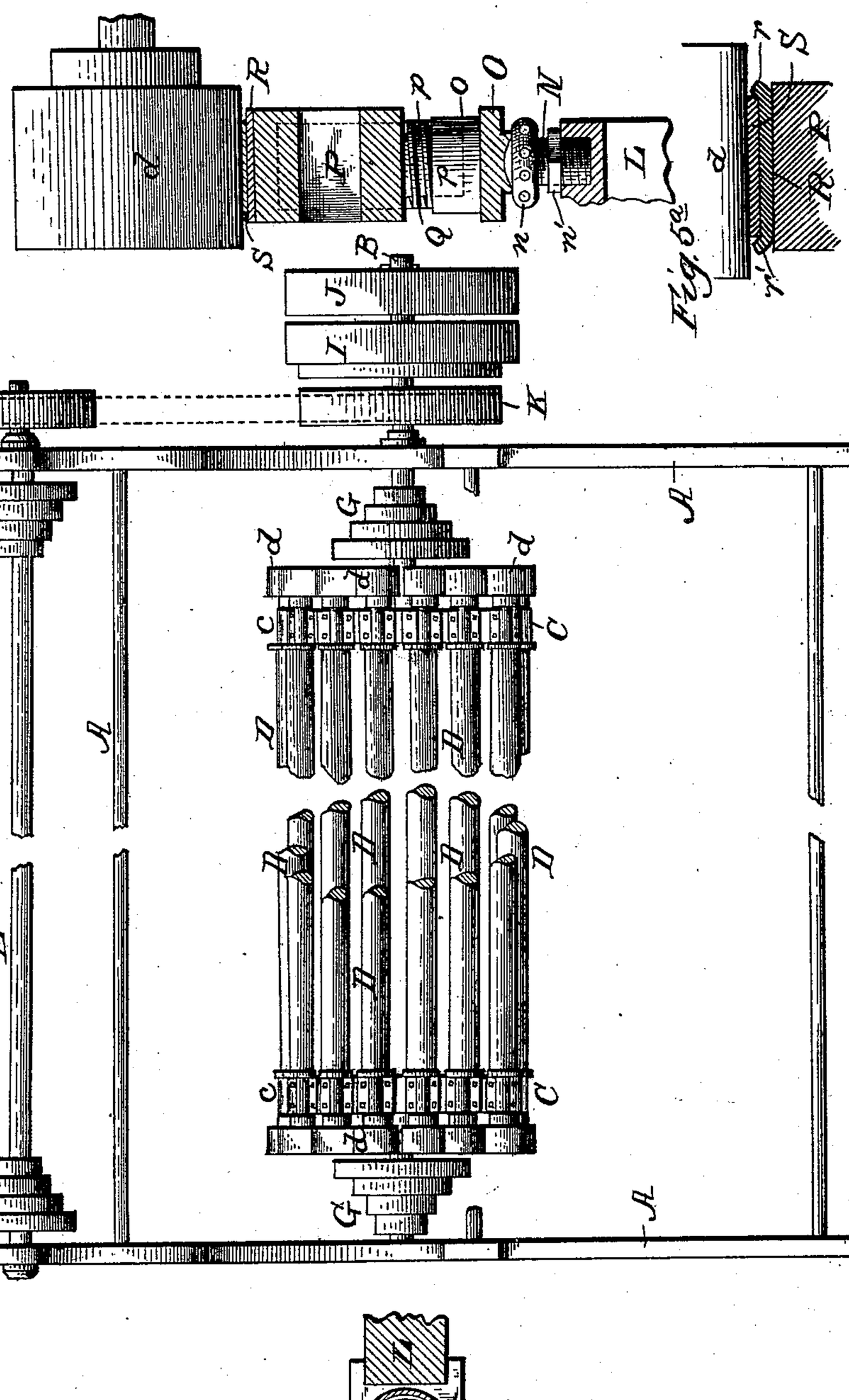

Fig. 2.

Fig. 6.

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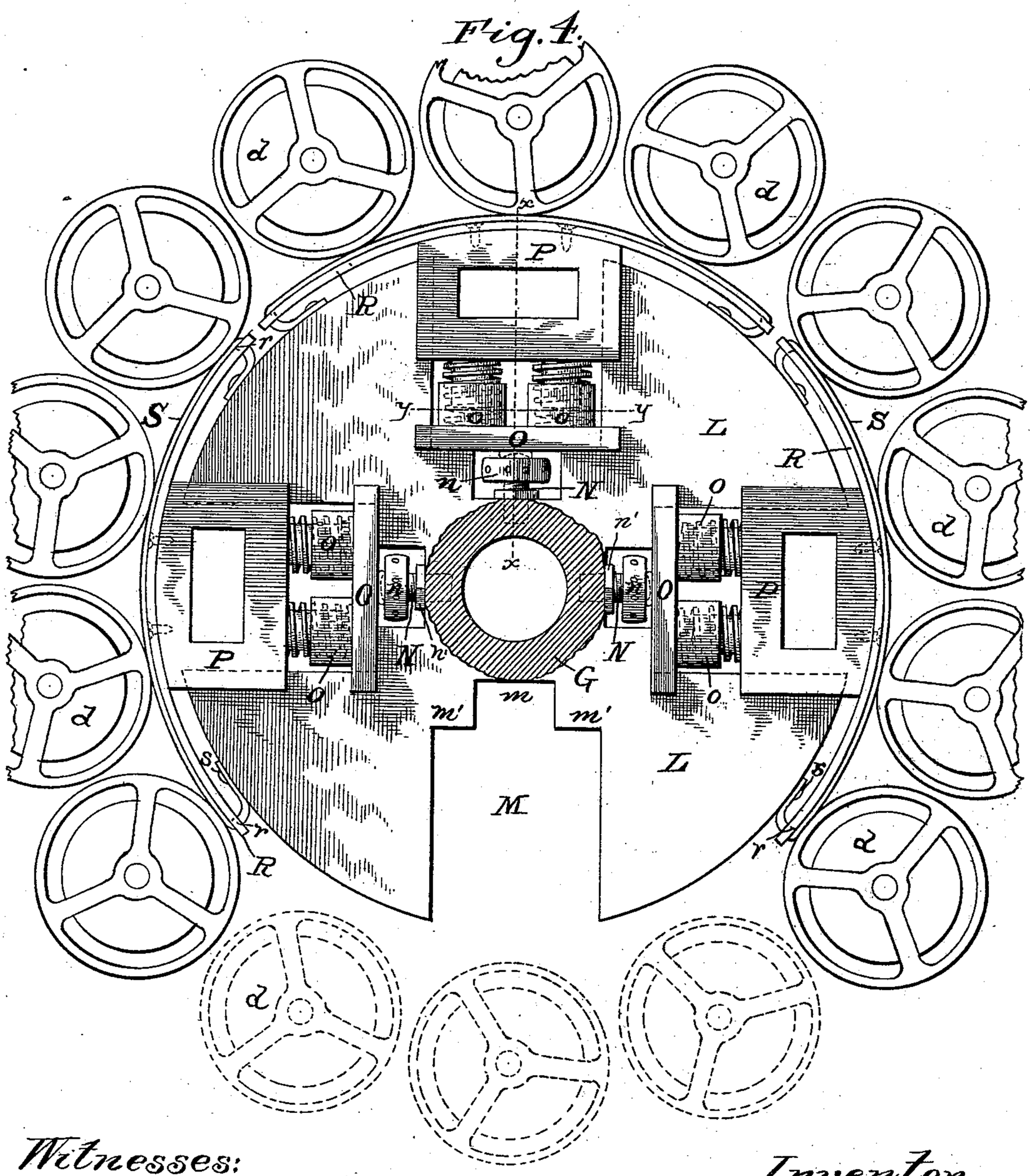
Fig. 4.



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UNITED STATES PATENT OFFICE.

WARREN H. CLOUGH AND HAMILTON O. MANNING, OF LOWELL, MASSACHUSETTS.

GIG-MILL.

SPECIFICATION forming part of Letters Patent No. 465,345, dated December 15, 1891.

Application filed August 22, 1891. Serial No. 403,418. (No model.)

To all whom it may concern:

Be it known that we, WARREN H. CLOUGH and HAMILTON O. MANNING, citizens of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Gig-Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is an end elevation of a gig-mill. Fig. 2 is a side elevation thereof, parts being broken away. Fig. 3 is a partial view of one of the drum-heads. Fig. 4 is a detached view, enlarged, of part of the mill. Fig. 5 is a vertical transverse section on line *x x* of Fig. 4. Fig. 5ª is a partial section, enlarged, on line X X, Fig. 4. Fig. 6 is a horizontal section on line *y y*, Fig. 4.

This invention relates to the construction of parts for driving the teaseling-rollers of a gig-mill, its object being to provide means whereby the rolls shall be driven not positively, but by means of friction devices, so that, although the driver moves continuously, any of the teaseling-rollers may slacken its speed of rotation, or their rotation may be interrupted in case of the engagement of their working faces (whether teasels or cards) meeting with any obstruction. So, also, the frictional contact between the parts of the rotating mechanism may be so adjusted that the teaseling may be varied, according to the character of the work to be done in raising the nap.

Like reference-letters refer to similar parts in all the figures.

A A is the frame upon which the operative parts are supported.

B is the shaft, and C C the heads of a drum mounted upon the frame.

c c are bearings, at suitable distances apart, around the peripheries of the drum-heads.

D D are teaseling-rollers provided with cards or teasels, preferably upon spiral lines, as shown in Fig. 7, with their journals mounted in the bearings *c c*. *d d* are pulleys on the outer ends of the journals of these rollers.

As the frame, the drum, and the teaseling-rollers may be of any usual or preferred construction, they need not be more specifically described.

E is a counter-shaft mounted either above or below the drum, as may be most convenient. In the drawings we have shown it above.

As it is desirable to be able to vary the speed of rotation of the teaseling-rollers, we propose to employ cone-pulleys, of which the driver F is mounted on the counter-shaft and is to be belted to a reversed pulley G, the mounting of which will be hereinafter explained.

I is a driving-pulley, and J a loose pulley, both on the drum-shaft B.

K K′ are pulleys on the drum-shaft and the counter-shaft.

L is the composite friction-driver mounted loosely on the drum-shaft, and has the cone-pulley G secured thereto or cast in one piece therewith.

From the above description it will readily be seen that the speed of rotation of the friction-driver relative to the rotation of the drum may be varied at the will of the operator within quite wide limits, and while we have illustrated this method of varying the relative rapidity of rotation of these parts by cone-pulleys we do not wish to be limited thereby, because many other well-known trains of gearing might be substituted therefor without in any manner affecting the character of our invention.

The composite friction-driver is located in the same vertical plane with the pulleys *d d* of the teaseling-rollers, its diameter being such that its periphery will engage with the faces of those pulleys which are nearest the drum-shaft on which the driver is mounted, and in order to insure a satisfactory frictional driving contact we propose to make the periphery of the driver of a somewhat yielding material. In order to further provide for all the requirements of our invention we also propose to so construct the driver that its diameter may be varied. In the illustration which we have given of our invention the composite driver is formed with four slots M *m*, opening outward and arranged at about equal distances around its periphery. As these slotted portions of the composite driver and their co-operating parts are substantially alike, we will describe them in the singular. The inner portion *m* of the slot is of less width than the outer portion, so that there are shoulders at *m′*.

N *n* is an adjusting-screw having its lower

end seated in a screw-threaded socket formed for its reception in the driver, the enlarged part *n* being adapted to receive a wrench or a turning-pin to be inserted in radial holes or recesses. The extreme outer end of the screw is preferably rounded to engage with a correspondingly-shaped seat in the inner face of a slide O, which has its ends flanged to take hold of the opposite sides of the driver, whereby the slide is maintained in working position, being first inserted at the open end of the slot.

o o are sockets or cups projecting outward from the slide and preferably cast in one piece therewith.

P is a carrier also flanged at its ends to fit the opposite faces of the driver adjacent to the slot. By preference the depth of the grooves between the flanges of the carrier is such that the adjacent edges of the slot fit somewhat closely the carriers at the bottoms of the grooves. Thus the walls of the slot serve as guides to insure that the movement of the carrier toward and from the center of the driver shall be on practically right lines. We propose to fit up the parts of these devices where they slide one upon the other so that, while there shall be but little lost motion, there will be but little friction. Ordinarily we prefer to make this carrier centrally open to save weight.

p p are lugs projecting inward from and ordinarily cast in one piece with the carrier. These lugs are of less diameter than the sockets *o o*, within which they are adapted to enter centrally, leaving annular spaces between the lugs and the sockets to receive spiral springs Q, which are thus held against displacement, and as they each abut at one end against the bottom of its socket and at the opposite end against the carrier they operate to thrust the carrier outward.

R is a segment representing ninety degrees of a circle which is concentric to the drum-shaft, and of course with the shafts of the teaseling-rollers.

S is a supplemental surface applied to the outer face of the segment, and is preferably of some yielding and somewhat elastic material to promote a good frictional contact between the segments and the adjacent pulleys *d d*. One way we have illustrated of applying this supplemental surface is in the form of a strap held in proper working position by means of its ends being carried down through slots *r r* (see dotted lines, Fig. 4) in the ends of the segment, the ends of the strap being then carried underneath the segment and fastened to the driver by a threaded pin or set-screw, as is indicated at *s s*. The outer face of the segment may be flanged upon both edges, thus forming a trough to receive the supplemental surface, as at *r' r'*, Fig. 5. We prefer in practice to make the segment somewhat elastic—say a thin band of steel—and their elasticity, coupled with the elasticity of springs Q, will insure a practically uniform frictional contact of the four drivers with each and every of the pulleys *d d*. The thrust of the supplemental surfaces against the rollers may be increased by turning the screw N in the proper direction, after which all of the screws may be locked in position by the jam-nuts *n' n'*. The segments may be fastened to the carriers by set-screws r^2, or the carrier may be made in one piece of metal with the segment, as shall be found most convenient.

We are aware that the teaseling-rollers have been mounted in radially-sliding boxes with springs to thrust them outward to force their elastic pulleys into contact with the inner surface of a stationary ring; but we prefer to mount the rollers in boxes which are rigid with the drum, so that they shall always remain at the same distance from the axis of the drum, so as to engage properly with the cloth and then effect a suitable driving contact by making the central driver with a periphery which is radially expansible. By the word "central," as herein used, we mean that the driver is arranged within the series of pulleys of the rollers. By reference to Fig. 4 it will be seen that there are but small spaces between the adjacent ends of the carriers, and as there will be but a slight additional separation of these ends under ordinary adjustment these parts constitute, practically, a continuous driving-surface to engage with the rollers *d*.

We are aware that teaseling-rollers have been provided with beveled friction-wheels and driven by an inner correspondingly-beveled friction-wheel, in which case a large part of the thrust of the beveled wheel tends to push the teaseling-rollers endwise, which end-thrust tends to wear rapidly the encircling shoulders of the journals or their bearings unless some provision is made for otherwise supporting those journals against endwise movement, whereas in our construction the pulleys, being cylindrical in form and the driver being cylindrical and capable of having its diameter increased at all points, end-thrust upon the rollers is avoided even though each roller be driven from one end only. This capability in the driver of having its periphery, which engages with the pulleys of the teaseling-rollers, increased in diameter by moving part of the composite driver outward from its center is what is meant by the word "expansible," wherever used herein, and wherever the word "yielding" is used as referred to the periphery of the driver it means that the working surface of the driver is sufficiently elastic in its nature so that it will give slightly toward the center of the driver in order to insure a satisfactory frictional contact with the pulleys, and thus secure a practically uniform rotation of all of the rollers when the other parts of the machine are running at a regular rate.

We are aware that cone-pulleys have been employed in gig-mills for varying the speed of rotation of the teaseling-rollers; but we be-

lieve ourselves to be the first to mount one of the cone-pulleys loosely upon the drum-shaft inside of the bearing which supports the end of the drum-shaft, connect the cone-pulley rigidly to the driver, which engages with the teaseling-rollers to produce their axial rotation, and then belt that cone-pulley to its driving cone-pulley on the counter-shaft, the counter-shaft being driven directly from the drum-shaft, by means of which organization of mechanism a very simple and compact machine may be built.

The operation of gig-mills is so well understood by those acquainted with the art of manufacturing cloth that no detailed description need be given; and it will be readily seen that by adjustment of the belt on the cone-pulleys a proper speed of rotation of the teaseling-rollers can be effected.

Although we have indicated, generally, the composite friction-driver by the letter L, yet it is apparent that the carriers and segments constitute parts thereof, these sections being movable outward from the slotted section when it is desired to expand the periphery of the driver, or, when either of the sections are moved out by the springs, to conform to any irregularity which may exist in the position of the concentric rollers. It will be readily understood that it is much more desirable to have this driver made up of parts which are adjustable one upon another, so that its diameter can be varied, than to mount the journals of the teaseling-rollers each in adjustable bearings, in order that they may be moved in or out to insure a proper engagement with the driver.

It is evident that by crossing the belt which connects the cone-pulleys with each other the direction of rotation of the teaseling-rollers may be reversed.

In some of the claims we prefer, for the sake of brevity, to refer to the friction-driver as engaging with the teaseling-rollers, which of course it does mediately through the pulleys *d d*.

What we claim is—

1. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric to the drum, of a central rotating and radially-expansible driver arranged to engage at its periphery with the teaseling-rollers, substantially as set forth.

2. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric to the drum, of a central rotating sectional driver, and means for moving part of the sections outward to engage with the teaseling-rollers, substantially as set forth.

3. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric to the drum, of a central rotating composite driver having its driving-surface formed of removable sections, substantially as set forth.

4. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric to the drum, of a central rotating composite driver having its driving-surface formed of segments adapted to be moved outward to increase the diameter of the driver, substantially as set forth.

5. In a gig-mill, the combination, with a rotary drum and a series of teasling-rollers concentric to the drum, of a central rotating composite driver having an inner member provided with slots opening outwardly, and a series of segments supported in the slots and thrust against the pulleys of the rollers with a yielding pressure, substantially as set forth.

6. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric with the drum, of a central rotating composite driver provided with a yielding periphery, and means for increasing the pressure of the periphery against the pulleys of the teaseling-rollers, substantially as set forth.

7. In a gig-mill, the combination, with a rotary drum and a series of teaseling-rollers concentric with the drum, of the central rotating driver having an inner member provided with slots opening outwardly, a series of carriers supported in the slots, the segments, and the flexible straps outside of the segments and attached at their ends to the inner member of the driver, substantially as set forth.

8. In a gig-mill, the combination, with the drum-shaft and rotary drum, of a series of teaseling-rollers mounted thereon, provided with pulleys at their projecting ends, a frictional driver arranged within the pulleys and in the same vertical plane therewith, a cone-pulley rigidly connected to and rotating with the driver upon the drum-shaft, a counter-shaft, means for driving the counter-shaft, a cone-pulley upon the counter-shaft, and a belt connecting the cone-pulleys for rotating the friction-driver, substantially as set forth.

9. The composite friction-driver having an inner member formed with slots opening outwardly, in combination with slides fitting the slots, carriers also fitting in the slots, springs between the slides and the carriers, and means for adjusting the tension of the springs, substantially as set forth.

10. The composite friction-driver having an inner member formed with slots opening outwardly and of reduced size at their inner ends, forming shoulders, slides fitting in the slots and adapted to engage with the shoulders, adjusting-screws mounted in the lower ends of the slots to move the slides, the carriers fitting in the slots, the springs between the carriers, and the sockets and pins upon opposite sides of the springs to prevent their displacement, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

WARREN H. CLOUGH.
HAMILTON O. MANNING.

Witnesses:
JOHN J. PICKMAN,
FRANCIS P. RIVET.