

(No Model.)

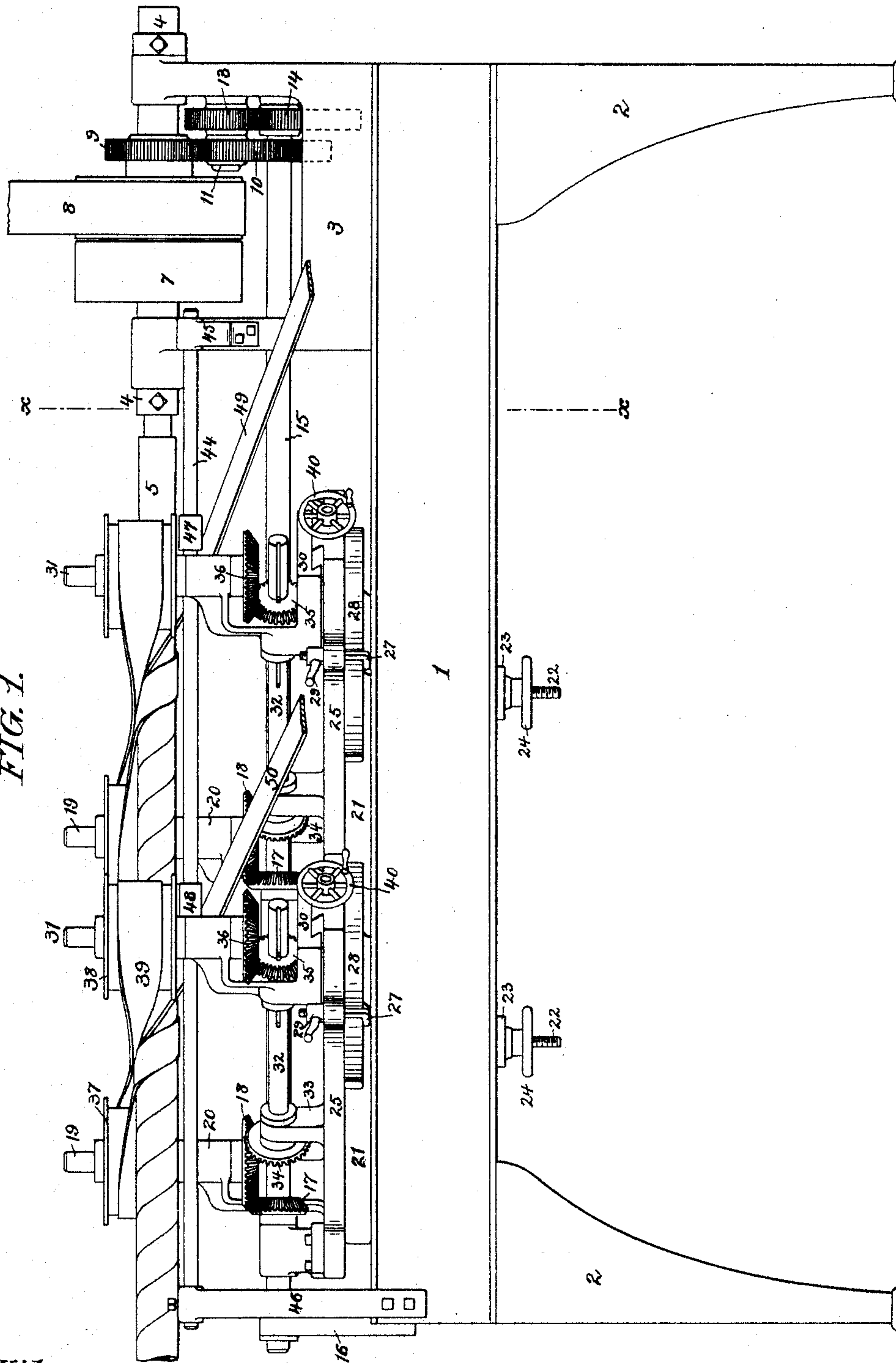
3 Sheets—Sheet 1.

H. A. NOBLE.  
MACHINE FOR MAKING COILED PAPER TUBES.

No. 586,054.

Patented July 6, 1897.

FIG. 1.



Witnesses:  
*W. D. Goodwin*  
*L. E. Bechtold*

Inventor:  
*Henry A. Noble*  
by his Attorneys  
*Howson & Howson*

(No Model.)

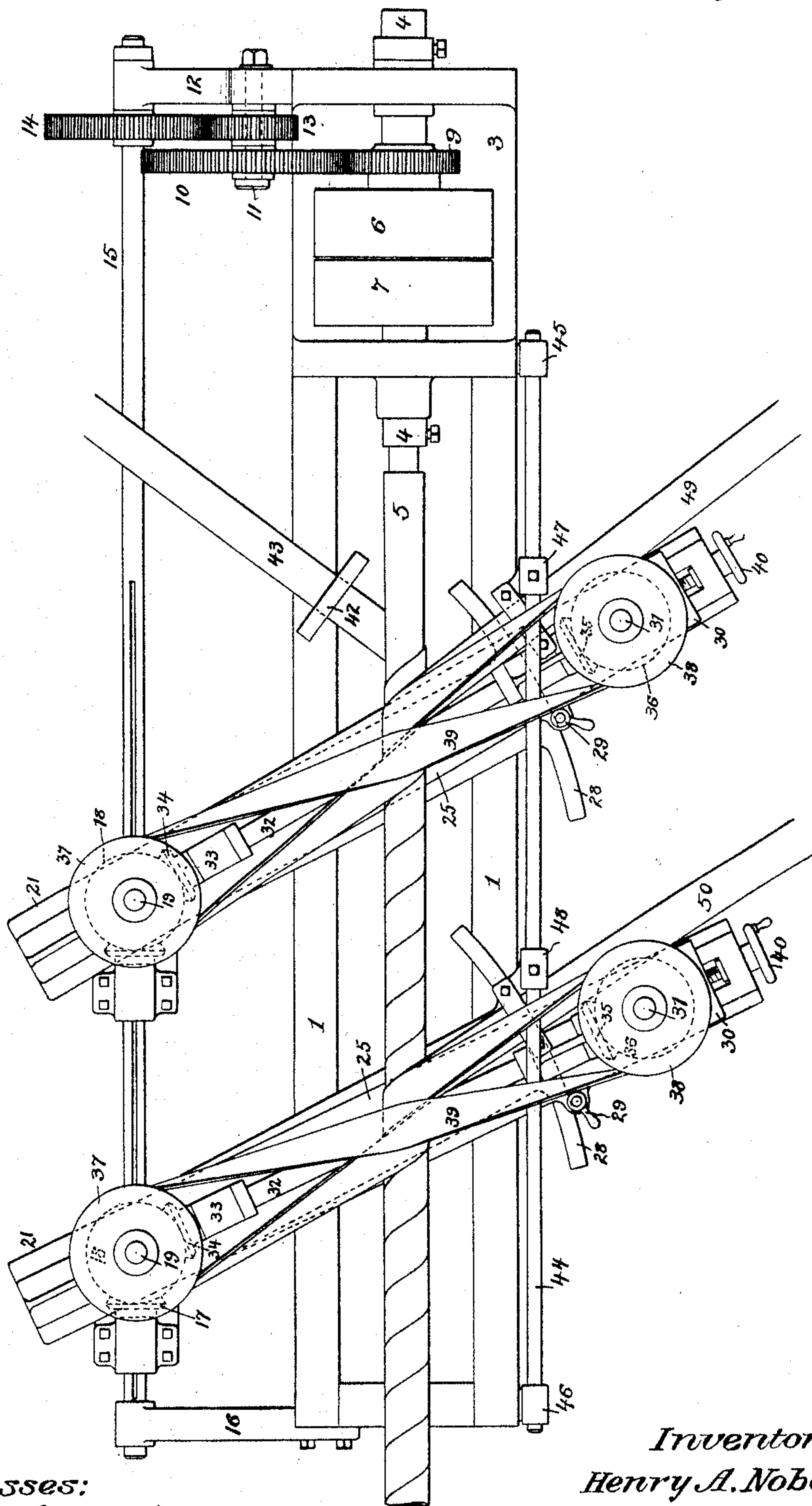
3 Sheets—Sheet 2.

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FIG. 2.



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(No Model.)

3 Sheets—Sheet 3.

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FIG. 3.

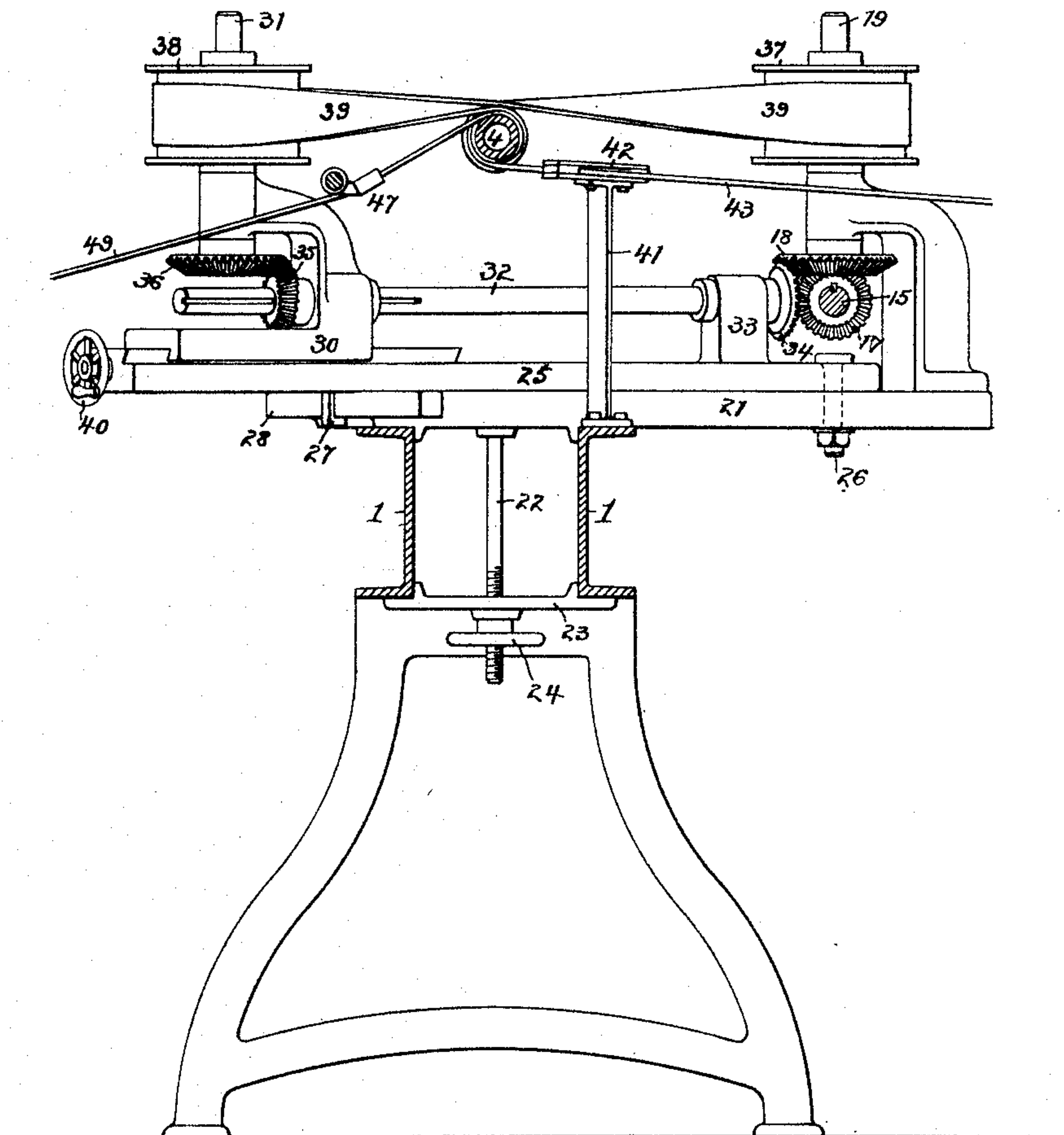
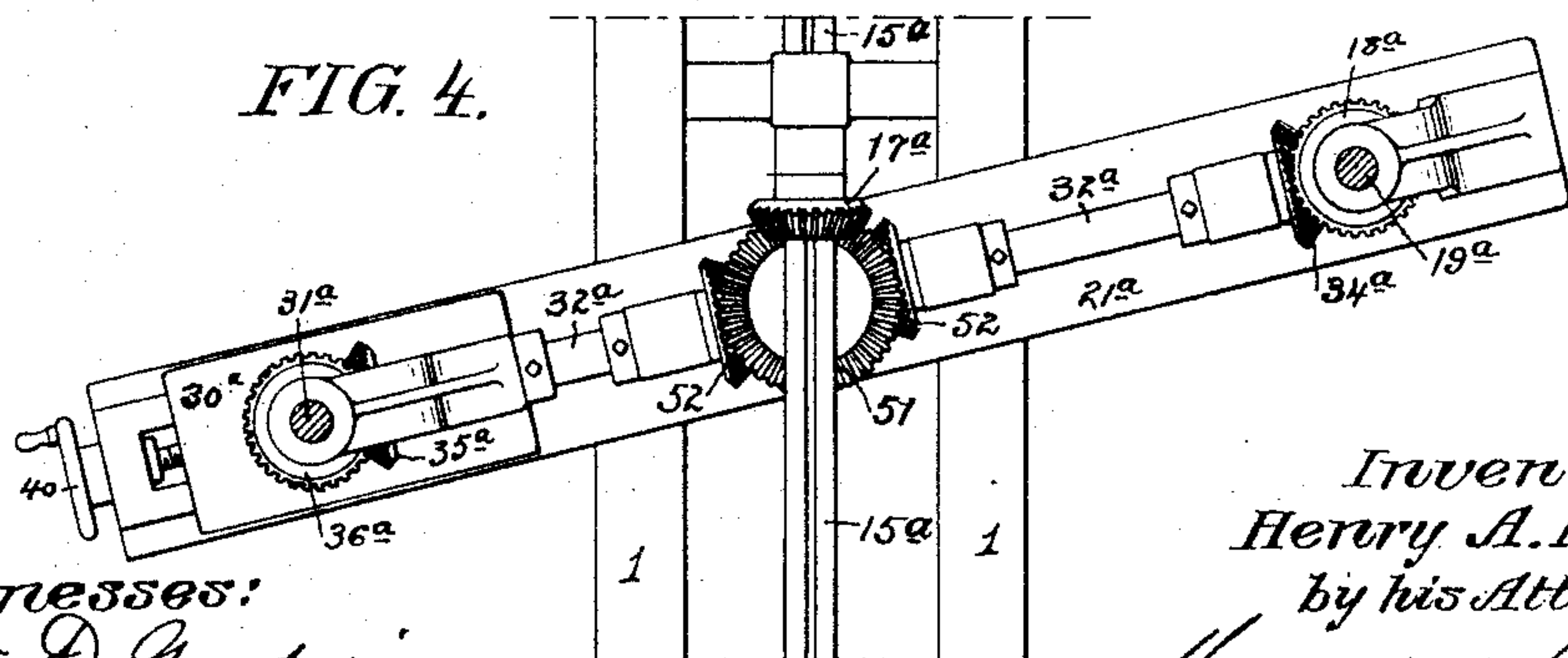


FIG. 4.



Witnesses:

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# UNITED STATES PATENT OFFICE.

HENRY A. NOBLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO WYLE  
T. WILSON, OF SAME PLACE.

## MACHINE FOR MAKING COILED-PAPER TUBES.

SPECIFICATION forming part of Letters Patent No. 586,054, dated July 6, 1897.

Application filed October 9, 1896. Serial No. 608,376. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. NOBLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain  
5 Improvements in Machines for Making Coiled-Paper Tubes, of which the following is a specification.

My invention consists of certain improvements in paper-tube machines whereby successive strips of paper are spirally coiled one  
10 upon another and the superposed layers secured together by the action of the spiral run of an endless belt, of which any desired number may be used, the object of my invention  
15 being to provide for readily changing the angle of the presser belt or belts without slackening or tightening the same or stopping the machine.

In the accompanying drawings, Figure 1 is  
20 a side elevation of a paper-tube machine constructed in accordance with my invention. Fig. 2 is a plan or top view of the same. Fig. 3 is a transverse section on the line  $x x$ , Fig. 1; and Fig. 4 is a plan or top view of a modified construction of part of the machine.  
25

The fixed frame or bed of the machine may be constructed in any available manner, this element of the machine consisting in the present instance of a pair of channel-bars 1,  
30 mounted upon suitable lugs 2 and having at one end a structure 3, which carries the hollow spindle 4, to which is suitably secured one end of the mandrel 5, upon which the tube is formed and from which it is delivered  
35 as produced, the outer end of the mandrel being unsupported. Turning loosely upon the spindle 4 are a pair of pulleys 6 and 7, the pulley 6 receiving the belt 8 from a pulley on any available drive-shaft. The hub of  
40 the pulley 6 has secured to it a spur-pinion 9, which meshes with a spur-wheel 10, turning loosely upon a stud 11, carried by an arm 12, projecting from one side of the structure 3.

Secured to the spur-wheel 10 and turning  
45 loosely with it upon the stud 11 is a spur-pinion 13, which meshes with a spur-wheel 14 on a shaft 15, said shaft being adapted at one end to a bearing in the arm 12 and at the other end to a bearing in an arm 16, projecting  
50 from the bed of the machine at the opposite end of the same. Splined upon the shaft

15 are bevel-pinions 17, which mesh with bevel-wheels 18 at the lower ends of vertical shafts 19, the latter being free to turn in bearings 20, mounted upon transverse bars  
55 21, which rest upon the opposite bars 1 of the fixed frame of the machine and have depending bolts 22, passing through bars 23, the latter bearing against the under sides of the bars 1 and the bolts being provided with nuts  
60 24, which when tightened serve to secure the transverse bars 21 securely in the position to which they have been adjusted longitudinally upon the bars 1.

Upon each of the transverse bars 21 is pivotally mounted a swinging bar 25 by means  
65 of a bolt 26, these bolts being in line axially with the shafts 19, and the outer end of each of the swinging bars 25 carries a clamp 27, engaging with a segmental rib 28, formed  
70 upon the corresponding bar 21, the stem of the clamp being threaded and provided with a nut 29, so that either of the swinging bars 25 can be adjusted upon its carrying-bar 21 and secured in position after adjustment.  
75

Longitudinally guided upon ways at the outer end of each of the swinging bars 25 is a slide 30, which has bearings for a vertical shaft 31 and also for a horizontal shaft 32, the inner end of this latter shaft having a  
80 bearing in a post 33 near the inner end of the swinging bar 25. Each shaft 32 has at the inner end a bevel-pinion 34, meshing with the bevel-wheel 18 of one of the shafts 19, and at its outer end a bevel-pinion 35, meshing  
85 with a bevel-wheel 36 at the lower end of one of the shafts 31, said bevel-pinions 35 being splined upon the shafts 32, so that adjustment of the slide 30 upon the swinging bar  
90 25 can be readily effected.

Each pair of shafts 19 and 31 carries a pair of belt drums or pulleys 37 and 38, to which is adapted a belt 39, which runs from the right-hand side of one pulley to, over, and  
95 around the mandrel 5 and thence to the left-hand side of the opposite pulley, the return run of the belt crossing from pulley to pulley above the mandrel and being twisted in its course, so as to clear said mandrel, as shown in Fig. 3.  
100

That portion of each belt 39 which surrounds the mandrel 5 follows a spiral course,



the angle of which is dependent upon the adjustment of the pulleys 37 and 38 angularly in respect to each other, and this is effected by swinging upon the bar 21, the bar 25 carrying the outer pulley-shaft 31, the shaft 19 constituting the fixed shaft of the pair, and the axis of said shaft being the axis on which the frame 25 swings in effecting angular adjustment of the pulleys in respect to each other, so that said angular adjustment can always be varied without slackening or tightening the belt 39 or stopping the machine, thus overcoming an objection to which previous machines of this class with which I am familiar are subject.

In order to slacken or tighten the belts 39 to adapt them for acting upon tubes of different diameters, the slides 30 are adjusted longitudinally upon the swinging bars 35, such adjustment being effected by means of screws having hand-wheels 40 in a manner similar to that adopted in effecting adjustment of the tool-carriages of lathes and like machinery.

A bracket 41, mounted upon one of the side bars 1 of the main frame of the machine, carries at its upper end a guide 42 for the strip of paper 43, which forms the primary coil of the tube, said strip 43 being laid directly upon the mandrel 5, as shown in Fig. 2.

A rod 44 is carried by arms 45 and 46, and upon this rod 44 are mounted guides 47 and 48 for the strips 49 and 50, which form, respectively, the intermediate and outer coils of the tube which is being produced, these strips being coated with some suitable cement upon the under side before reaching the machine.

The strip 49 is subjected to the action of the first presser-belt 39 and is thereby pressed firmly upon the primary or inside coil of the tube, a second strip 50 being subjected to the action of the second presser-belt 39 and being thereby pressed firmly upon the second or intermediate layer, the finished tube passing from the outer end of the mandrel 5 to suitable cutting mechanism, whereby it is severed into lengths of the proper size.

Other strips may be fed to the tube between the presser-belts or the number of presser-belts may be increased, as circumstances may suggest.

Although I prefer to mount the shafts 31 upon swinging bars pivoted concentrically with the shafts 19, such construction is not absolutely essential to the proper carrying out of the main feature of my invention. For instance, in Fig. 4 I have shown a modification in which the swinging frame 25 is dispensed with, the main transverse frame 21<sup>a</sup> having a central bevel-wheel 51, which turns on an axis concentric with the bolt 22, this bevel-wheel meshing with a pinion 17<sup>a</sup> on a shaft 15<sup>a</sup>, to which said pinion is splined so that it can be moved with the bar 21<sup>a</sup> longitudinally on the main frame, but will always rotate with said shaft 15<sup>a</sup>. With the bevel-wheel 51 also engage bevel-pinions 52, carried

by shafts 32<sup>a</sup>, which have bevel-pinions 34<sup>a</sup> and 35<sup>a</sup> meshing, respectively, with a bevel-wheel 18<sup>a</sup> on a shaft 19<sup>a</sup> at one end of the bar 21<sup>a</sup> and with a bevel-wheel 36<sup>a</sup> on a shaft 31<sup>a</sup> at the opposite end of said bar. It will be evident that in this case the swinging of the bar 21<sup>a</sup> upon the axis of the bevel-wheel 51 will not affect the relative position of the parts carried by said bar. Hence the construction will attain the same result as that shown in Figs. 1, 2, and 3. The bearings for the shaft 31<sup>a</sup> and pinion 35<sup>a</sup> are preferably carried by a slide 30<sup>a</sup>, so as to provide for the movement of said shaft 31<sup>a</sup> from and toward the shaft 18<sup>a</sup> in order to slacken or tighten the winding-belt.

It will be observed that in both of the constructions shown the axis on which the swinging bar turns is concentric with the axis of the primary wheel of the power-transmitting gear, this wheel in the construction shown in Figs. 1, 2, and 3 being the bevel-wheel 18, and in the construction shown in Fig. 4 being the bevel-wheel 51.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs passing around said mandrel, a pair of shafts having pulleys for said belt, a driving-shaft, means for transmitting the motion of said shaft to said pulley-shafts, and a swinging bar having its axis concentric with that of the primary wheel of said transmitting devices whereby the angular relation of the presser-belt in respect to the mandrel may be changed without slackening or tightening said belt, substantially as specified.

2. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs carried around said mandrel, shafts having pulleys for said belt, a driving-shaft, devices whereby the motion of said driving-shaft is transmitted to the pulley-shafts, and a swinging bar carrying one of said pulley-shafts and pivoted concentrically with the axis of the other pulley-shaft, substantially as specified.

3. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs carried around said mandrel, a pair of shafts having pulleys for said presser-belt, a driving-shaft, devices whereby the motion of said driving-shaft is transmitted to the pulley-shafts, and a bar longitudinally adjustable on the frame of the machine and pivoted in line axially with the primary wheel of the power-transmitting devices, substantially as specified.

4. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs passing around said mandrel, shafts having pulleys for said belt, a driving-shaft, devices for transmitting the movement of said shaft to the pulley-



shafts, a bar adjustable longitudinally on the frame of the machine, and a second bar pivoted to said first bar in line axially with one of the pulley-shafts, said pivoted bar carrying the bearings for the other pulley-shaft, substantially as specified.

5. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs passing around said mandrel, shafts having pulleys for said presser-belt, a driving-shaft, devices for transmitting the movement of said driving-shaft to the pulley-shafts, a bar carried by the frame of the machine, and having a segmental rib thereon, a second bar pivoted to the first in line axially with one of the pulley-shafts, and a clamp carried by said swinging bar and engaging the segmental rib of the other bar, substantially as specified.

6. The combination in a machine for making coiled-paper tubes, of a mandrel, a presser-belt having one of its runs passing around said mandrel, shafts having pulleys for said presser-belt, a driving-shaft, devices for transmitting the motion of said driving-shaft to the pulley-shafts, a swinging bar having its axis concentric with that of the primary wheel of the transmitting devices, and a bearing for one of the pulley-shafts adjustable longitudinally on said swinging bar, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY A. NOBLE.

Witnesses:

WILL. A. BARR,  
JOS. H. KLEIN.