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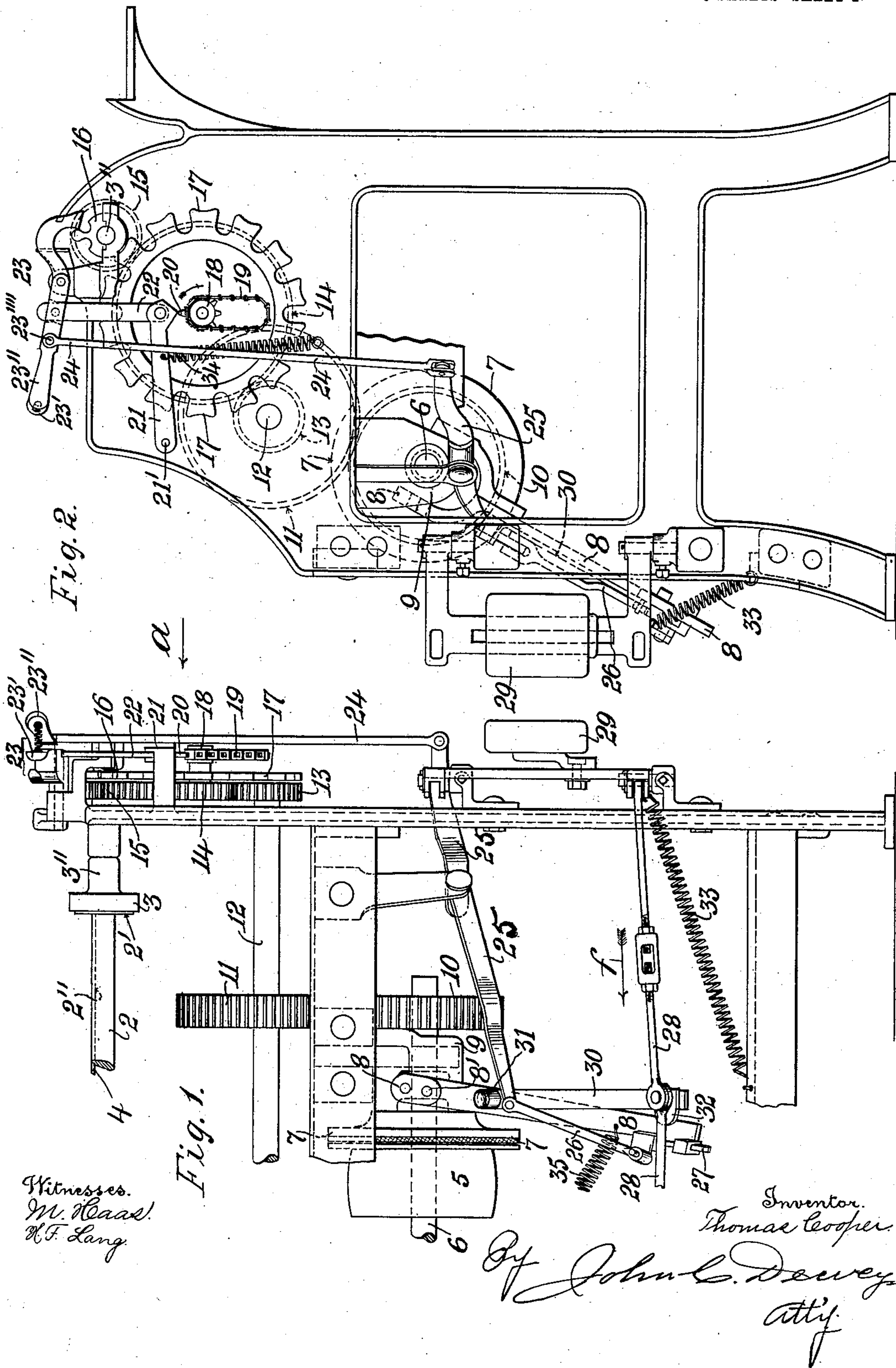
PATENTED MAR. 29, 1904.

T. COOPER.
STOP MOTION FOR WINDING MACHINES.

APPLICATION FILED SEPT. 25, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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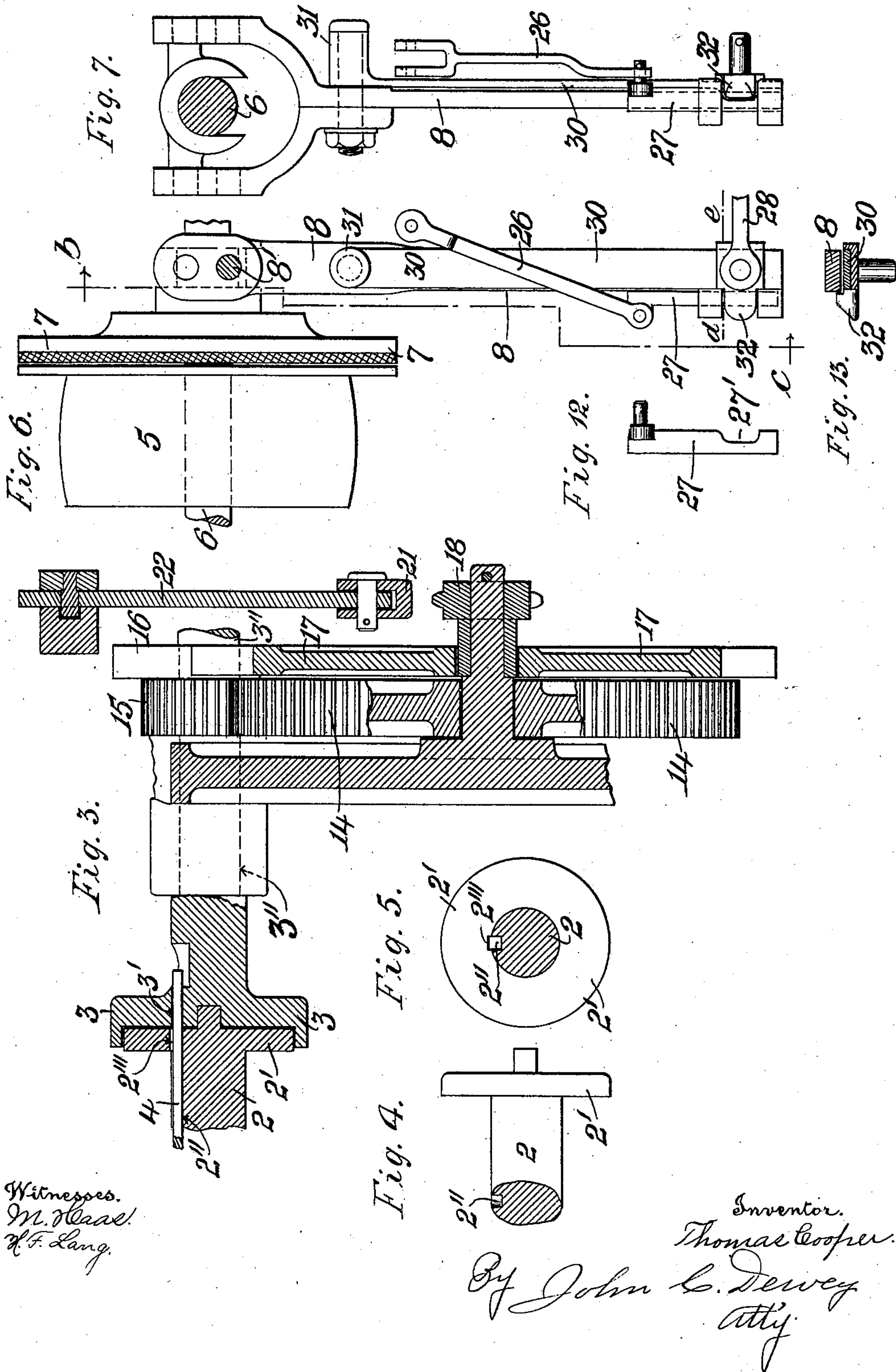
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3 SHEETS—SHEET 2.



Witnesses.
M. H. Hall.
W. F. Lang.

Inventor.
Thomas Cooper.
By John C. Dewey
Atty.

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3 SHEETS—SHEET 3.

Fig. 8.

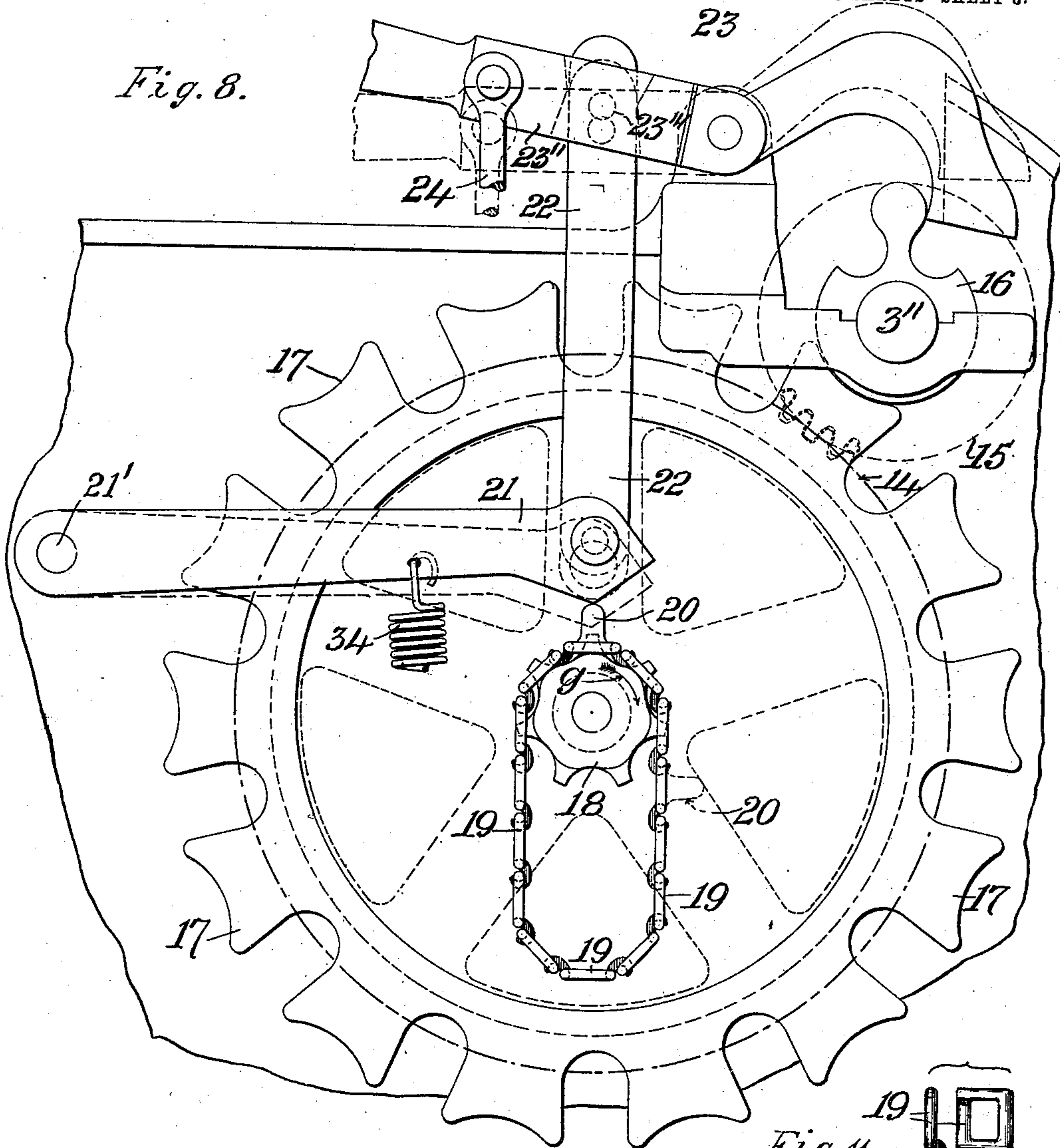


Fig. 11.

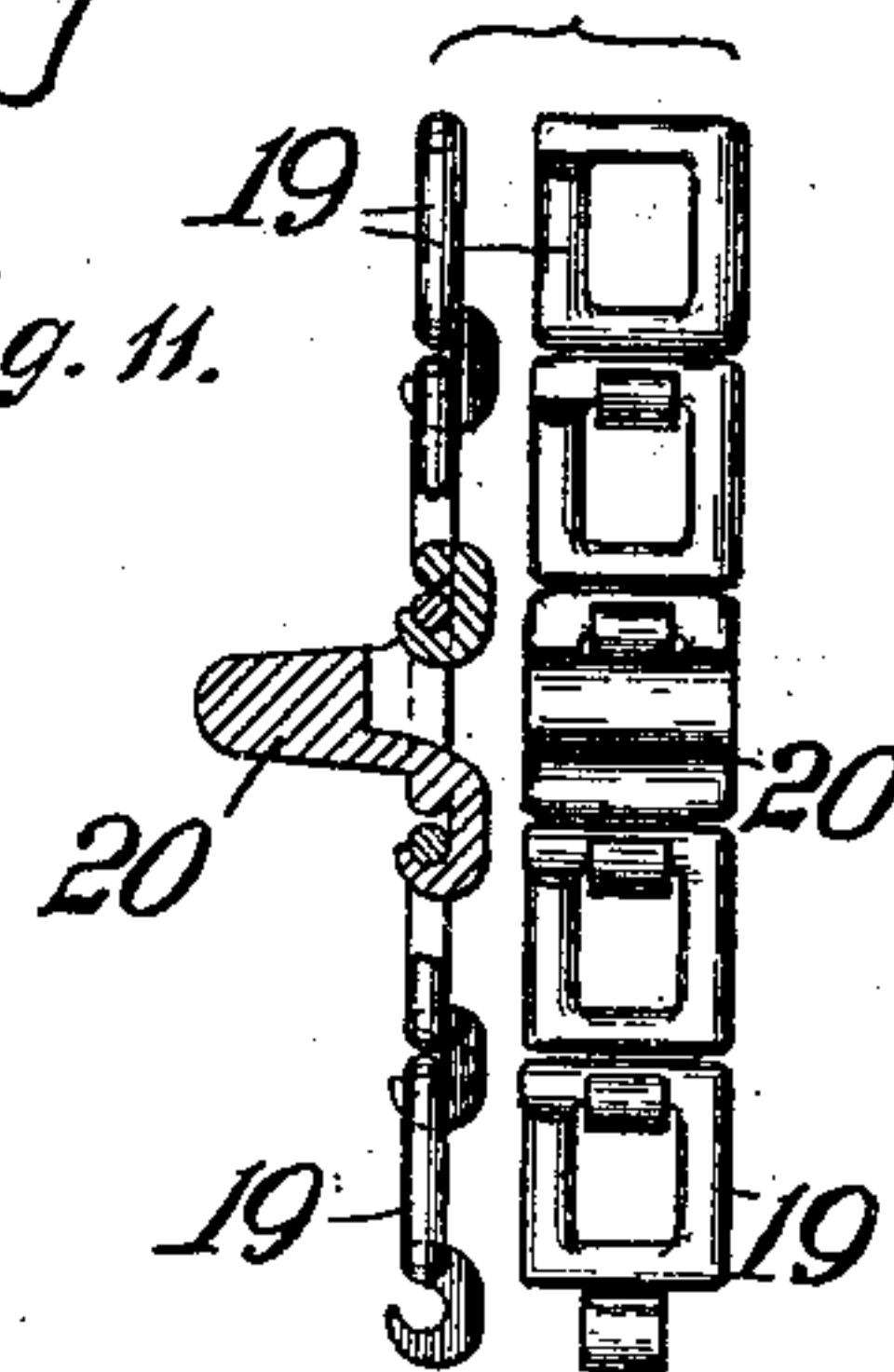


Fig. 9.

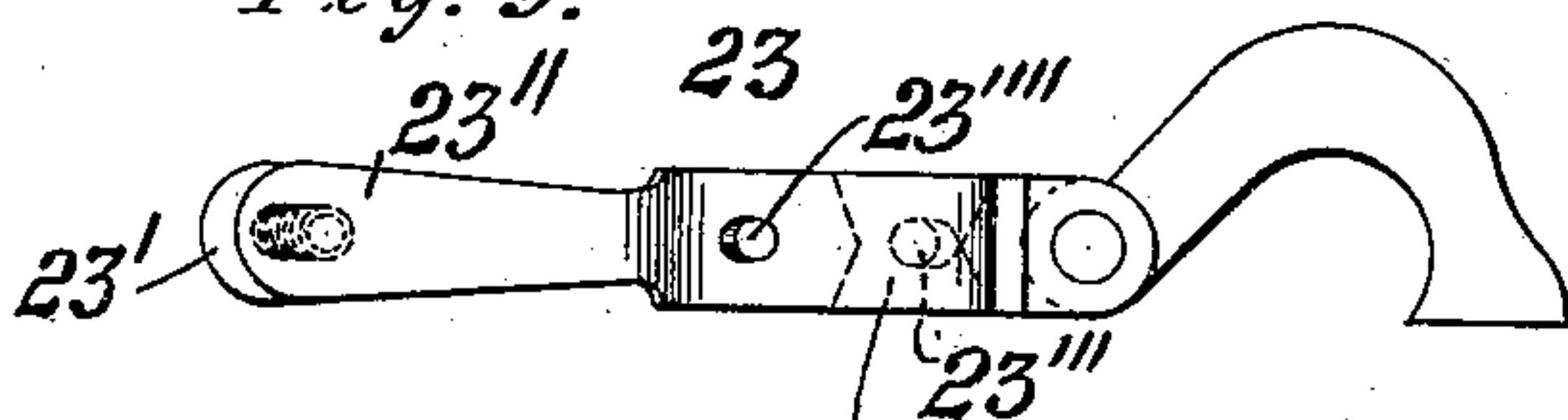
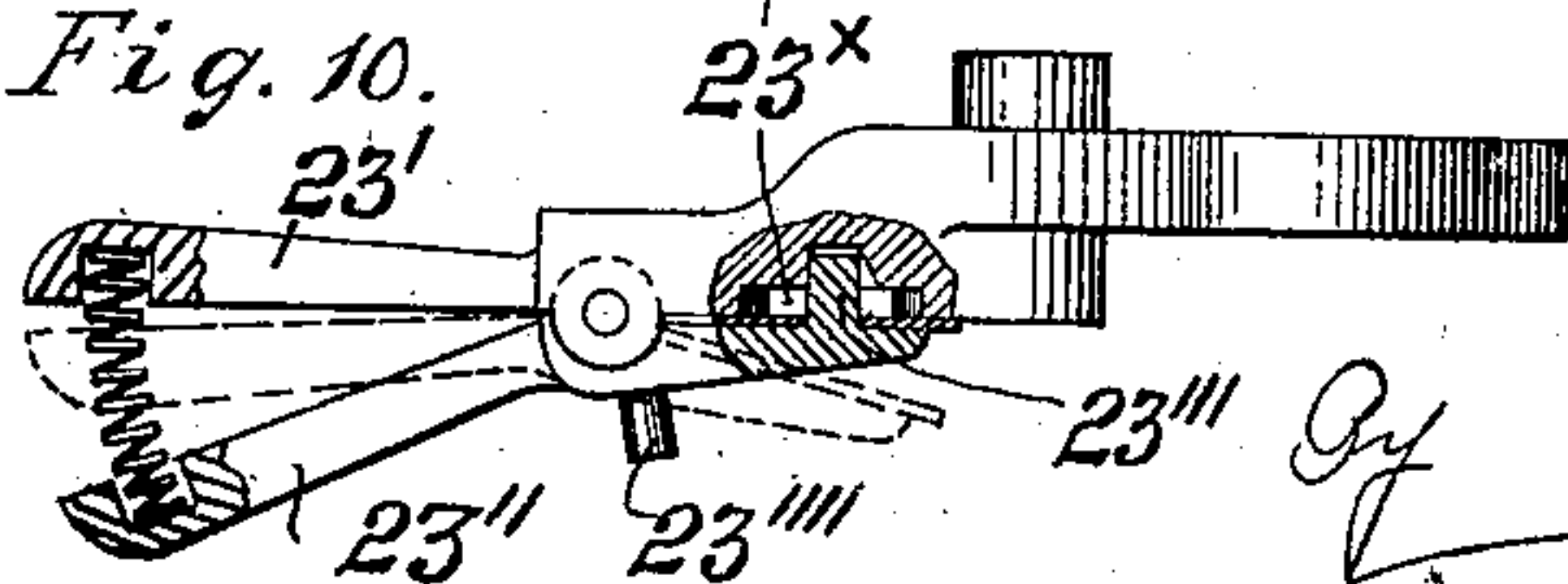


Fig. 10.



Witnesses.
M. Haas.
H. F. Lang.

Inventor
Thomas Cooper.
By John A. Dewey
att'y.

UNITED STATES PATENT OFFICE.

THOMAS COOPER, OF KIDDERMINSTER, ENGLAND, ASSIGNOR TO CROMPTON AND KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

STOP-MOTION FOR WINDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 756,001, dated March 29, 1904.

Application filed September 25, 1903. Serial No. 174,639. (No model.)

To all whom it may concern:

Be it known that I, THOMAS COOPER, a subject of the King of Great Britain, residing at Kidderminster, in the county of Worcester, England, have invented certain new and useful Improvements in Stop-Motions for Winding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to bobbin or spool setting frames or bobbin or spool filling machines for Axminster or moquette carpet looms.

The object of my invention is to provide improved mechanism for securing greater uniformity in the amount of yarn wound on each of the bobbins or spools introduced or fitted into the setting frame or machine and also to effect the automatic stopping of the machine as soon as the required amount of yarn has been wound on the bobbin or spool, whereby dials or other indicators which require to be observed from time to time are dispensed with and other minor disadvantages attending the use of ordinary setting-frames are obviated.

My invention consists in certain novel features of construction of my improvements, as will be hereinafter fully described.

Referring to the drawings, Figure 1 is a front elevation of that end of a setting-frame to which the mechanism constituting my invention is applied. Fig. 2 is an end elevation of Fig. 1 looking in the direction of arrow *a*, same figure. Fig. 3 is an enlarged longitudinal sectional view of the head portion of the machine. Fig. 4 is an enlarged elevation of a portion of the bobbin detached. Fig. 5 is a cross-section of the bobbin. Fig. 6 is an enlarged elevation of the driving belt-pulley, sliding friction disk or clutch, and clutch-lever and parts. Fig. 7 is a sectional elevation taken on the irregular line *b c* in Fig. 6. Fig. 8 is an enlarged end elevation of the head portion of the machine. Fig. 9 is an enlarged elevation of the stop-lever, and Fig. 10 is a plan thereof. Fig. 11 shows in cross-section and elevation a por-

tion of the chain carrying the stud or studs which actuate the stop-lever. Fig. 12 is a side elevation of the sliding releaser 27 carried by the clutch-lever; and Fig. 13 is a sectional plan view of the clutch-lever, supplementary or secondary lever, and coupling-catch, taken on line *d e* in Fig. 6.

In the accompanying drawings the same reference-numerals indicate corresponding parts in the several figures.

The portion of the bobbin or spool represented in the machine is marked 2. Instead of relying on the frictional grip of the rotating cups (one only of which is shown and marked 3) which receive the end flanges 2' of the bobbin 2, as is usual, I provide for a positive drive between the said cups 3 and the bobbin 2 by cutting a groove 2'' in the barrel of the bobbin throughout its length and making a hole 2''' in each end flange 2'. (See Figs. 4 and 5.) A hole 3' is also made in each cup 3. A wire 4, somewhat longer than the bobbin 2, is fitted into the groove 2'' in the bobbin so that its ends engage in the hole 3' in each cup 3. (See Fig. 3.) There is thereby obtained a positive engagement or connection between the bobbin 2 and each end cup 3, which insures a positive drive, and consequently the slipping of the bobbin in the end cups during the winding of the yarn on the bobbin, which frequently takes place in ordinary setting-frames, is prevented.

The spindle 3'' of each end cup 3 is driven from a driving-pulley 5, loose on the shaft 6 of the machine, in the following manner: The leather-covered face of a sliding friction disk or clutch 7, keyed to the said shaft 6, can be made to forcibly bear against a flange on the loose driving belt-pulley 5 by a clutch-lever 8, (see Figs. 6 and 7,) which clutch-lever 8 is pivoted at 8' to a hanging bracket 9 (see Fig. 1) on the frame of the machine. When the friction disk or clutch 7 is thrown by the turning of the lever 8 into contact with the flange of the driving-pulley 5, the shaft 6 and spur-wheel 10 thereon are driven and rotate with the said pulley 5. The said spur-wheel 10 gears with and drives a similar spur-wheel

11 on the parallel shaft 12, which has at its end a second toothed wheel or pinion 13. The pinion 13 gears with a toothed wheel 14, which drives a pinion 15 on the bobbin-receiving cup-spindle 3'', as will be best seen by reference to the enlarged view Fig. 3. Each end of the machine is provided with the gearing 13 14 15, so as to gear the shaft 12 to the bobbin-receiving spindles 3'' at both ends.

10 The number of rotations of the spindle 3'' and bobbin 2 is controlled and the machine automatically stopped when the bobbin has made the prearranged number of rotations and with the wire 4 on top or brought uppermost by the following construction and arrangement of parts:

Keyed to the bobbin-receiving cup-spindle 3'' and on the outer side of the spur-pinion 15 is a single-toothed driving-wheel 16, which gears with a star-wheel 17, (see Figs. 3 and 8,) which star-wheel 17 and its connected sprocket 18 are loose on the spindle which supports the toothed wheel 14 and held from endwise movement by any usual means. It will be understood that for each rotation of the bobbin 2 and single-toothed driver 16 on the spindle 3'' the star-wheel 17 is turned a distance of one tooth. The star-wheel 17 has operatively connected thereto a sprocket or chain pinion 18, over which is a chain 19, made up of a series of detachable links. (See Fig. 11.) One of the said links has on it a stud, finger, or projection 20. The number of links employed to form the endless chain depends upon the amount of yarn to be wound on the bobbins; but where the bobbins are to be only partially filled I may employ a chain having two or more stud-carrying links 20.

Immediately over the chain-wheel 18 is the V-shaped end of a lever 21, pivoted at 21' to the frame of the machine. The outer end of the said lever 21 supports a link 22, the upper end of which extends into and occupies a slot 23^x between the jaws or arms of a pair of spring-levers 23' 23'', constituting the outer arm of a stop-lever 23. (Shown detached in Figs. 9 and 10.) The lever 23'' has on its inner side a stud 23''', which for the greater part of the time the machine is working engages in a hole in the vertical link 22. The said lever 23'' also has a pin 23'''' on its outer side, which pin is connected by a connecting-rod 24 to a lever 25, which when turned automatically in the manner hereinafter described depresses a depending link or arm 26 and a sliding releaser 27, (shown detached in Fig. 12,) which releaser 27 is attached to the lower end of the said link 26 and works in staples or guiding-eyes on the lower end of the clutch-lever 8.

In the initial position of the parts of the machine—that is, in the positions which the parts occupy when an empty bobbin or spool has been introduced into the machine and fixed by arranging the wire 4 in the groove

2'' of the bobbin or spool so that the ends of the said wire project through the holes 3' in the cups 3, as is represented in Fig. 3—the chain 19, stud 20 thereon, lever 21, link 22, and stop-lever 23 and levers 8 and 30 occupy the full-line positions represented in Figs. 1, 2, and 8. To start the machine, the spring-levers 23' and 23'' of the stop-lever 23 are firmly gripped by the hand of the attendant at that end of the machine, so as to close the said handle ends, as is indicated in dotted lines in Fig. 10, and thereby disengage the pin 23'''' from the link 22. The said stop-lever 23 is then turned into the dotted position indicated in Fig. 8. By this action the curved stop-arm of the stop-lever 23 is raised out of the path of the single tooth of the star-wheel driver 16. Further, the connecting-rod 24, attached to the other arm of the stop-lever 23, is depressed, and through the lever 25 the link 26 and releaser 27 are raised and a notch 27' in the latter (see Fig. 12) made to coincide with the space between the guiding eyes or staples on the clutch-lever 8. (See Fig. 7.)

The ordinary connecting-rod 28 between the two knee-block levers of the machine (one only of which is shown and marked 29) instead of being connected directly to the clutch-lever 8, as in an ordinary bobbin-filling machine, is connected to a secondary lever 30, pivoted at 31 to the clutch-lever 8. The secondary lever 30 is of such thinness (see Fig. 7) that it is capable of a limited amount of elasticity or spring movement. The lower end of the secondary lever 30 is provided with a catch 32, and when the attendant moves the knee-block lever and trips it from the usual holding-notch at the end of the machine not represented the spring 33 effects the pulling of the connecting-rod 28 in the direction indicated by the arrow *f* in Fig. 1, and the lever 30 is thereby turned on its pivot 31 and made to coincide with the lever 8, as is represented in Figs. 6 and 7. By this motion of the lever 30 the catch 32 is pressed past the lever 8 and snaps into engagement with its other edge, (see Fig. 13,) and thereby couples the two levers 8 and 30 together, as is represented in Figs. 6 and 7, so that on the attendant again applying pressure to the knee-block lever at the end of the machine not represented to again engage it with the usual holding-notch the motion of the connecting-rod 28 is reversed and the said levers 8 and 30 turn as one and effect the throwing of the friction-disk 7 or clutch into engagement with the driving-pulley 5, and consequently start the machine.

The machine may be stopped from time to time, if desired, in the ordinary way and be restarted also in the ordinary way; but when the bobbin or spool is filled or supplied with the predetermined amount of yarn the machine is automatically stopped, as I will now proceed to explain.

By the rotation of the chain-wheel 18 in the direction of the arrow *g*, Fig. 8, the stud 20 on the chain 19 is soon after the machine has commenced working carried from under the lever 21, and the said lever 21 and link 22 are under the action of the spring 34 brought down into the dotted positions indicated in Fig. 8, in which positions the pin 23'', which had been temporarily disengaged from the hole in the link 22, reengages itself therein, and thereby reconnects the stop-lever 23 with the said link 22. When by the rotation of the chain-wheel 18 and the movement of the chain 19 the stud 20 has been again brought under the V-shaped end of the lever 21, the said lever 21, link 22, and handle-arm of the stop-lever 23 are lifted, and there is thereby simultaneously effected the stopping of the machine and the lowering of the curved or stop arm of the lever 23 into the path of the single tooth of the wheel 16, so that the machine cannot be inadvertently restarted until the handle end of the stop-lever 23 has been first gripped and depressed, as hereinbefore described.

The automatic raising of the handle end of the stop-lever 23 effects the stopping of the machine in the following manner: The turning of the lever 25 through the connecting-rod 24, attached at its upper end to the stop-lever 23, effects the depressing of the releaser 27, the plain or unnotched part of which being brought against the catch 32 forces the lower end of the secondary lever 30 outward and the said catch 32 out of engagement with the clutch-lever 8 and the two levers are separated under the action of the spring 35, as is represented in Fig. 1. It will thus be understood that these two levers 8 and 30 cannot be made to reengage or couple together until the plain or unnotched part of the releaser 27 has been taken out of the path of the catch 32 of the secondary lever 30.

Where only one stud-link 20 is employed in the endless chain 19, the machine is stopped after each complete movement of the said chain; but where two or more stud-links 20 are employed in the endless chain the machine is automatically brought to rest when the chain 19 has made a half or partial movement. I prefer to employ two or more stud-links 20 in the chain only when the spools are to be partially filled, as hereinbefore described.

Although I have described and represented the endless chain 19 with a stud-carrying link or links 20 only in connection with the setting-frame-stopping mechanism constituting part of my invention, yet it may be applied to or used in combination with other arrangements of stopping mechanism for setting-frames or bobbin-filling machines, nor do I limit myself to the precise details of the mechanism described.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. In a winding-machine, the combination of the driving-pulley, a cup-spindle, driving connections between the driving-pulley and cup-spindle, a clutch, means for moving said clutch to operatively engage and disengage the driving-pulley and said driving connections, a stop-lever, connections between the stop-lever and said means for effecting the disengagement of the clutch from the driving-pulley, and devices carried by the stop-lever for positively arresting the motion of the cup-spindle as the clutch is disengaged from the driving-pulley.

2. In a winding-machine, the combination of the driving-pulley, a cup-spindle, driving connections between the driving-pulley and cup-spindle, a clutch, means for moving said clutch to operatively engage and disengage the driving-pulley and said driving connections, a stop-lever, connections between the stop-lever and said means for effecting the disengagement of the clutch from the driving-pulley, devices carried by the stop-lever for positively arresting the motion of the cup-spindle as the clutch is disengaged from the driving-pulley, an endless chain carrying a stud, means for moving said chain, and devices adapted to be actuated by said stud for moving the stop-lever.

3. In a winding-machine, the combination of a cup-spindle, means for driving the same, a clutch, a stop-lever, connections between said stop-lever and clutch for releasing the clutch from the driving means, a toothed driver mounted on the cup-spindle, a chain carrying a stud and driven from the said toothed driver, devices actuated by said stud for moving the stop-lever and thereby releasing the clutch, and means carried by the stop-lever for engaging the toothed driver to thereby stop the cup-spindle in a predetermined position of its revolution.

4. In a winding-machine, the combination of a cup-spindle and means for positively operating the same, a stopping mechanism for stopping the cup-spindle, a stop-lever for actuating the stopping mechanism, a chain carrying a stud, means to move said chain, devices connected to the stop-lever and adapted to be actuated by the said stud to move the stop-lever when a predetermined quantity of yarn has been wound to thereby actuate the stopping mechanism; and hand-operated means carried by the stop-lever for disconnecting the stop-lever from said devices to permit the re-starting of the winding-machine.

5. In a winding-machine, the combination of a cup-spindle, means for driving the same including a clutch, a stop-lever, connections between the stop-lever and clutch for releasing the clutch, a single-toothed driver mounted on the cup-spindle, a star-wheel actuated by

the single-toothed driver, a chain-wheel oper-
atively connected to the star-wheel and carry-
ing a chain, a stud on said chain, devices con-
nected to the stop-lever adapted to be actuated
5 by said stud for moving the stop-lever, said
stop-lever being provided with a stop-arm
which on movement of the stop-lever to re-
lease the clutch engages the single-toothed
driver.
10 6. In a winding-machine, the combination
of a driving-shaft, a cup-spindle, means in-
cluding a clutch for driving the cup-spindle
from the driving-shaft, a clutch-lever for mov-
ing said clutch, a secondary lever carried by
15 the clutch-lever, a knee-block lever, a connect-
ing-rod attached at one end to the knee-block
lever and at the opposite end to the secondary
lever, a catch provided on said secondary le-
ver which catch is adapted to snap into en-
20 gagement with the clutch-lever, a releaser car-
ried by the clutch-lever and mechanism for
moving the releaser in one direction automat-

ically for stopping the machine, and in the op-
posite direction by hand as a preliminary to
starting the machine. 25

7. In a winding-machine, the combination
of a driving-shaft, a cup-spindle, means in-
cluding a clutch for driving the cup-spindle
from the driving-shaft, a clutch-lever, a sec-
ondary lever mounted on the clutch-lever and 30
provided with a catch for connecting the two
levers, a stop-lever, means for moving the
stop-lever when a predetermined quantity of
yarn has been wound, mechanism movable by
the stop-lever for releasing the catch connect- 35
ing the clutch and secondary levers, and means
to thereupon move the clutch-lever to throw
the clutch into inoperative position.

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

THOMAS COOPER.

Witnesses:

JAMES MORTON,

ALBERT E. HORTON.