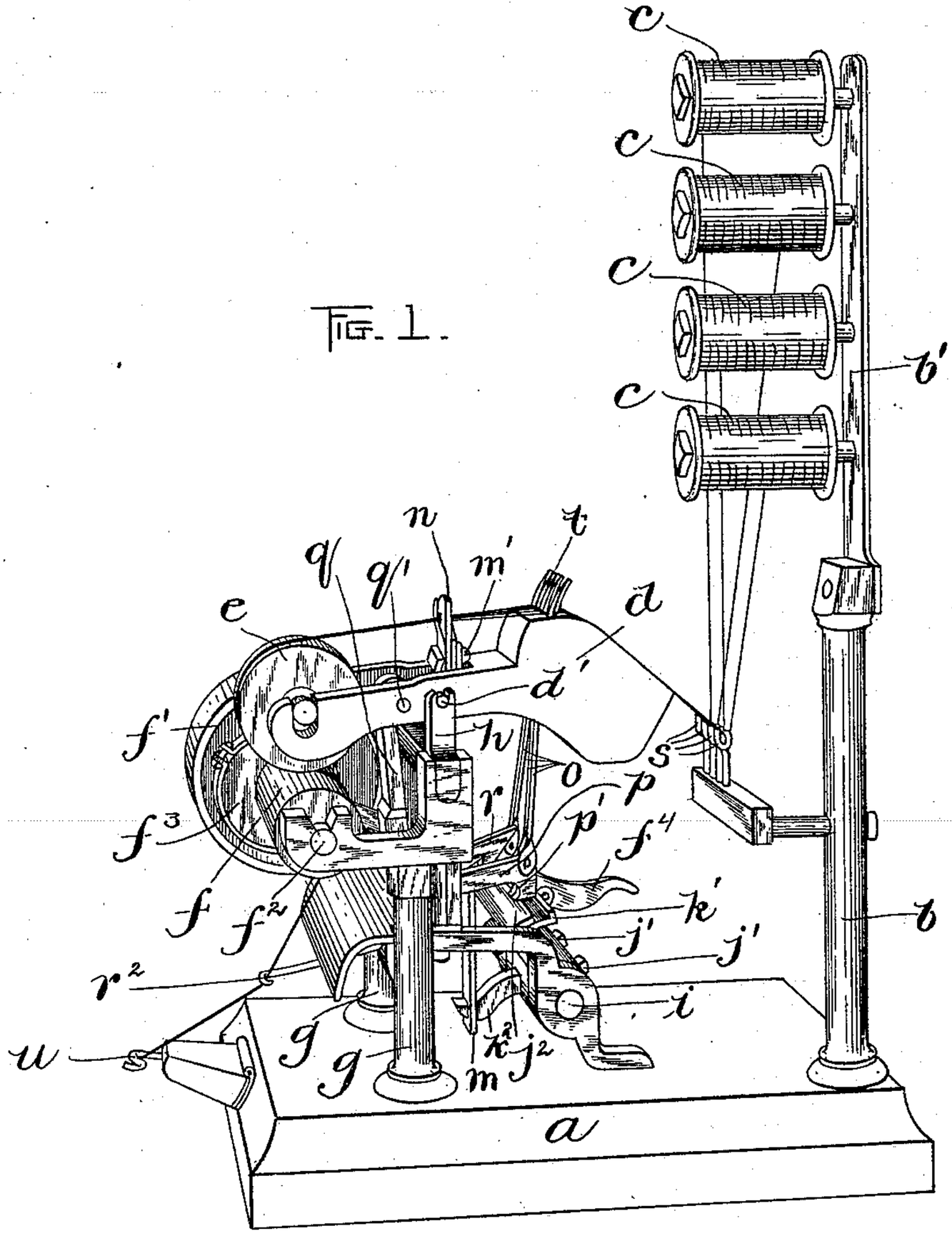
(No Model.) 3 Sheets—Sheet 1.

A. M. PRICE.

STOP MECHANISM FOR DOUBLING AND TWISTING MACHINES.

No. 604,500. Patented May 24, 1898.

FIG. 1.



WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
A. M. Price
by Wright Brown Quinby
attys

(No Model.) 3 Sheets—Sheet 2.

A. M. PRICE.

STOP MECHANISM FOR DOUBLING AND TWISTING MACHINES.

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FIG. 4

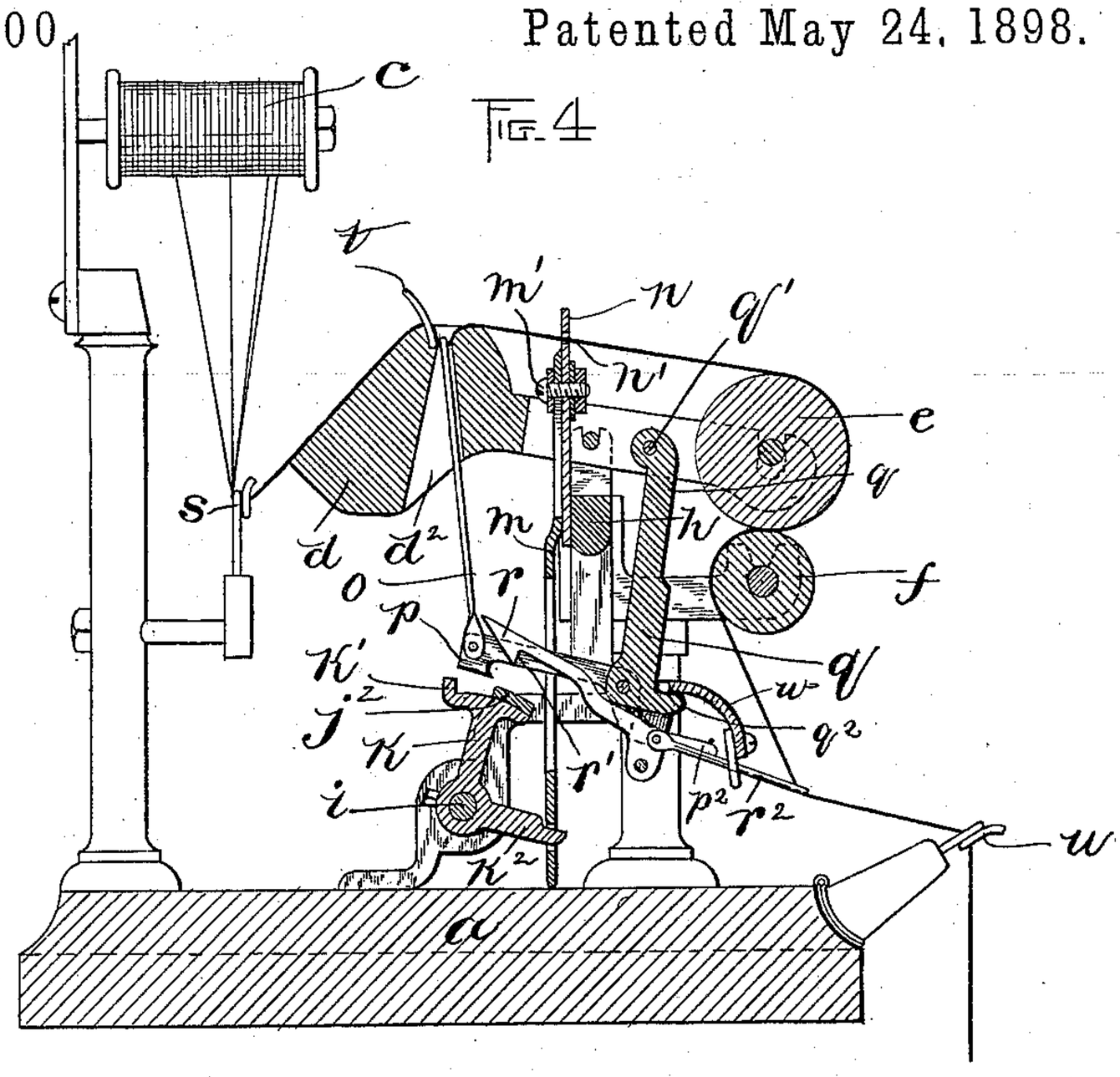
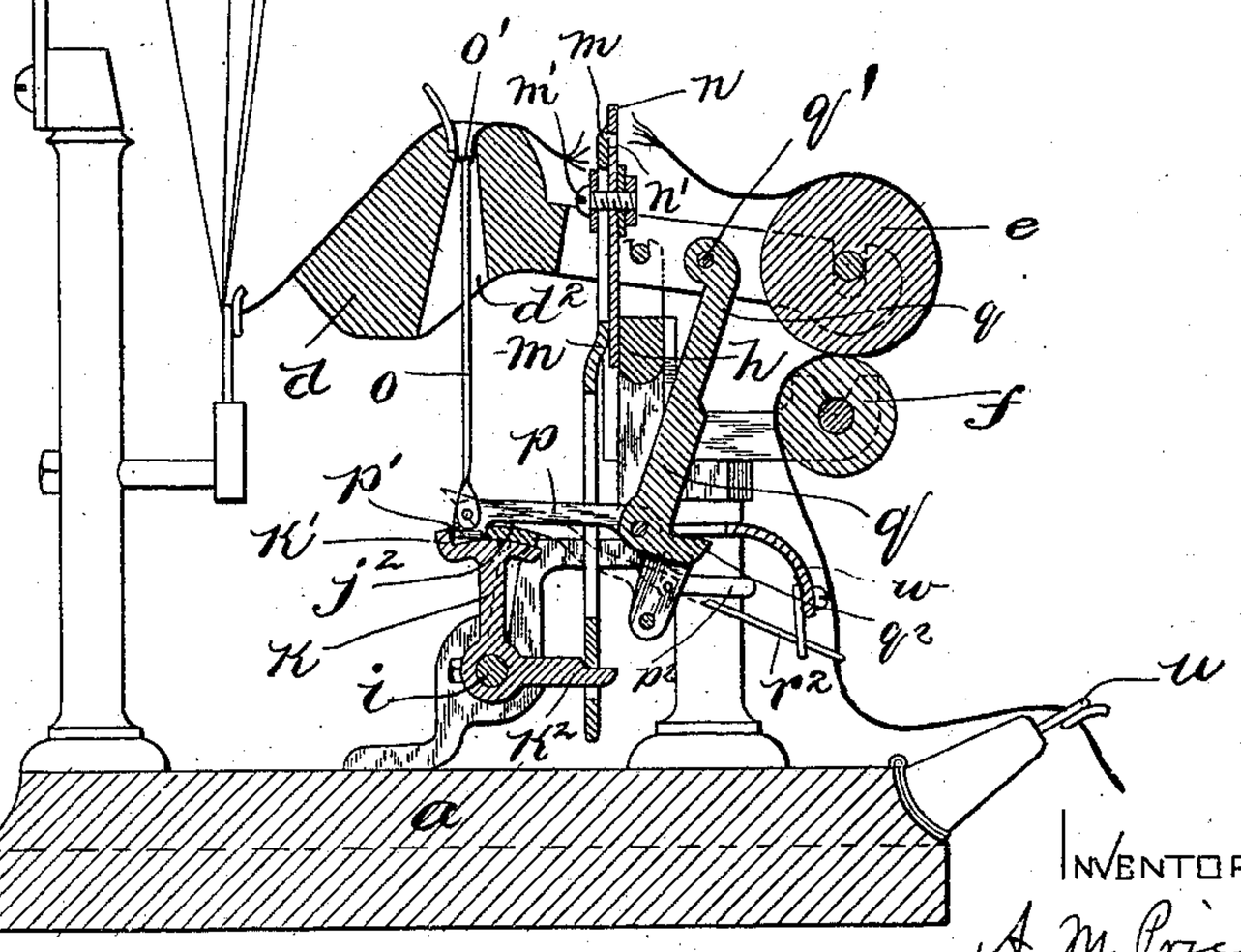


FIG. 5.



WITNESSES:
A. D. Harman
P. W. Pezzetti.

INVENTOR:
A. M. Price
by Wright Brown & Quinby
Attys.

(No Model.) 3 Sheets—Sheet 3.

A. M. PRICE.

STOP MECHANISM FOR DOUBLING AND TWISTING MACHINES.

No. 604,500. Patented May 24, 1898.

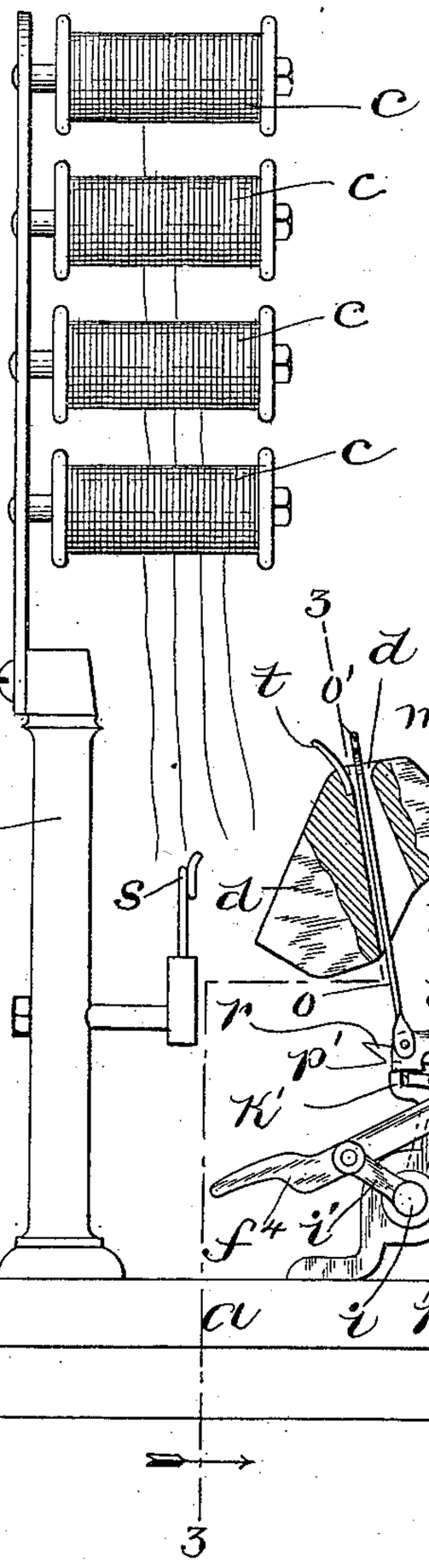


FIG. 2.

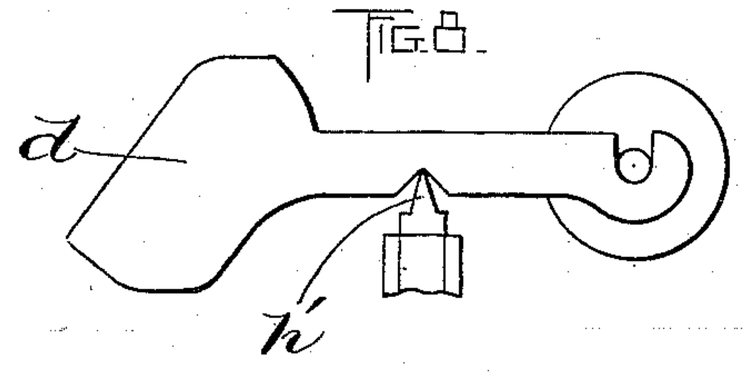


FIG. 6.

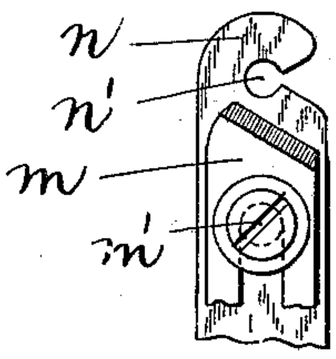


FIG. 7.

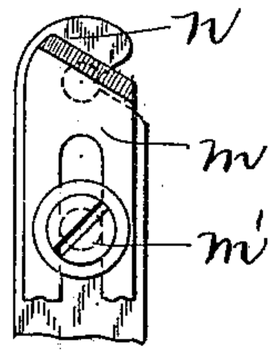
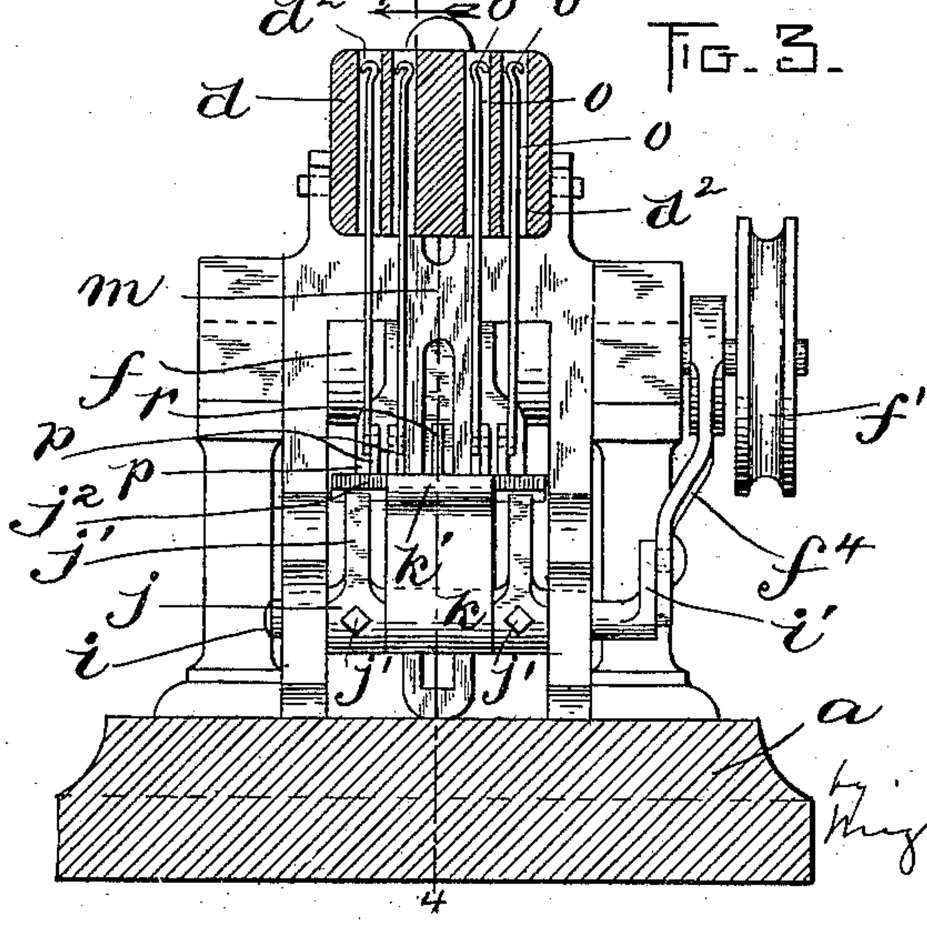


FIG. 3.



WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
A. M. Price
by Wright Brown Quinby
attys

UNITED STATES PATENT OFFICE.

ANDREW M. PRICE, OF LINCOLNTON, NORTH CAROLINA.

STOP MECHANISM FOR DOUBLING AND TWISTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 604,500, dated May 24, 1898.

Application filed July 1, 1897. Serial No. 643,073. (No model.)

To all whom it may concern:

Be it known that I, ANDREW M. PRICE, of Lincolnton, in the county of Lincoln and State of North Carolina, have invented certain new and useful Improvements in Stop Mechanism for Doubling and Twisting Machines, of which the following is a specification.

This invention has relation to machines for doubling and twisting yarn, and has for its object to provide an improved stop mechanism for such machines whereby all of the individual strands or yarns which are being twisted together to form the thread are cut if any one of said strands breaks in passing through the machine.

The invention also has for its object to provide improved mechanism for separating the drawing-rollers upon the breaking of any one or all of the component strands of the thread.

The invention consists in those features of construction and arrangement which I shall now proceed to describe and claim, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 represents a perspective view of a machine constructed in accordance with my invention. Fig. 2 represents a side elevation of the machine. Fig. 3 represents an end elevation, partly in section, on the line 3 3 of Fig. 2. Fig. 4 represents a section on the line 4 4 of Fig. 3. Fig. 5 represents a view similar to Fig. 4, showing a different position of the parts. Figs. 6 and 7 are detail views of the upper ends of the thread-guide and knife. Fig. 8 represents a modification.

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

In the embodiment of my invention illustrated in the drawings I employ a number of drop-wires or detectors corresponding to the number of component strands of the thread and having hooks at their ends under which the strands for the yarn-spools pass before being twisted together. These drop-wires are connected at their lower ends to pivoted latch-fingers, below which is located the knife-actuating mechanism consisting of a vibrator or feeler and a normally stationary member, the latter being connected with the knife. When the machine is in normal operation and the thread-strands are taut, the drop-wires hold the latch-fingers free from the knife-actuating mechanism; but in case any strand breaks the corresponding latch-finger in falling effects engagement between the feeler and the normally stationary member and causes the latter to lift the knife and cut all of the strands. In this way is prevented the formation of a thread without the full complement of strands in case one or more of the strands break.

I also employ a novel locking mechanism for the upper drawing-roller, whereby said roller is held against the lower roller when the machine is in normal operation. When, however, one or more of the yarn-threads break, the locking mechanism is automatically released and the upper drawing-roller separates from the lower one and stops the drawing action.

Referring to the drawings, in which I have shown only those portions of a twisting-machine which are necessary to illustrate my invention, *a* designates a base or support, at one end of which is a column *b*, supporting the spool-frame *b'*, on which are rotatably mounted the yarn spools or bobbins *c c*, which supply the individual yarns for the thread.

d designates a tilting table, the outer end of which is forked and carries the upper drawing-roller *e*. Below said roller is the lower drawing-roller *f*, adapted to be positively driven by suitable means, such as a belt passing over a pulley *f'*. The shaft f^2 of the roller *f* revolves in stationary journals supported on standards *g g*, attached to the base *a*, which standards also support a rack *h*, carrying the trunnions *d'* of the tilting table.

At one end of the roller *f* on the shaft f^2 is mounted an eccentric f^3, which is connected by means of a rod f^4 with a crank *i'*, fixed to an oscillatory shaft *i*, Fig. 2. The revolution of the eccentric causes the shaft *i* to oscillate in its bearings and produces the oscillation of a vibrator or feeler *j*, consisting of a flat horizontal bar j^2, carried by two arms, in the hubs of which are set-screws *j' j'*, by means of which the feeler is attached to the shaft *i*. On the shaft *i* between the arms of the feeler is loosely mounted a bell-crank lever *k*, provided with an upwardly-extending arm, on which is formed a horizontal lip or flange *k'* parallel with the feeler-bar, and a laterally-extending arm k^2, which engages the lower end of a knife *m*. The said knife extends upwardly between the forks of the

tilting table d and is movably held by means of a headed screw m', which passes through a slot in the knife against the face of a flat thread-guide n, attached to the rack h, and having an eye n' near its upper end through which all of the thread-yarns pass before reaching the rollers e f.

The head of the tilting table d is perforated by channels d^2, in which the hooked drop-wires o operate. These drop-wires are here shown as four in number and are pivoted at their lower ends to the rear ends of a corresponding number of latch-fingers p. The said fingers are arranged two on either side of the knife, and each is pivotally connected at a knee formed near its forward end with the lower end of a depending member q, which I term the "latch," and which is pivoted between the forks of the tilting table d on a pin q'. Each of the several latch-fingers p, as will be seen in the drawings, is provided with a heel p', which is normally held away from the feeler-bar j^2 and the top of the bell-crank lever k by the drop-wire o, when said wire is supported by a yarn-thread passing under the hook o' on its upper end. By the oscillation of the feeler j the feeler-bar is given a reciprocating motion toward and away from the lip k' on the bell-crank lever. When the feeler is at the extremity of its forward stroke, there is sufficient space between the feeler-bar and the said lip to admit the heels of the latch-fingers, and if the breaking of a strand causes a finger to drop its heel is caught between the latch-bar j^2 and the lip k', as shown in Fig. 5, and the next rearward stroke of the feeler moves the bell-crank lever and raises the knife m, so that its upper end, which is provided with a cutting edge, passes across the eye n' in the thread-guide n, Figs. 5, and 7.

w designates a latch-rail which is bolted to the side standards of the frame. The latch q is provided near its lower end with a lip q^2, adapted to take under the said latch-rail w when the latch is in its lowermost position and swung forward. When said latch is thus engaged with the rail, the tilting table d is firmly locked, as shown in Fig. 4, in such a position that the drawing-roller e rests upon the drawing-roller f, the two being then in their thread-drawing relation to each other. The tilting table cannot now be tilted to separate the rollers until the latch q is pulled rearwardly out of engagement with the latch-rail w.

At the extreme lower end of the latch q is pivoted a dog r, which is provided at its rear end with a catch r', adapted to engage the feeler-bar j^2, and at its forward end with a hooked arm or detector r^2, which engages the thread after it leaves the lower roller f. The said arm is drawn forward by the tension of the thread when the machine is in normal operation, as shown in Figs. 1 and 4, thereby holding the catch end of the dog r out of engagement with the feeler-bar.

It will be observed that when the heel of any one of the latch-fingers p is engaged by the feeler-bar j^2 and is drawn rearwardly therewith by the rearward reciprocation of the feeler the lower end of the latch q is drawn by said latch-finger rearwardly to the left, as shown in Fig. 5. I term this operation "pulling the latch." The latch is also pulled to disengage it from the latch-rail w, when a break in the thread beyond the drawing-rollers allows the dog r to fall and engage the oscillating feeler-bar j^2.

The course of the thread will readily be traced in the drawings. The yarn-threads pass from the spools c through a series of suitably-supported eyes s across the face of the tilting table, between the teeth of a comb t, arranged as a guide behind the drop-wire apertures, underneath the drop-wire hooks, through the thread-guide n, between the rollers e f, through the hook r^2, through an eye u, and from thence to the flier of the twisting-machine.

The operation of the machine, briefly stated, is as follows: When the machine is running, the parts have the normal positions shown in Figs. 1, 3, and 4, with the rollers in contact, the drop-hooks o' just below the top of the tilting table, and the latch-fingers and dog r raised above the vibrating feeler. When a strand breaks, its drop-wire falls and causes the knife m to cut the strands, as described. Simultaneously with this action the lower end of the latch q is pulled out of engagement with the latch-rail w. This unlocks the tilting table d, and since the left-hand end, Figs. 2, 4, and 5, or head of said table is much heavier than the end which carries the roller e the table tilts by reason of gravity, so as to bring the heavy end downward and lift the upper drawing-roller away from the lower one.

Each latch-finger p is provided with a forward extension or toe p^2, which takes under the latch-rail w. When the latch q is depressed, the toes of the latch-fingers are depressed out of contact with said rail; but when the latch is raised by reason of the tilting of the table d, as above described, the toes of the latch-fingers are brought up against the under side of the latch-rail, and the heel ends p' of all of said fingers are thereby lifted above the feeler-bar j^2, as shown in Fig. 2. The hooks on the upper ends of the drop-wires o then project above the top of the tilting table, and the machine is ready for rethreading.

Should the doubled thread break in the drawing-rollers e f or below them, the arm r^2 loses its support and allows the dog r to engage the feeler j^2 and pull the latch q, thereby tilting the table d and separating the drawing-rollers, so as to stop their drawing action on the thread. In this case the knife m is not operated to cut the strands.

It will be observed that when the knife is operated to cut the threads it is automatically returned to its inoperative position im-

mediately after the upward stroke, for as soon as the table tilts and lifts the latch the heel of the latch-finger, which has fallen in between the feeler and the knife-operating lever, is lifted out therefrom, as above described, and the weight of the knife and of the lever-arm k^2 causes the knife to drop back into its first position.

In stop-motions of this class as heretofore constructed a readjustment or resetting of a considerable number of parts is usually necessary before the machine can be rethreaded, whereas in my improved construction the machine is automatically put in condition for rethreading immediately after a break.

To those skilled in the art it will appear from the above description that I have provided an improved stop mechanism adapted for attachment to any of the well-known patterns of doubling and twisting machines, such variations of structure or operation being made as may prove requisite or desirable to meet the requirements of particular machines.

I do not confine myself to the construction herein set forth where such construction may be varied without departing from the spirit of my invention. For instance, in Fig. 8 I have indicated a modification in which the round trunnions of the tilting table are dispensed with and said table is represented as supported on knife-edges h'.

I claim—

1. A device of the character specified comprising means for progressively actuating two or more yarn-threads, a knife, a normally-stationary knife-actuating member, a feeler having a reciprocating motion toward and away from said member, detectors engaged with the several yarn-threads, and members connected with the several detectors, each of said members being adapted, upon the breaking of a thread and the release of the corresponding detector to fall into the space between the feeler and the knife-actuating member, causing engagement of the two and causing the knife to be operated to cut all of the threads.

2. A device of the character specified comprising means for progressively actuating two or more yarn-threads, a knife having a normally-inoperative position in proximity to said threads, means for moving said knife from this position to cut the threads upon the breaking of one or more of them, and means for automatically returning the knife to its inoperative position immediately after the cutting operation.

3. A device of the character specified comprising means for progressively actuating two or more yarn-threads, a knife, a knife-operating member, a vibratory feeler, detectors adapted to effect engagement between said member and said feeler so as to operate the knife and cause it to cut the threads when one or more of said threads break, and means for automatically effecting disengagement of the said member and said feeler immediately after the cutting operation, thereby permitting the knife to return to an inoperative position.

4. A device of the character specified comprising drawing-rollers for progressively actuating two or more yarn-threads, a tilting member carrying one of said rollers, means for locking said tilting member with the rollers in contact, a knife, and thread-controlled devices for causing said knife to sever the threads and simultaneously therewith releasing the locking means to allow of the separation of the rollers upon the breaking of one or more of the threads.

5. A device of the character specified comprising drawing-rollers for progressively actuating two or more yarn-threads, a knife, a knife-operating lever, a vibratory feeler, detectors normally suspended by the threads, a tilting table carrying one of the drawing-rollers, a latch depending from said tilting table and adapted to lock the same with the rollers in contact, and latch-fingers connected with said latch and with the detectors, the arrangement being such that a latch-finger will fall and effect engagement between the vibratory feeler and the knife-operating lever, upon the breaking of its suspending thread, thereby causing the knife to cut the threads, and at the same time pulling the latch so as to unlock the tilting table and allow of the separation of the drawing-rollers.

6. A device of the character specified, comprising means for progressively actuating two or more yarn-threads, an oscillating shaft, a knife-actuating member loosely mounted thereon, a knife, a feeler secured to and vibrated by the oscillating shaft, detectors engaged with the several yarn-threads, and members connected with the several detectors and each adapted, upon the breaking of the thread supporting its detector, to fall between the feeler and the knife-actuating member, thereby causing the latter to oscillate and operate the knife to sever the threads.

7. A device of the character specified, comprising a tilting table formed with detector-channels, a series of detectors occupying said channels and normally supported by the yarn-threads at or near the orifices of the channels, and means for automatically tilting the table upon the breaking of one or more of the yarn-threads so as to depress its channeled portion and cause the detectors to project from their orifices for the purpose of rethreading.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of June, A. D. 1897.

ANDREW M. PRICE.

Witnesses:

GEO. J. WILLIAMS,

JOHN F. ADAMS.