

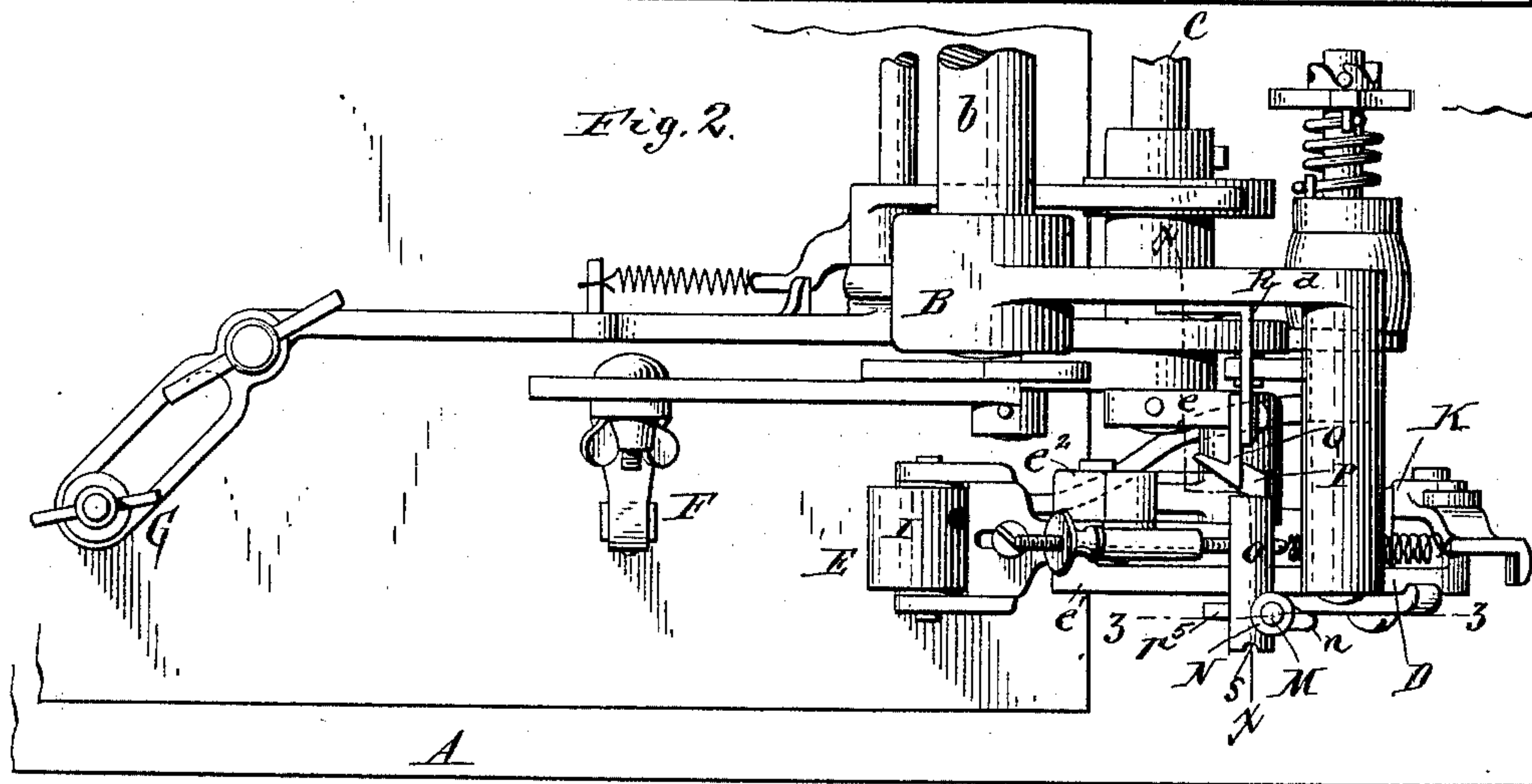
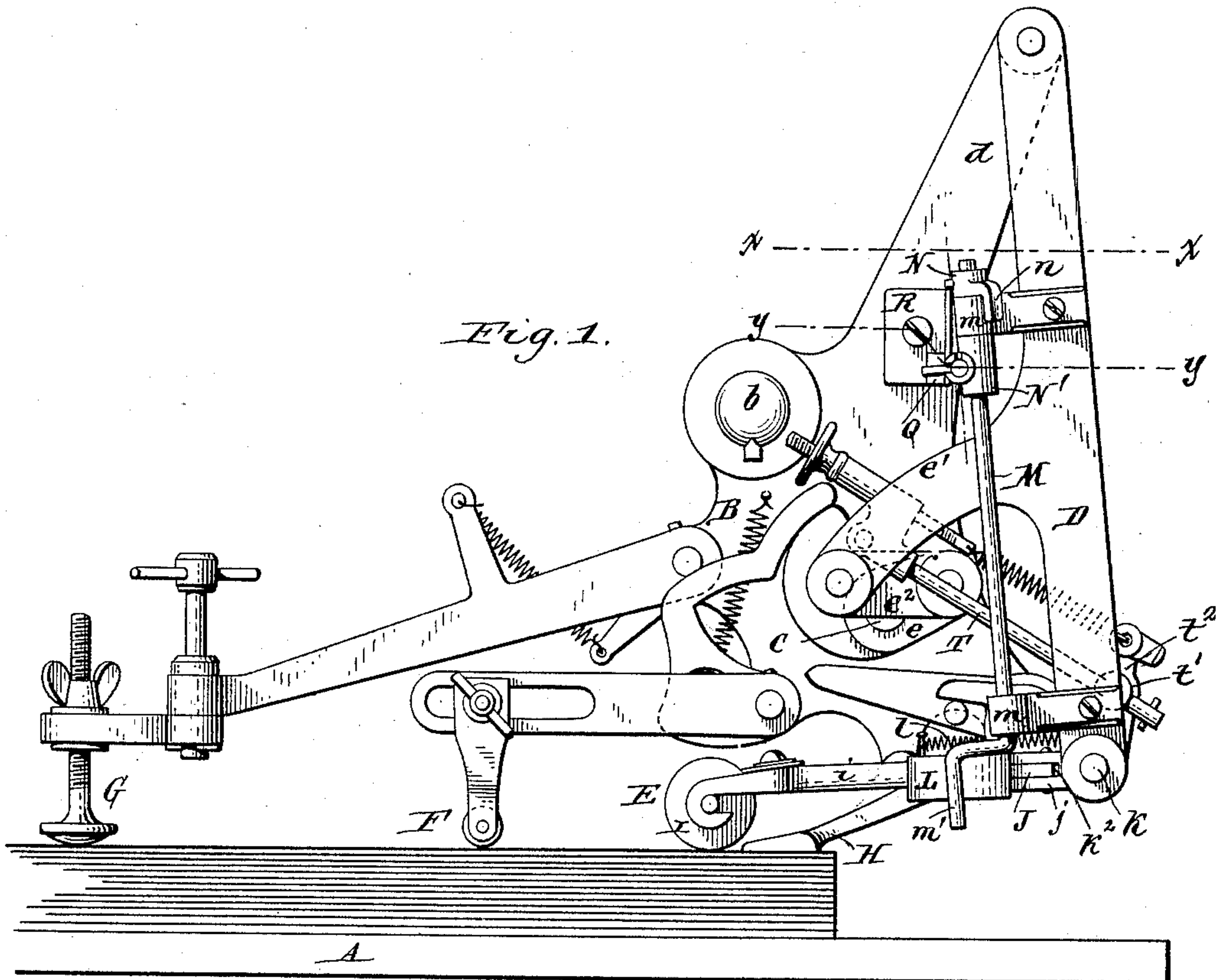
(No Model.)

3 Sheets—Sheet 1.

W. WOMERSLEY.  
PAPER FEEDING MACHINE.

No. 475,839.

Patented May 31, 1892.



Witnesses:  
Thos. L. Popp.  
John N. Ordner.

William Womersley,  
Inventor,  
By Wilhelm Bonner,  
Attorneys.

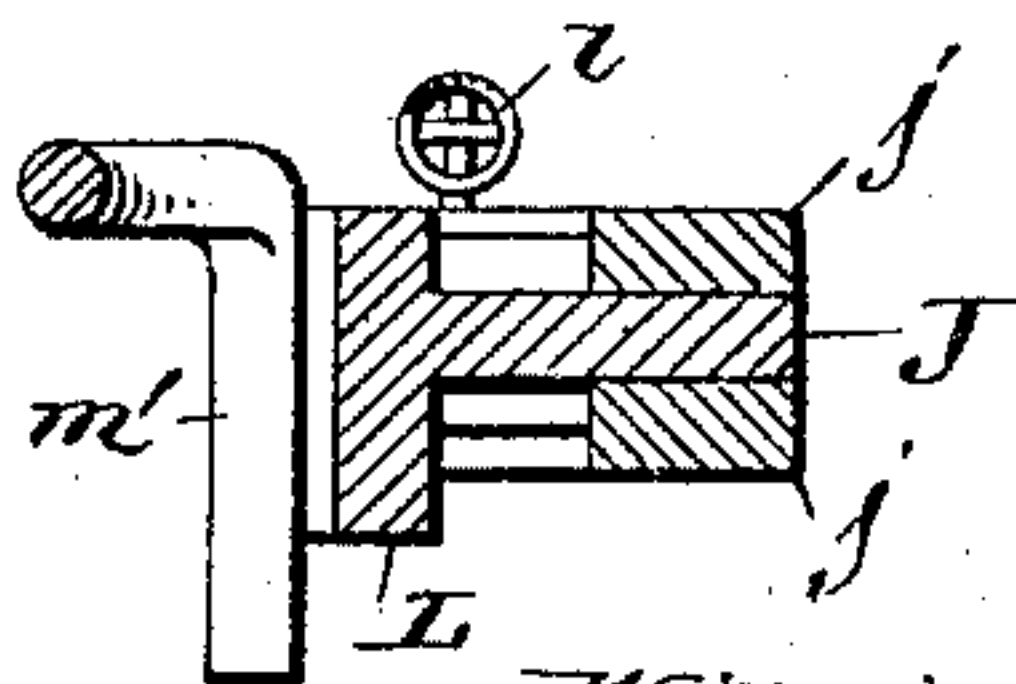
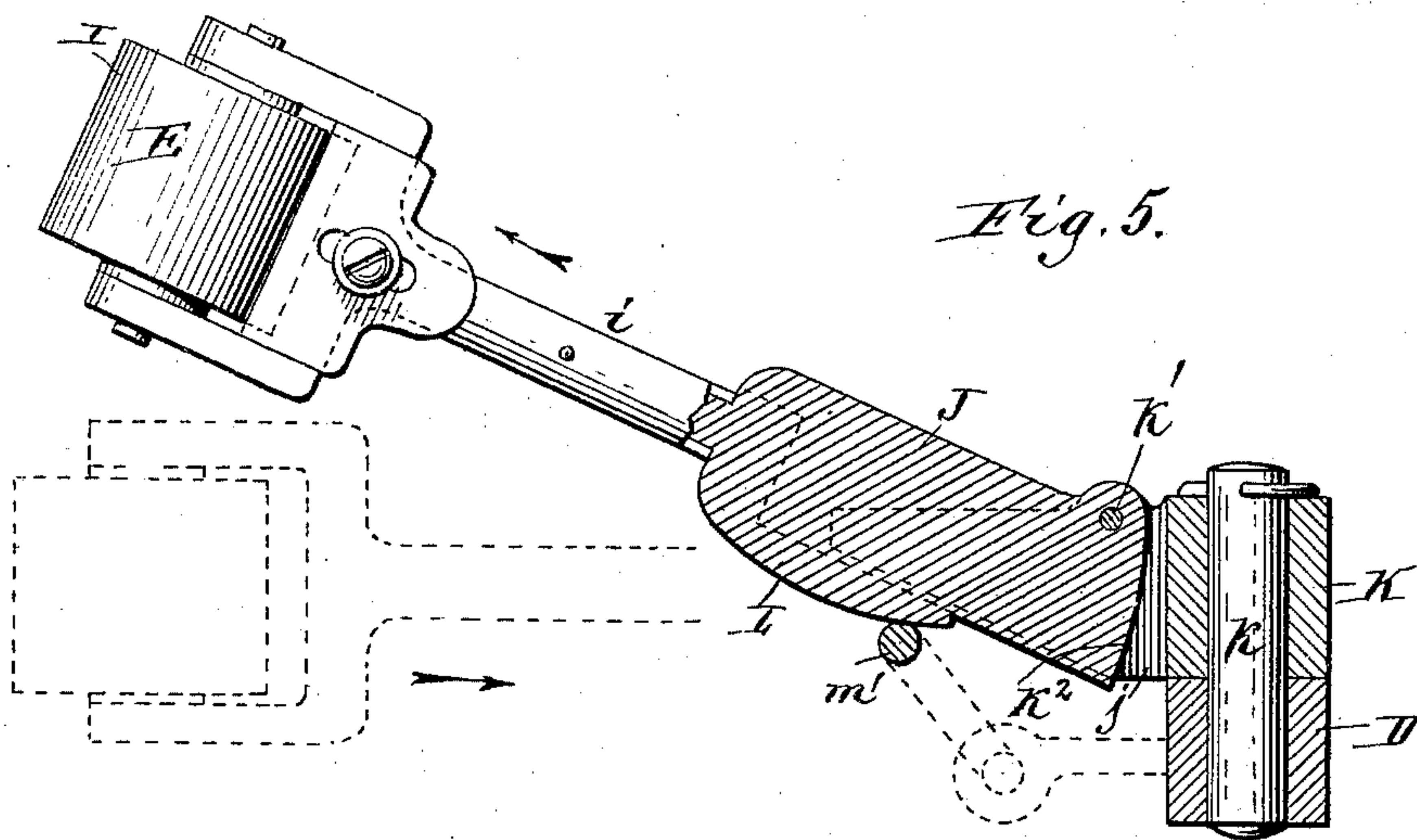
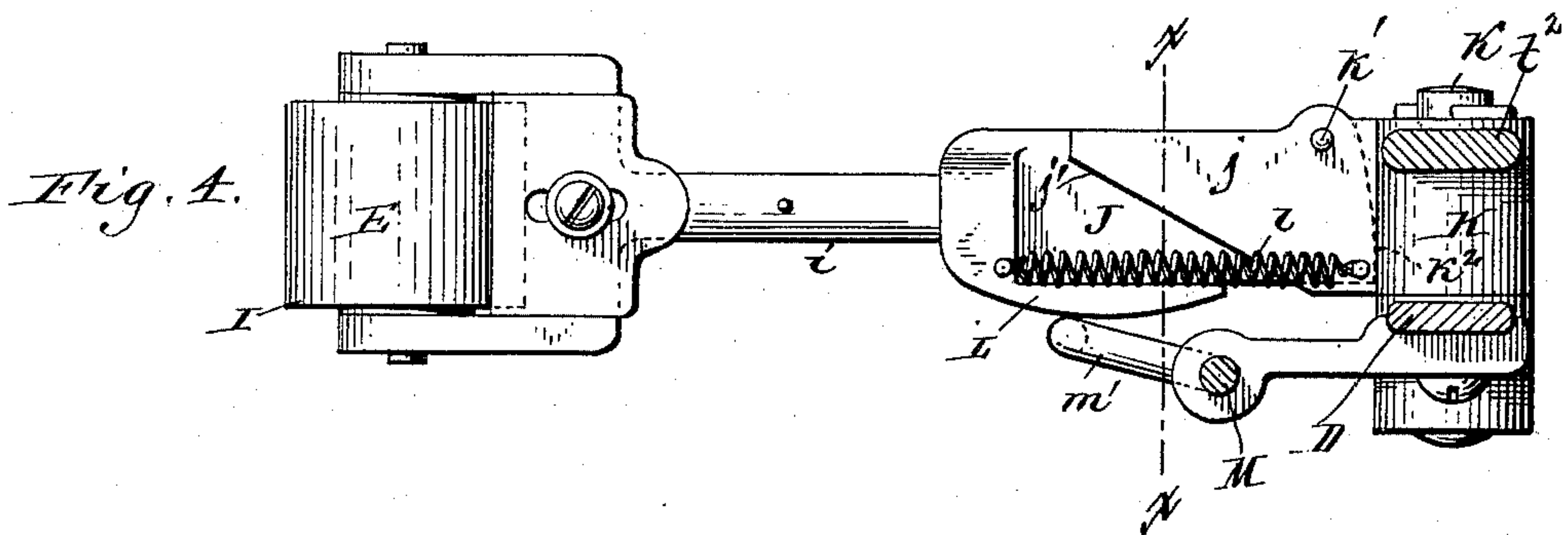
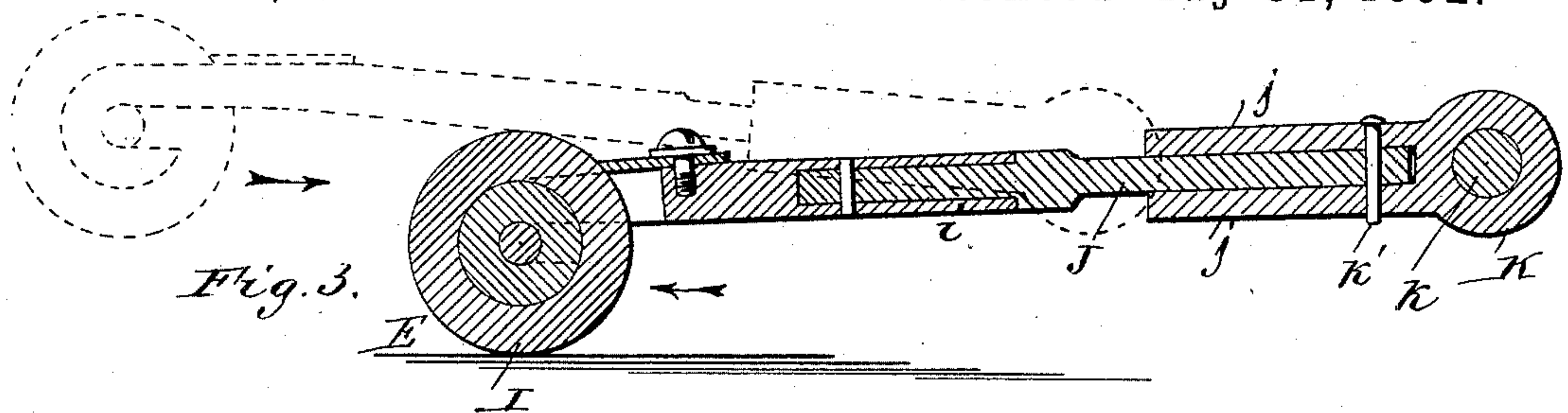
(No Model.)

3 Sheets—Sheet 2.

W. WOMERSLEY.  
PAPER FEEDING MACHINE.

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Patented May 31, 1892.



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(No Model.)

3 Sheets—Sheet 3.

W. WOMERSLEY.  
PAPER FEEDING MACHINE.

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Patented May 31, 1892.

*Fig. 7.*

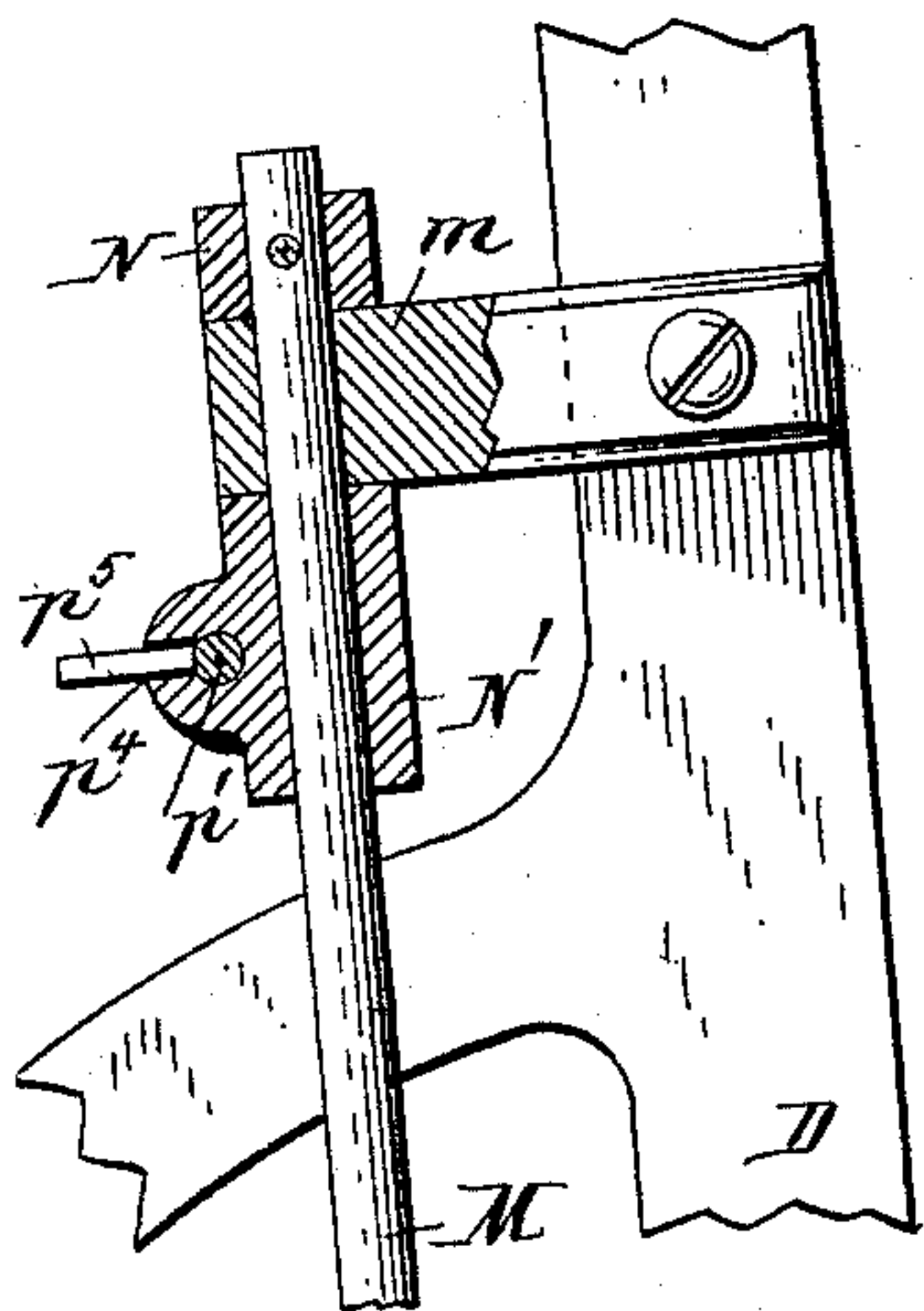


Fig. 10.

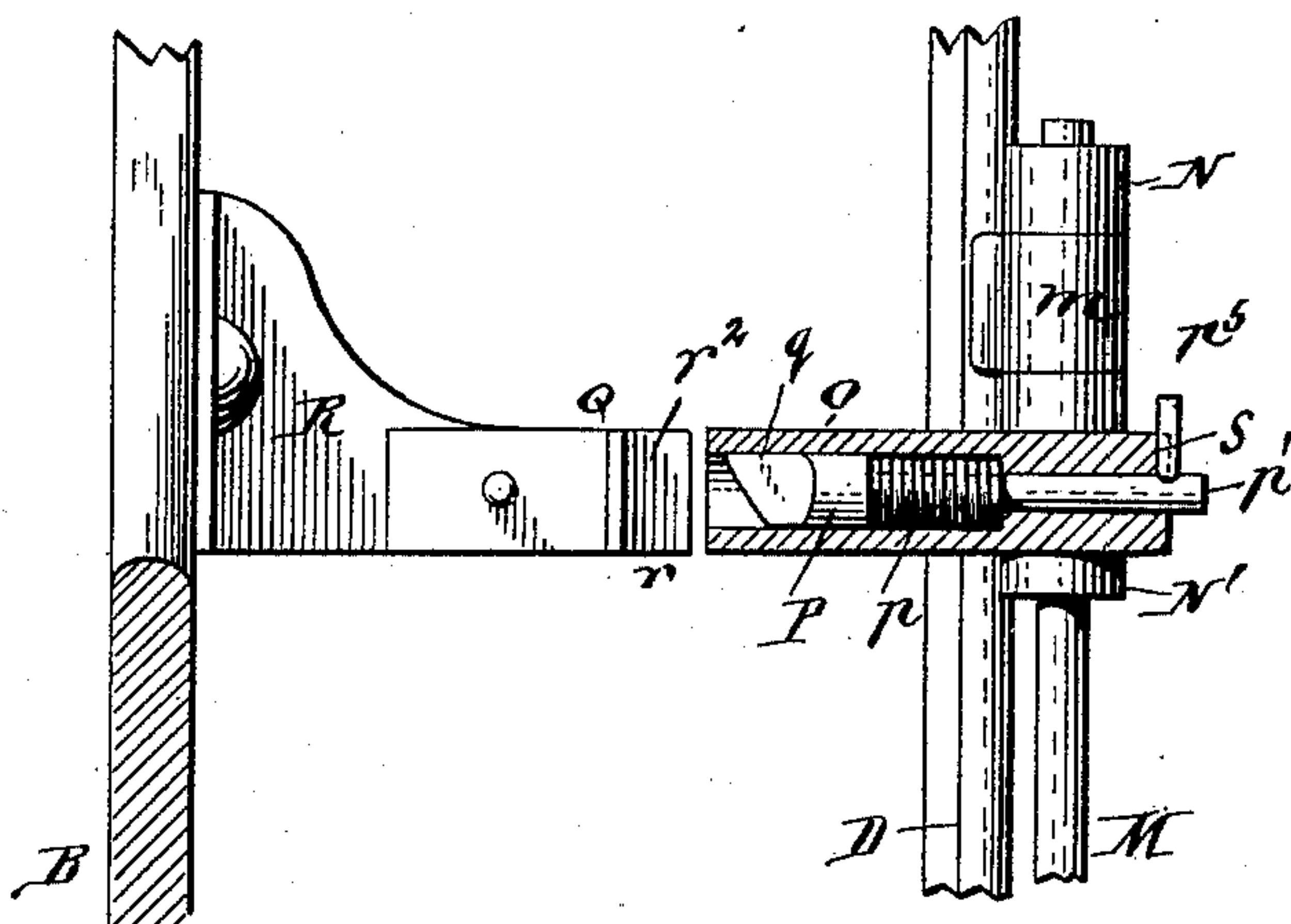


Fig. 8.

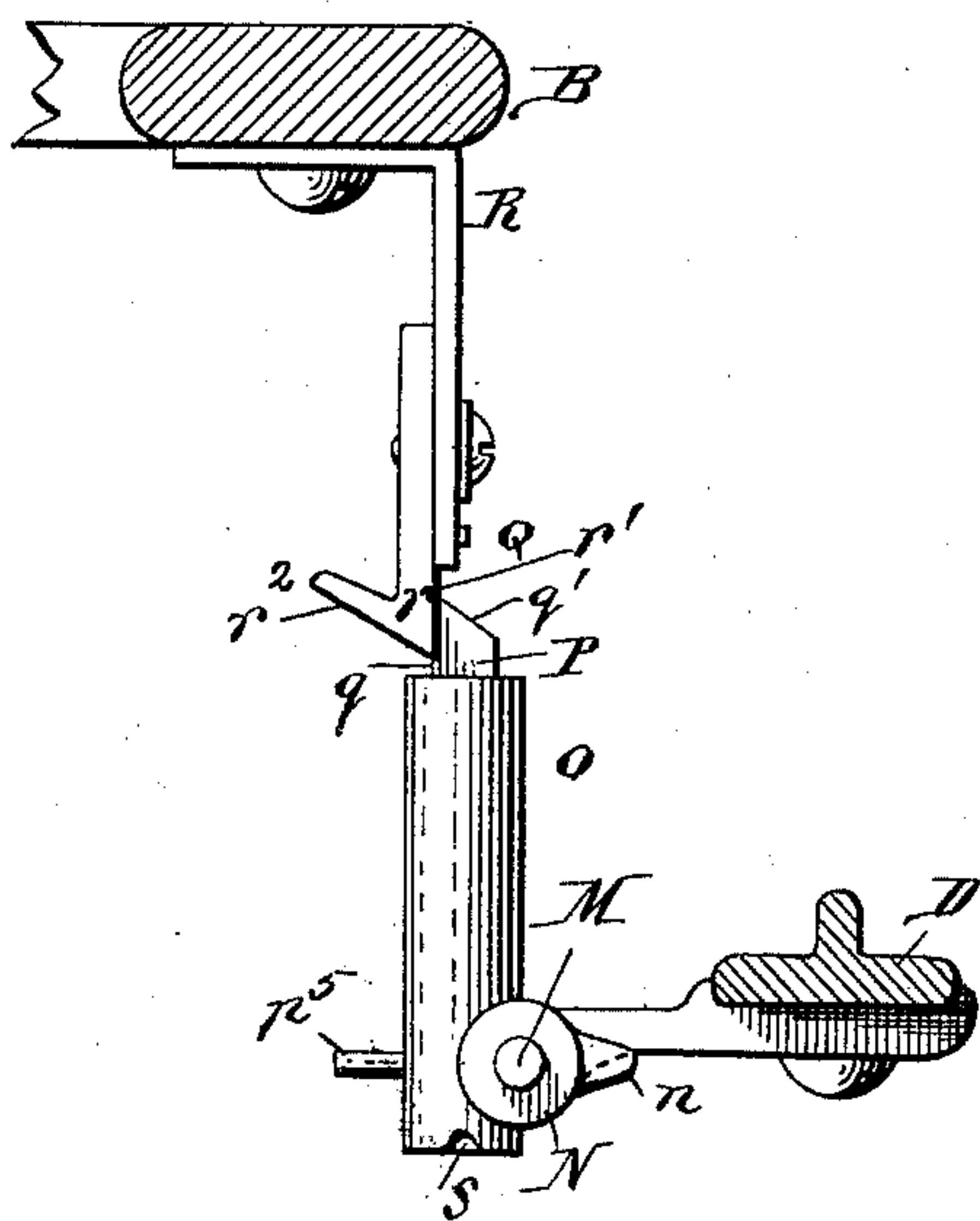
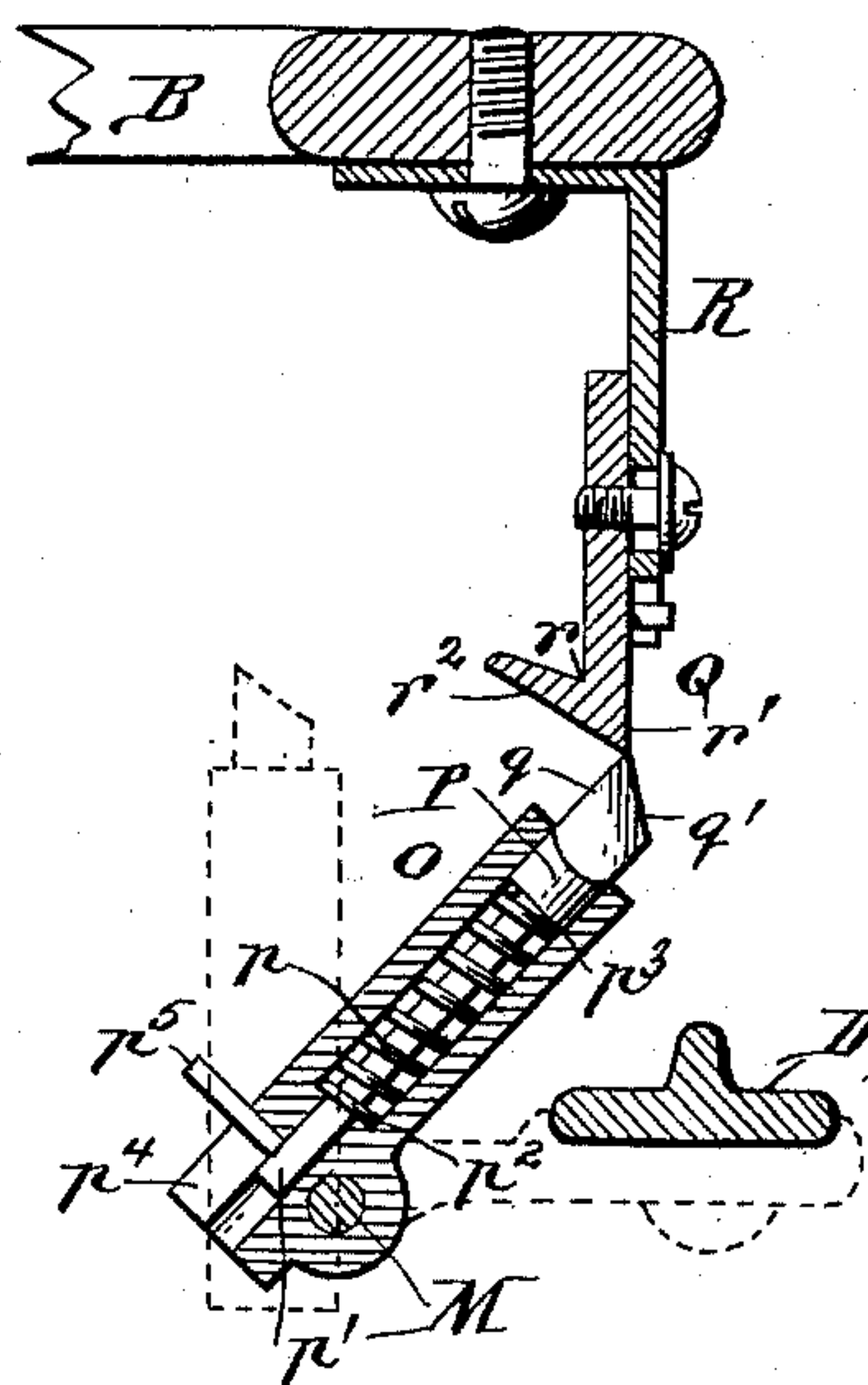


Fig. 9.



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# UNITED STATES PATENT OFFICE.

WILLIAM WOMERSLEY, OF POUGHKEEPSIE, ASSIGNOR TO D. H. BURRELL & CO., OF LITTLE FALLS, NEW YORK.

## PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 475,839, dated May 31, 1892.

Application filed August 18, 1891. Serial No. 402,968. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM WOMERSLEY, a citizen of the United States, residing at Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful Improvement in Paper-Feeding Machines, of which the following is a specification.

This invention relates to paper-feeding machines which feed sheets of paper successively from a pile to a printing-press or other machine in which sheet-paper is operated upon. These machines consist, essentially, of a pile-supporting table which is automatically raised as the sheets are fed off from the top of the pile, a buckling-finger whereby the sheet is buckled, holding-down fingers against which the sheet is buckled, a pile-retaining finger whereby the pile is held in place, and devices for carrying the buckled or loosened top sheet from the pile to the printing-press or other machine. Heretofore the buckling of the sheet was effected by a forward-and-backward movement of the buckling-finger parallel with the rear edge of the sheet. It has been found desirable in feeding certain kinds of paper to buckle the sheet obliquely, or on a line running approximately diagonal from the corner of the pile.

The objects of my invention are to provide a simple and efficient device whereby the buckling-finger is moved in a diagonal direction; also, to produce a device whereby the movement of the buckling-finger can be changed from a direction parallel with the rear edge of the sheet to a diagonal direction, or vice versa.

In the accompanying drawings, consisting of three sheets, Figure 1 is a front elevation of the sheet-buckling mechanism. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal section of the buckling-finger on an enlarged scale. Fig. 4 is a top plan view of the buckling-finger, showing the same straight and in its retracted position. Fig. 5 is a similar view, partly in section, showing the buckling-finger moved forward and deflected to its oblique position. Fig. 6 is a vertical cross-section in line  $x x$ , Fig. 4. Fig. 7 is a fragmentary vertical section in line  $z z$ , Fig. 2, on an enlarged scale. Fig. 8 is a horizontal sec-

tion in line  $x x$ , Fig. 1, on an enlarged scale, showing the trip-arm in its normal position at right angles to its line of motion. Fig. 9 is a similar section in line  $y y$ , Fig. 1, on an enlarged scale, showing the trip-arm in its shifted position obliquely to its line of motion. Fig. 10 is a vertical section in line  $x x$ , Fig. 2, on an enlarged scale, showing the spring-bolt in the trip-arm retracted.

Like letters of reference refer to like parts in the several figures.

A represents the vertically-movable feed-table upon which the pile of paper is placed and which is raised automatically in the usual manner as the sheets are fed from the top of the pile.

B represents the carrying-head, which supports the parts of the sheet-buckling mechanism and which is secured to the rear end of a supporting-rod  $b$ .

C represents the longitudinal driving-shaft, which is journaled in the lower portion of the carrying-head and which imparts motion to the buckling mechanism.

D represents a depending rock-arm provided at its lower end with a buckling-finger E, which receives a backward-and-forward movement from the rock-arm. The buckling-finger bears upon the sheet and buckles the same while moving forward and is raised from the sheet during its backward movement. The rock-arm D, carrying the buckling-finger, is pivoted at its upper end on a lug  $d$ , projecting from the upper end of the carrying-head. A transversely-oscillating motion is imparted to the arm D by means of a crank  $e$ , secured to the end of the driving-shaft and connecting with an inwardly-extending arm  $e'$  of the rock-arm D by a link  $e^2$ .

F represents the preliminary holding-down finger, against which the top sheet is buckled by the initial portion of the forward stroke of the buckling-finger. This preliminary holding-down finger has a vertical movement toward and from the top of the pile of paper and is provided with actuating mechanism, whereby it is held on the pile of paper and lifted therefrom just before the advancing buckling-finger reaches it.

G represents a gage-foot, which rests upon the pile of paper and is arranged at a dis-



tance inwardly from the preliminary holding-down finger. This foot serves the double function of regulating the upward feed motion of the pile-supporting table and of a holding-down finger, against which the top sheet is buckled when the latter has been released by the preliminary holding-down finger. The gage-foot has a vertical movement toward and from the pile of paper, so as to release the sheet and allow it to be fed off from the pile.

H represents the vertically-movable pile-retaining finger, which bears upon the corner of the pile of paper in rear or outside of the buckling device and holds the pile in place while the top sheet is being removed.

The pile-retaining finger, the preliminary holding-down finger, the gage-foot, and their actuating device and the device for moving the buckling-finger back and forth and lifting it on its return stroke are the same as those described in Letters Patent of the United States No. 434,629, dated August 19, 1890, to which reference is hereby made for a more complete description thereof.

The buckling-finger is preferably provided with a roller I, journaled in the bifurcated inner end of a horizontal rod or stem  $i$  in such manner that it is held against turning during its forward movement, but allowed to revolve during its backward movement. The outer end of the rod or stem of the buckling-finger is provided with a hinge-plate J, which is arranged between two lugs  $j j$ , formed on the inner side of an eye K, which is journaled on a horizontal arbor  $k$ , secured to the lower end of the depending rock-arm. The hinge-plate of the buckling-finger is pivotally secured between the lugs of the eye K by a vertical pin  $k'$ , passing through the outer ends of the hinge-plate J and lugs  $j j$  near the rear sides thereof. The eye K, journaled on the horizontal arbor of the rock-arm, and the hinge, having a vertical pivot, enable the buckling-finger to oscillate both vertically and horizontally. The shoulder  $k^2$  at the front outer edge of the hinge-plate J strikes the eye K when the buckling-finger is straight and limits the forward swinging movement of the buckling-finger on its vertical pin in the absence of any other device for the purpose.

L represents a bearing-plate formed on the front side of the hinge-plate J, and extending above and below the latter, so as to strike against the inclined front sides  $j'$  of the lugs  $j j$ , thereby limiting the backward swinging movement of the buckling-finger.

$l$  represents a coil-spring arranged lengthwise over the front portion of the buckling-finger and attached with its ends to pins arranged near the front sides of the lug  $j$  and the hinge-plate J, whereby the buckling-finger is yieldingly held in its straight position, or in line with the direction of the transverse movement of the depending rock-arm.

M represents an upright rock-shaft whereby a horizontal oscillating movement is imparted

to the buckling-finger. This rock-shaft is journaled in bearings  $m m$ , secured to the depending rock-arm D, and provided at its lower end with a crank  $m'$ , which bears against the front side of the bearing-plate L of the buckling-finger. The rock-shaft M is held against lengthwise movement by means of collars N N', secured to the rock-shaft above and below the upper bearing  $m$ . The upper collar N is provided with a stop  $n$ , which overhangs the outer side of the upper bearing and limits the forward movement of the rock-shaft by striking against the plate of the upper bearing, as represented in Figs. 1, 2, and 8.

O represents a horizontal trip-arm whereby the rock-shaft is oscillated. This trip-arm extends rearwardly from the lower collar and is preferably formed integral therewith. The trip-arm is made hollow and provided with a spring-bolt P, which slides therein and is adapted to strike against a fixed stop Q on the carrying-head during the forward movement of the buckling-finger.

$p$  represents a spring surrounding the contracted rear portion  $p'$  of the spring-bolt in the trip-arm and bearing against shoulders  $p^2 p^3$ , formed, respectively, on the inner sides of the trip-arm and the spring-bolt, whereby the latter is normally held in a projected position. The rear end of the trip-arm is provided with a longitudinal slot  $p^4$ , in which moves a guide-pin  $p^5$ , which is secured to the spring-bolt and whereby the latter is prevented from turning and which also limits the projecting movement of the spring-bolt. The front end of the spring-bolt is provided with an abrupt front  $q$  and an inclined back  $q'$ . This causes the trip-arm to be deflected when the abrupt face strikes the stop Q and the spring-bolt to recede without deflecting the trip-arm when the inclined back strikes against the stop. The latter consists of an angle-plate  $r$ , which is adjustably secured by a screw to a bracket R, arranged on the carrying-head. The angle-plate is provided with a flat face  $r'$  and an inclined back  $r^2$ , against which latter the inclined back of the spring-bolt engages during the backward movement of the trip-arm. At the beginning of the forward movement of the depending rock-arm the buckling-finger rests upon the pile of paper and the spring-bolt strikes with its flat face against the flat face of the fixed stop, as represented in Figs. 1, 2, 3, 4, and 8. During the further forward movement of the rock-arm the stop Q obstructs the forward movement of the trip-arm and causes the free end of the latter to be retarded or swung backward, whereby the upright rock-shaft is turned backward, as represented in Fig. 9. This turning movement of the rock-shaft causes the crank at its lower end to bear against the bearing-plate of the buckling-finger, thereby causing the latter to be swung on its hinge and to be deflected out of its straight course and to travel over the sheet obliquely, or at an angle to the line of movement of the rock-arm, as represented in



Fig. 5. During the oblique inward movement of the buckling-finger the spring *l* becomes strained. When the buckling-finger has nearly completed its forward movement, the trip-arm has been deflected sufficiently to permit its spring-bolt to pass the stop. It now again assumes its normal position, which is represented by dotted lines in Fig. 9. As soon as the trip-arm is released the spring *l* draws the buckling-finger forward into the straight position indicated by dotted lines in Fig. 5. The buckling-finger remains in this position during its entire backward or outward movement, and the trip-arm passes the stop, owing to its spring-bolt receding upon striking the inclined back of the stop. The oblique forward movement of the buckling-finger over the sheet causes the latter to be buckled diagonally, which is more desirable than the parallel buckling movement in feeding some kinds of paper. The trip-arm of the rock-shaft and the fixed stop on the carrying-head are arranged at a sufficient distance below the pivot of the depending rock-arm that the travel of the rock-arm at that point gives the trip-arm and the buckling-finger the requisite amount of oblique movement in moving forward over the pile. By adjusting the stop the trip-arm can be deflected more or less, thereby causing the buckling-finger to buckle the sheet at a greater or less angle. If desired, the sheet may be buckled parallel with the side of the pile by withdrawing the spring-bolt and locking it in its retracted position, so that it cannot come in contact with the stop. A simple locking device for this purpose consists of a notch *s*, formed in the rear end of the trip-arm. The bolt is locked by withdrawing it to such an extent that its guide-pin *p*<sup>5</sup> can be engaged in this notch upon giving the bolt a partial turn. Upon retracting the sliding bolt and holding it out of engagement with the stop during its forward-and-backward movement with the buckling-finger the latter moves across the pile parallel with the end of the pile, or in line with the transverse movement of the rock-arm.

It represents a lifting-rod whereby the buckling-finger is raised from the pile during its backward movement, as represented in dotted lines, Fig. 3. This lifting-rod is attached with its inner end to the link connecting the rock-arm with the crank of the driving-shaft and passes with its opposite end through a post *t'*, arranged on a lug *t*<sup>2</sup>, formed integral with the eye *K*.

My improved buckling mechanism produces an oblique or diagonal movement of the buckling-finger without changing the ordinary position of the driving-shaft and other actuating parts, which are arranged parallel with the sides and ends of the pile or pile-supporting table, so that these parts can be driven and adjusted with the same facility as in a mechanism having only the straight movement of the buckling-finger.

I claim as my invention—

1. The combination, with a support having a forward-and-backward movement, of a buckling-finger capable of lateral movement on said support and mechanism whereby the buckling-finger is deflected laterally during its forward movement, substantially as set forth.

2. The combination, with a support having a forward-and-backward movement, of a buckling-finger pivoted vertically on said support and a rock-shaft journaled on said support and provided with a crank which bears against the buckling-finger and whereby the buckling-finger is laterally deflected, substantially as set forth.

3. The combination, with a support having a forward-and-backward movement, of a buckling-finger pivoted on said support, a rock-shaft mounted on said support and provided with a crank bearing against said buckling-finger, a trip-arm secured to said rock-shaft, and a stop which arrests the trip-arm and whereby the rock-shaft is actuated, substantially as set forth.

4. The combination, with the carrying-head provided with a stop and an oscillating supporting-arm pivoted on said head, of a buckling-finger pivoted to said supporting-arm, a rock-shaft mounted on said supporting-arm and provided with a crank bearing against said buckling-finger, and a trip-arm secured to said rock-shaft and provided with a spring-bolt adapted to strike against said stop, substantially as set forth.

5. The combination, with the carrying-head provided with a stop and an oscillating supporting-arm pivoted on said head, of a buckling-finger pivoted on said supporting-arm, a rock-shaft mounted on said supporting-arm and provided with a crank bearing against said buckling-finger, a hollow trip-arm secured to said rock-shaft and provided with a slot at its rear end, a spring-bolt arranged in said trip-arm and adapted to bear against said stop, and a pin secured to said spring-bolt and arranged in said slot, substantially as set forth.

6. The combination, with a support having a forward-and-backward movement, of a buckling-finger capable of lateral movement on said support, a crank-shaft whereby said buckling-finger is deflected laterally, and a spring whereby the buckling-finger is returned to its straight position, substantially as set forth.

7. The combination, with a support having a forward-and-backward movement, of a buckling-finger capable of lateral movement on said support, mechanism whereby the buckling-finger can be deflected laterally during its forward movement, and a locking device whereby said mechanism can be rendered inoperative, thereby causing the buckling-finger to move in a straight course, substantially as set forth.

8. The combination, with the carrying-head



provided with a stop and an oscillating supporting-arm pivoted on said head, of a buckling-finger capable of lateral movement on said arm, a crank-shaft mounted on said arm  
5 and bearing against the buckling-finger, a spring-bolt connected with said crank-shaft and adapted to strike said stop, and a locking device whereby the spring-bolt can be held in a retracted position, substantially as set forth.

10 9. The combination, with the carrying-head provided with a stop and an oscillating supporting-arm pivoted on said head, of a buckling-finger pivoted to said supporting-arm, a rock-shaft mounted on said supporting-arm  
15 and provided with a crank bearing against said buckling-finger, a hollow trip-arm provided with a slot in its rear end, and a spring-bolt arranged in said trip-arm and provided with a pin which is arranged in said slot, whereby  
20 the spring-bolt can be retracted and turned in the trip-arm, so as to be held out of engagement with the stop, substantially as set forth.

10. The combination, with the movable supporting-arm, of an eye journaled horizontally  
25 on said arm and a buckling-finger pivoted vertically on said eye, substantially as set forth.

11. The combination, with the movable supporting-arm, of an eye journaled horizontally  
30 on said arm, a buckling-finger pivoted vertically on said eye and provided with a bear-

ing-plate, and a crank-shaft journaled on said supporting-arm and bearing against said bearing plate, substantially as set forth. 35

12. The combination, with the movable supporting-arm and the buckling-finger, of an eye journaled horizontally on said supporting-arm and provided with a lug, a hinge-plate formed on said buckling-finger and pivoted  
40 vertically to said lug, a bearing-plate formed on said hinge-plate and adapted to bear against said lug, a spring connecting the buckling-finger with the eye, and a rock-shaft journaled on said supporting-arm and provided with a crank bearing against said bearing-plate, substantially as set forth. 45

13. The combination, with the support having a forward-and-backward movement and the buckling-finger capable of lateral movement thereon, of a crank-shaft mounted on  
50 said support and bearing against the buckling-finger and a stop which is secured to said crank-shaft and whereby the turning movement of the latter is arrested when the buckling-finger has reached its straight position, substantially as set forth. 55

Witness my hand this 8th day of August, 1891.

WILLIAM WOMERSLEY.

Witnesses:

WILLIAM J. KENNEDY,  
J. S. VAN CLEEF.