

G. C. Howard. Paper Perforating Mach.

N^o 1089.

Patented Jul. 2, 1861.

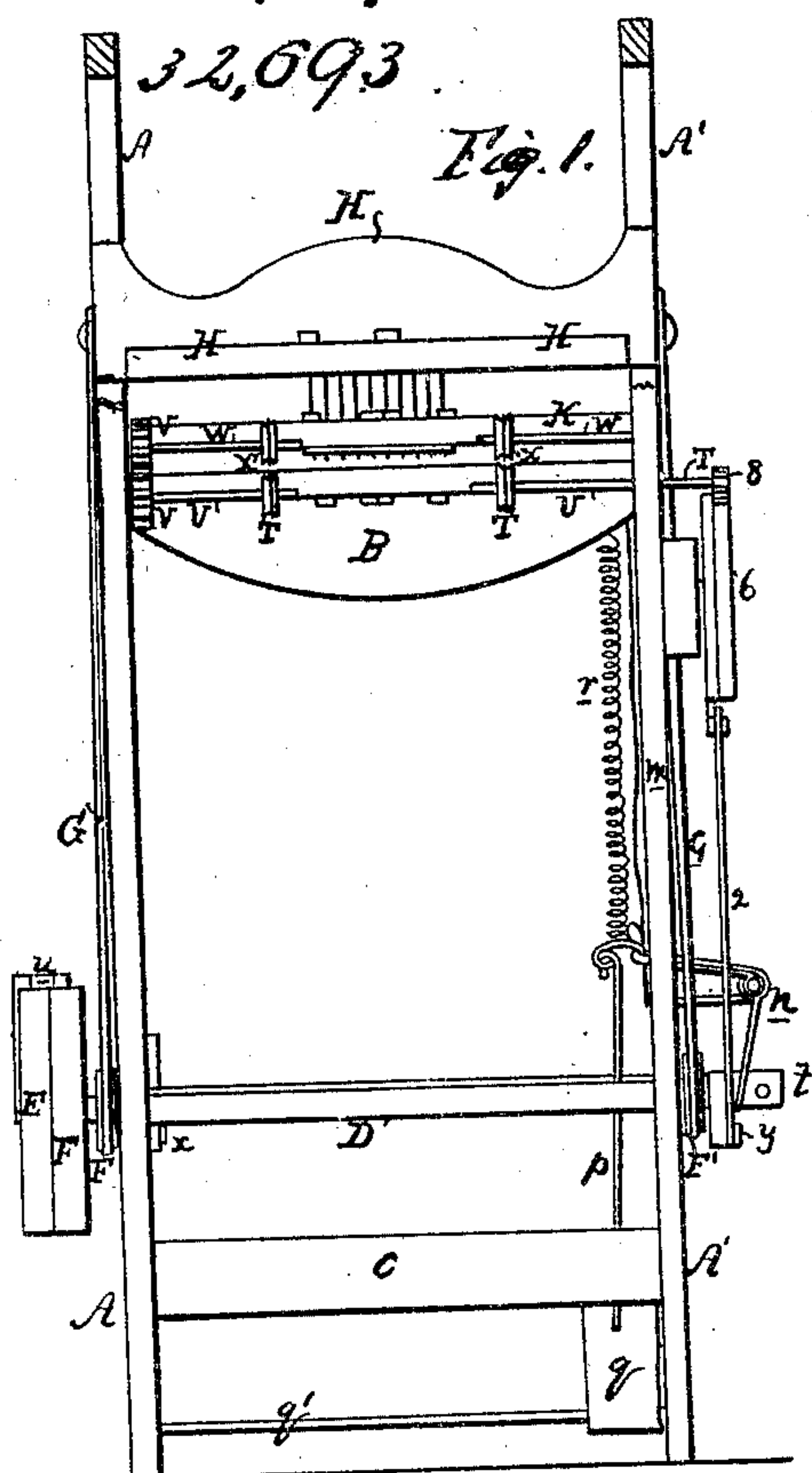


Fig. 1.

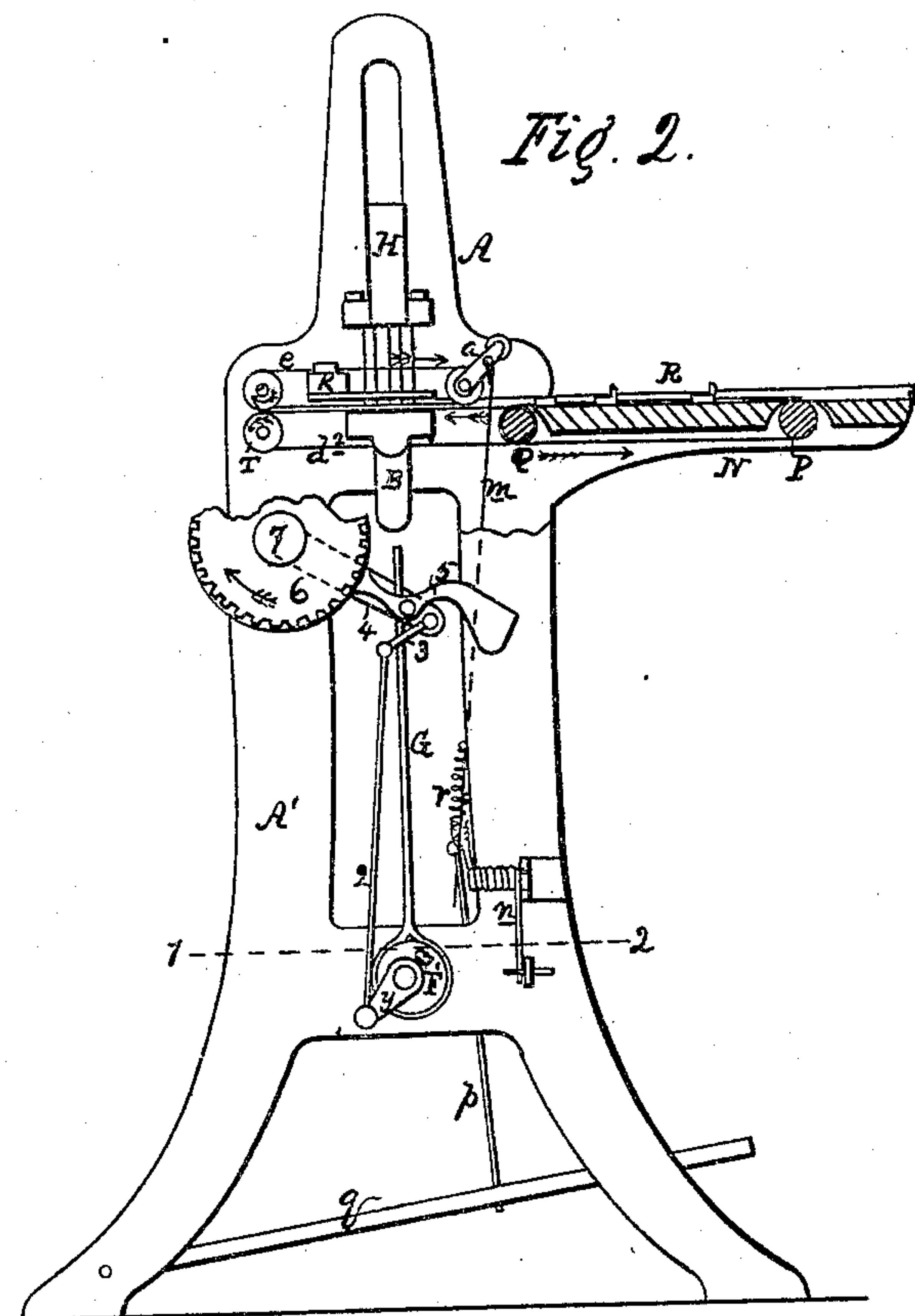


Fig. 2.

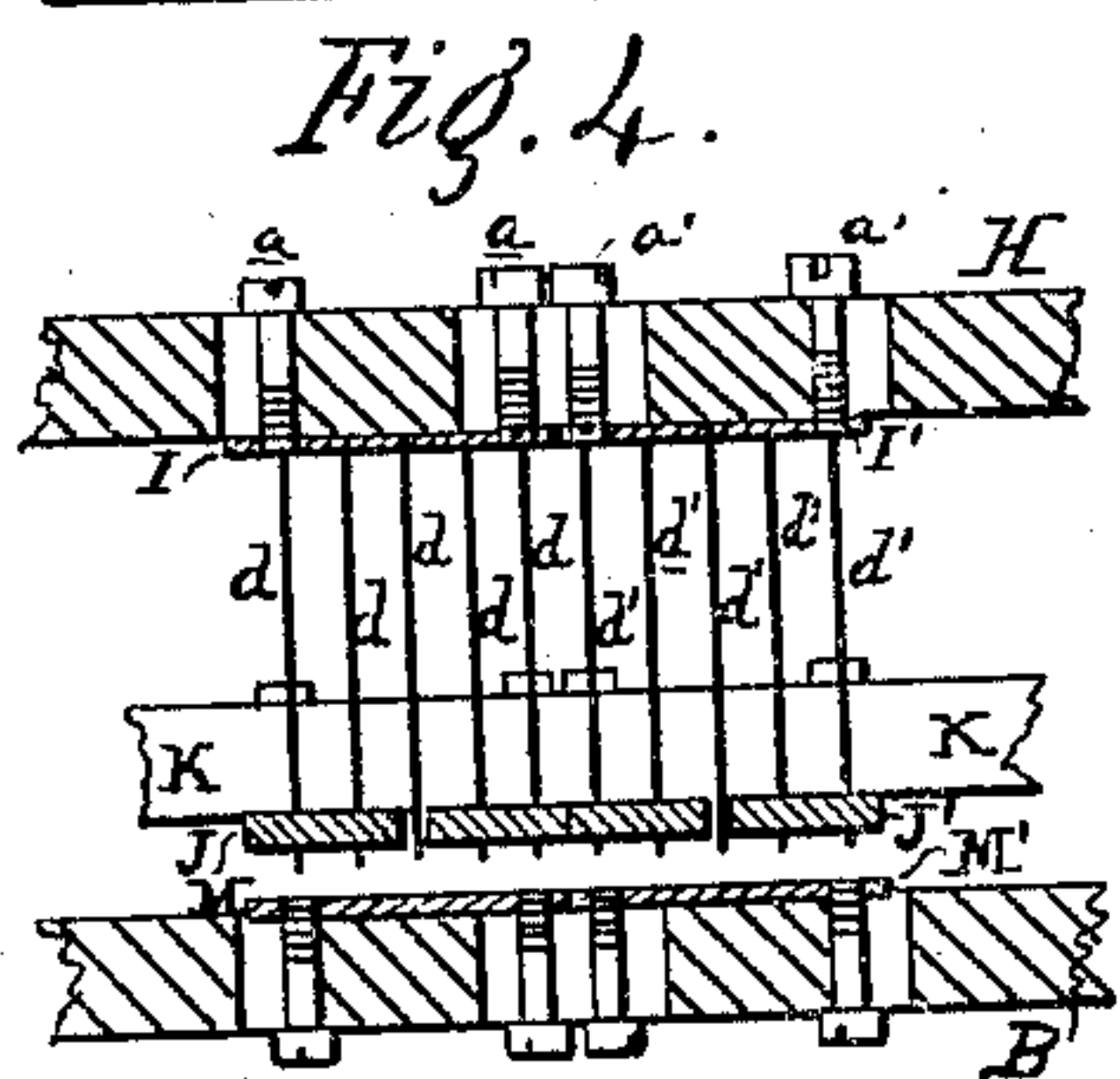


Fig. 4.

Fig. 3.

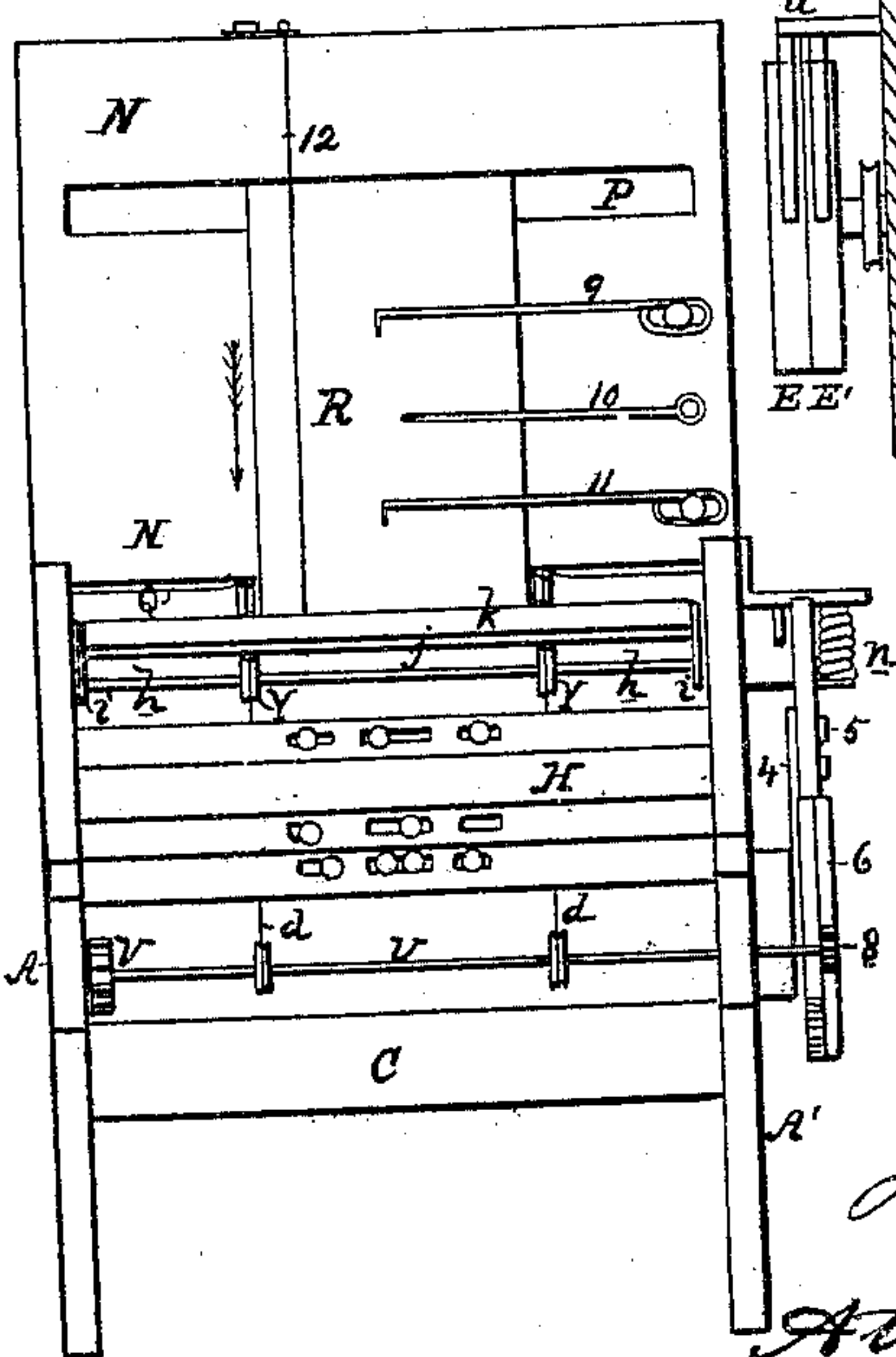


Fig. 6.

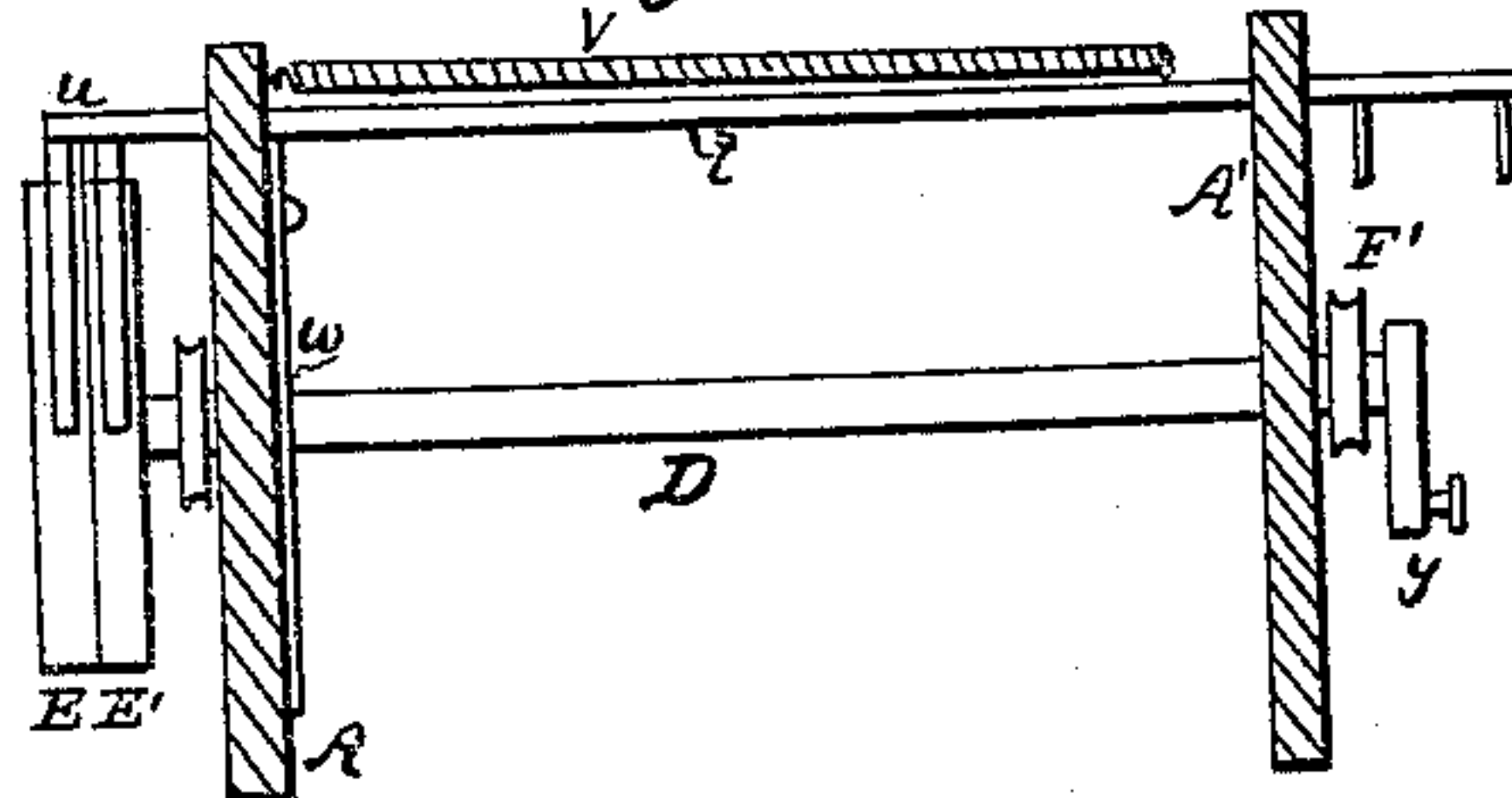
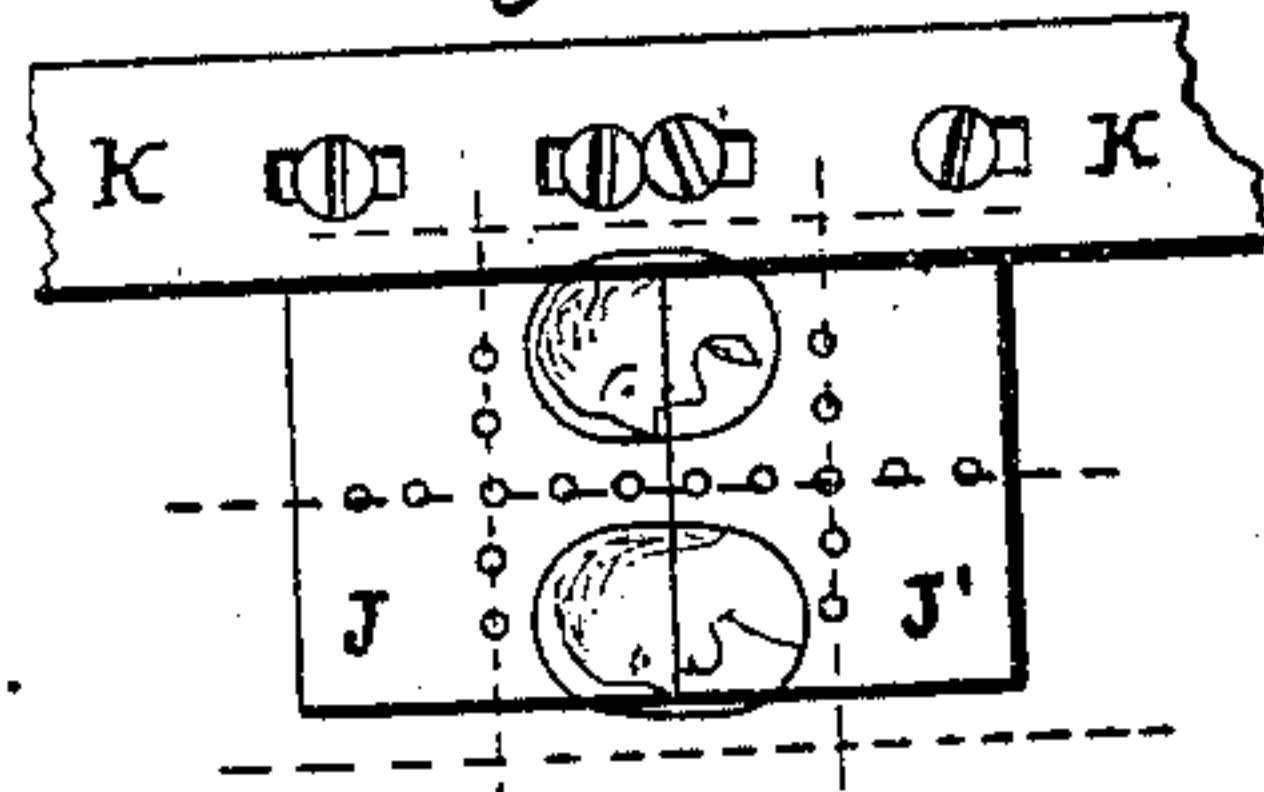


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE C. HOWARD, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR PERFORATING PAPER.

Specification of Letters Patent No. 32,693, dated July 2, 1861.

To all whom it may concern:

Be it known that I, GEORGE C. HOWARD, of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Perforating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the characters of reference marked thereon.

My invention relates to improvements in that class of perforating machines in which a number of vertically reciprocating punches are used and my improvements consist, firstly, in a reciprocating cross head carrying adjustable plates with punches, in combination with adjustable stripper and guide plates and lower adjustable perforated plates, the whole being constructed and arranged substantially as described hereafter so as to admit of ready adjustment; secondly, in the combination described hereafter of the reciprocating punches, an endless apron and certain endless bands for conveying the sheet to be perforated from the said endless apron to a proper position for being acted on by the punches; thirdly, in a registering device for adjusting the sheet to its proper position on the endless apron; fourthly, in an automatic device for stopping the machine at a given point in its movement, and, fifthly, in a device for regulating the extent of the movement of the feeding apparatus.

In order to enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

On reference to the accompanying drawing which forms a part of this specification, Figure 1 is a front view (partly in section) of my improved perforating machine. Fig. 2 a vertical section, Fig. 3 a ground plan, Fig. 4 a vertical section of a detached portion of the machine drawn to an enlarged scale, Fig. 5 a plan view of Fig. 4, and Fig. 6 a sectional plan on the line 1, 2, Fig. 2.

Similar characters refer to similar parts throughout the several views.

A and A' are the two opposite side frames of the machine connected together above by the cross bars B and K and below by the two bars C. In these frames turns the main driving shaft D which is furnished with a loose pulley E and the fast pulley E' and with two eccentrics F and F' one of which

is situated outside each frame, each eccentric being embraced by the lower end of a rod G the upper end of one rod being jointed to one end and the other rod to the other end of the crosshead H, which is arranged to move in vertical guides formed in the upper portion of the opposite frames.

On the underside of the cross head H are two metal plates I and I' the former plate being secured to the cross head by the set screws *aa* and the plate I' by set screws *a', a'* as best observed on reference to the enlarged view Fig. 4, the set screws passing through oblong slots so that the two plates may be adjusted laterally independently of each other. The plate I is furnished with a number of punches *d, d* and the plate I' with a similar number of punches *d', d'* the lower ends of the former passing through the stripper or guide plate J and the lower ends of the latter through the stripper or guide plate J' and both of these plates being secured to the cross bar K of the frame by set screws in such a manner that they can be adjusted laterally independently of each other as in the case of the plates I and I'.

At a suitable distance below the plates J and J' and to the cross bar B of the frame are secured two more plates M and M' admitting of lateral adjustment in the same manner as the upper plates, the plate M having holes for the reception of the ends of the punches *d, d* and the plate M' having similar holes for the reception of the ends of the punches *d', d'*. It will be observed on reference to Fig. 5 that in the present instance the punches as well as the holes in the several plates are arranged in rows situated at right angles to each other for the purpose of making the perforations in a sheet of postage stamps.

To the rear of the frame is secured a table N and to the latter is hung the roller P, a similar roller Q being hung to the frames immediately in front of the table and an endless apron R passing around both rollers in close contact with the upper surface of the table. Two endless bands *d², d²* pass around the rollers Q and around the pulleys T on the shaft U which turns in the opposite side frames, and which is furnished with a cog wheel V gearing into a similar wheel on the shaft W which also turns in the opposite side frames and which is furnished with two pulleys X, X around which pass the endless bands *e, e*, Fig. 2 said bands

passing around pulleys Y Y on the shaft h which also turns in the opposite side frames, an arm i being hung loosely to each end of this shaft h and the two arms being connected together by a rod j and a roller k the latter being arranged to turn freely in the ends of the arms to one of which is attached the other end of the rod m Fig. 1 the lower end of this rod passing through an eye in the horizontal arm of the bell crank lever n which is hung to a bracket projecting from the side of the frame A' this rod m having an enlargement resting on the said horizontal arm of the bell crank lever so that on depressing that arm the rod will descend thereby allowing the roller k to bear against the endless apron R at a point immediately above the roller Q . The horizontal arm of the bell crank lever is connected by a rod p to a treadle q hung to a rod q' and also by means of a coiled spring r to the frame A' this spring tending to maintain the treadle in an elevated position.

The vertical arm of the bell crank lever n is arranged to bear (when the treadle is depressed) against a pin which projects from a bar t , the latter fitting snugly but so as to slide freely in slots in the opposite frames A and A' , a strap guide u is secured to the opposite end of this bar to which is connected one end of a coiled spring v the opposite end of the latter being attached to the frame A , and the spring tending to maintain the bar t in such a position that its strap guide u will maintain the strap on the loose pulley E when the treadle is not depressed.

To a pin on the inside of the frame A is hung a lever w the long arm of which rests on the shaft D the short arm fitting in a notch or recess on the underside of the bar t so as temporarily to retain the latter in such a position that its guide u will maintain the strap on the fast pulley E' , there being on the driving shaft D a small arm x (Fig. 1) by means of which the long arm of the lever w is raised and the short arm consequently lowered thereby releasing the bar t and allowing the spring v to move it outward and to pass the strap from the fast to the loose pulley.

On one end of the driving shaft D is a crank y the pin of which is connected by means of a rod 2 to an arm 3 , secured to another arm 4 which is hung loosely to a pin 7 secured to the frame A' to which pin a wheel 6 is also hung loosely; a weighted dog 5 is hung to the arm 4 and this dog bears against the edge of the wheel 6 part of which is serrated for receiving the end of the dog the other part having teeth for gearing into the teeth of a pinion 8 on the shaft U .

To the table N and above the endless apron R are secured the three adjustable

registering arms 10 , 9 and 11 , the two last having points bent at right angles and the middle arm having a plain point, a registering wire 12 may also be stretched from the rear of the table to the cross bar K the wire being placed in a line parallel with that in which the endless apron R traverses.

The operator is seated at the rear of the table N , one foot being within reach of the treadle Q . Having adjusted a sheet, say of postage stamps, on the endless apron R laterally by means of the arms 9 and 11 and their bent points, and longitudinally by means of the arm 10 the wire 12 also affording a convenient guide for proper adjustment, the operator depresses the treadle thereby moving the driving strap from the loose to the fast pulley and setting the machine in motion. While the crosshead H with its punches is being raised by means of the eccentrics F and F' and their rods G , the crank y is drawing down the arms 3 and 4 and through the weighted dog 5 turning the wheel 6 in the direction of the arrow and consequently turning the shafts U and W and the rollers Q and P and causing the endless bands d^2 and e and the endless apron R to move in the direction pointed out by the arrows. These movements however do not take place until the treadle has been partially depressed and the roller k has been brought to bear on the sheet to be perforated the front edge of the sheet being thus compressed between the roller k and the endless apron the latter carrying the sheet forward and pushing it between the endless bands d^2 and e which serve to carry the sheet to its proper position on the plates M and M' (Fig. 4) and beneath the stripper plates J and J' . At this point the movement of the endless apron and endless bands ceases as the downward motion of the arms 3 and 4 has been completed, the sheet consequently remains stationary as the crosshead with its punches descends through the action of the eccentrics F and F' and makes the desired perforations.

As long as the operator retains the treadle in its depressed position the reciprocating motion of the punches and the alternate stopping and starting of the endless apron and endless bands caused by the above described feed motion will be continued and the entire sheet of stamps perforated at the desired points; should the operator however merely depress the treadle and then remove his foot from it the movements of the machine will continue up to a given point and will there stop without the aid of the operator, for on depressing the treadle and removing the strap from the loose to the fast pulley the short arm of the lever w will catch into the notch on the underside of the bar t and retain it until the short arm x on the driving shaft D raises the lever and re-

leases the bar consequently stopping the machine as the cross head approaches its most elevated position.

Although I have shown but a limited number of punches secured to but two adjustable plates I and I' it is evident that the number of punches may be increased, there may in fact be as many punches attached to adjustable plates as will suffice to perforate a whole sheet of postage stamps at one movement, in all cases however the plates to which the punches are secured as well as those through which the punches pass should admit of ready adjustment as the sheets vary somewhat in size through inordinate shrinkage, and as it is important that the perforations should not encroach on the printed matter of the sheets.

It is necessary that the extent of the movement of the wheel 6 should admit of being regulated to the greatest nicety as on this movement depends the proper position of the sheet prior to the descent of the punches. This regulation is effected by means of the arm 3 which is so attached to the arm 4 that its position in respect to that arm may be altered at pleasure, for instance should a decrease in the extent of the movement of the wheel 6 be required, the lower end of the arm 3 must be moved away from the wheel and secured after adjustment thus increasing the extent of the leverage on the arm 4 and consequently diminishing the extent of its movement. It should be understood that the registering of the sheets on the endless apron is not effected by perforations in the said sheets as in printing presses, paper folding and other machines but by the printed matter on the sheets, for instance, the bent ends of the registering arms 9 and 11 may be adjusted to coincide with the middle of the space between the stamps or with the edges of a row of stamps, this will give the proper lateral position of

the sheet, while its longitudinal position is determined by the point of the registering arm 10.

Without claiming broadly the employment in perforating machines of a series of vertically reciprocating punches I claim as my invention and desire to secure by Letters Patent—

1. The reciprocating cross-head H its adjustable plates I and I' with their punches in combination with the adjustable perforated stripper plates J and J', and the adjustable plates M and M' the whole being constructed and arranged substantially as set forth for the purpose specified.

2. In combination with the vertically reciprocating punches the endless apron R and endless carrying bands d^2 and e arranged and operating substantially as and for the purpose herein set forth.

3. Registering the sheet prior to being submitted to the action of the punches, by means of the printed matter on the sheet with the aid of any convenient number of registering arms 9, 10, and 11 or their equivalents as herein described.

4. The lever w hung to the frame of the machine in combination with the arm x on the driving shaft and the notched strap bar t for the purpose specified.

5. The arm 4, the weighted dog 5 or its equivalent and the adjustable arm 3 or its equivalent in combination with the feed wheel 6 the whole being arranged and operating substantially as and for the purpose herein set forth.

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

GEO. C. HOWARD.

Witnesses:

HENRY HOWSON,
JOHN WHITE.