

No. 628,798.

Patented July 11, 1899.

N. HAYWARD.
FOLDING MACHINE.

(Application filed May 23, 1898.)

(No Model.)

4 Sheets—Sheet 1.

by
Knight Brown & Linsley
Atty.

No. 628,798.

Patented July 11, 1899.

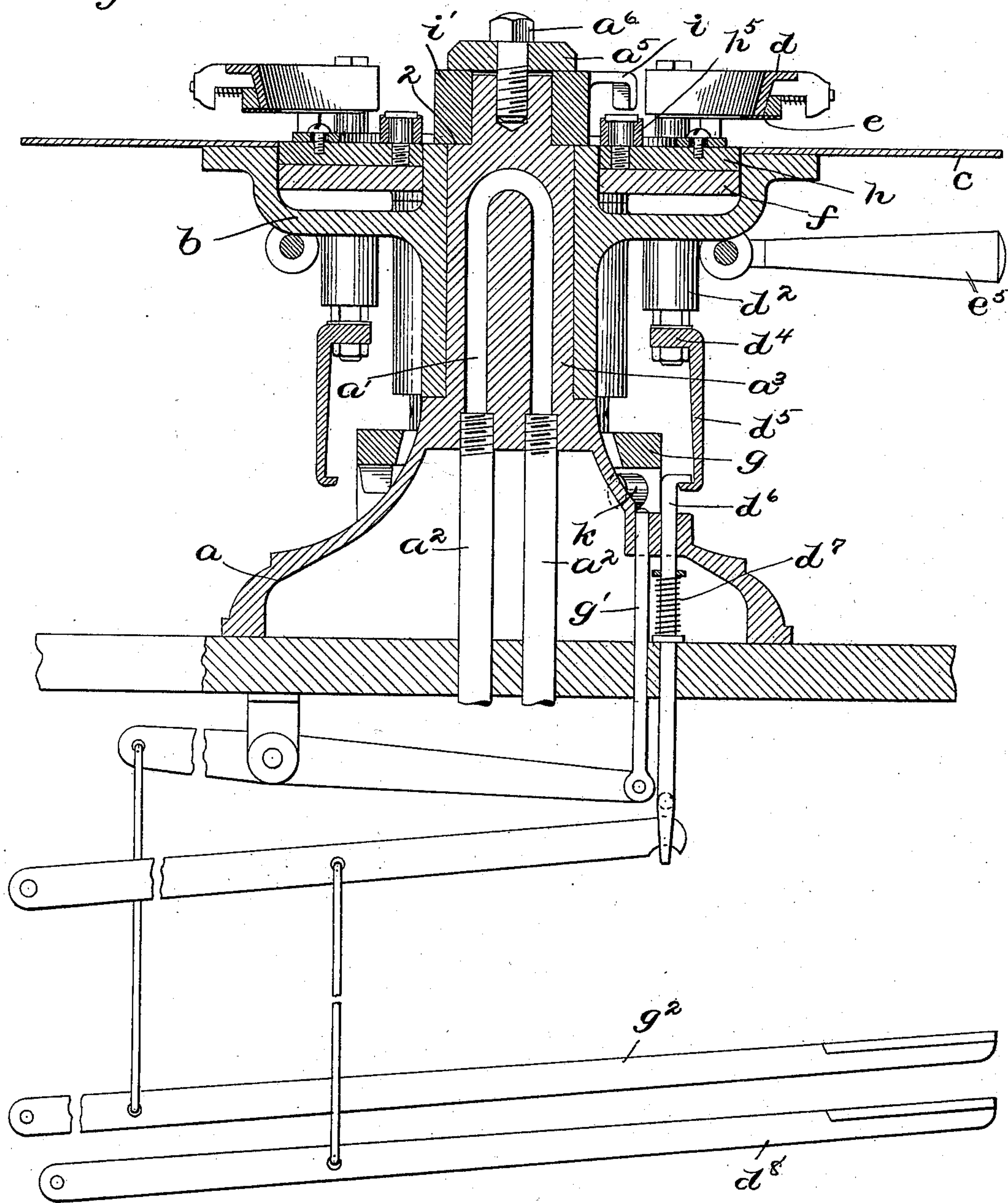
N. HAYWARD.
FOLDING MACHINE.

(Application filed May 23, 1898.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 3.



Witnesses.

A. D. Harrison.

P. W. Pezzetti.

Inventor.

Nathan Hayward
by Hight Brown & Quincy
Attys.

No. 628,798.

Patented July 11, 1899.

N. HAYWARD.
FOLDING MACHINE.

(Application filed May 23, 1898.)

(No Model.)

4 Sheets—Sheet 3.

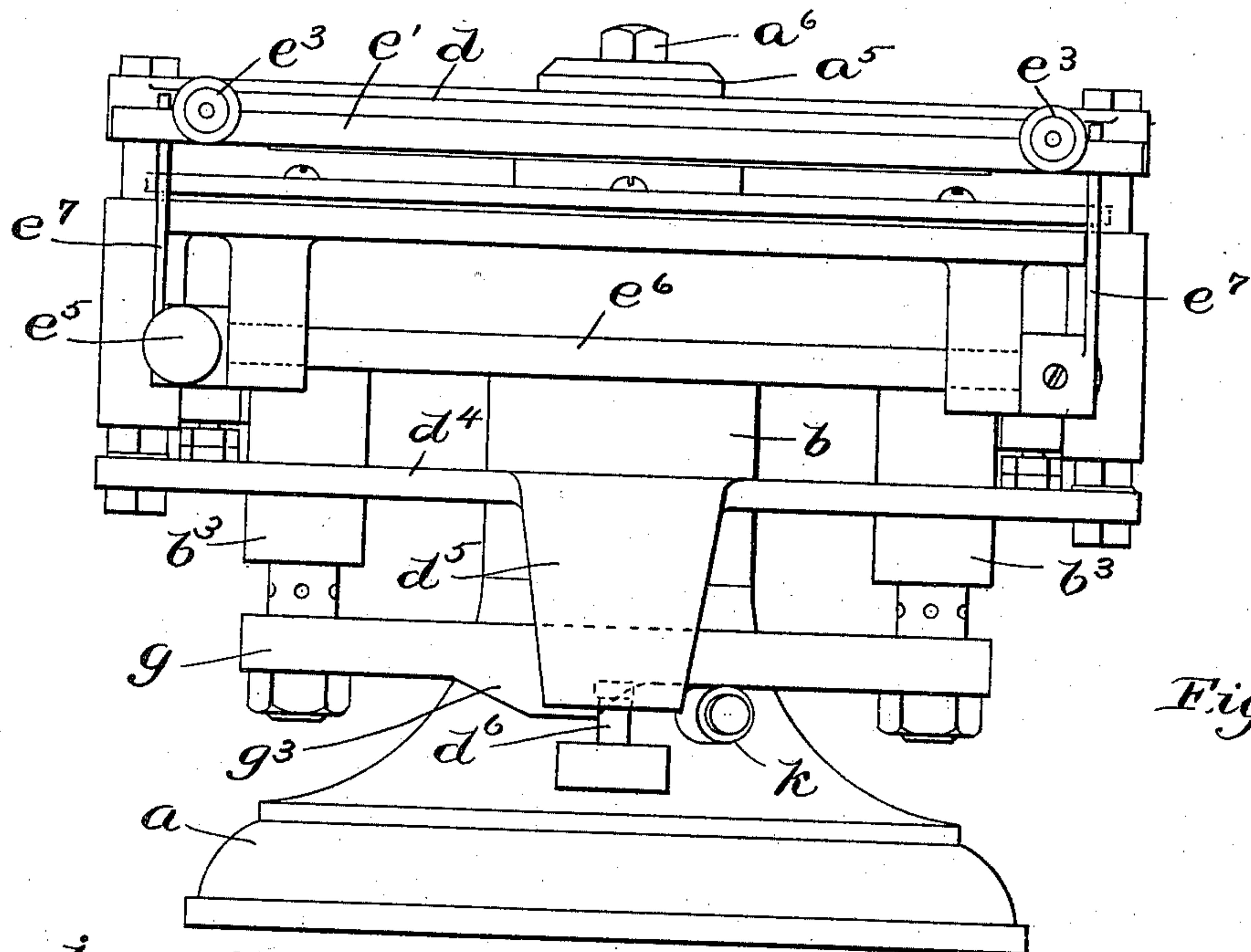


Fig. 4.

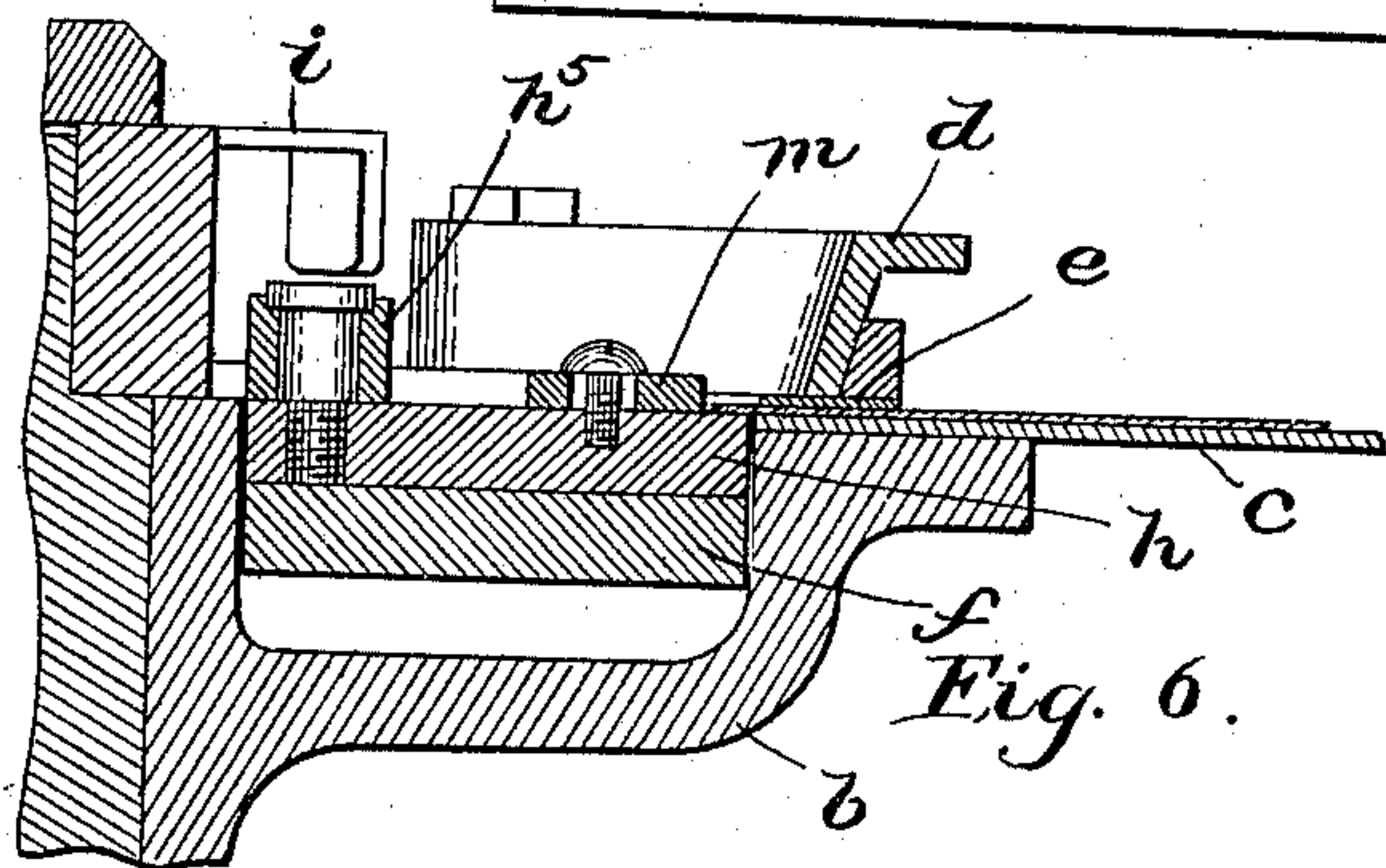


Fig. 6.

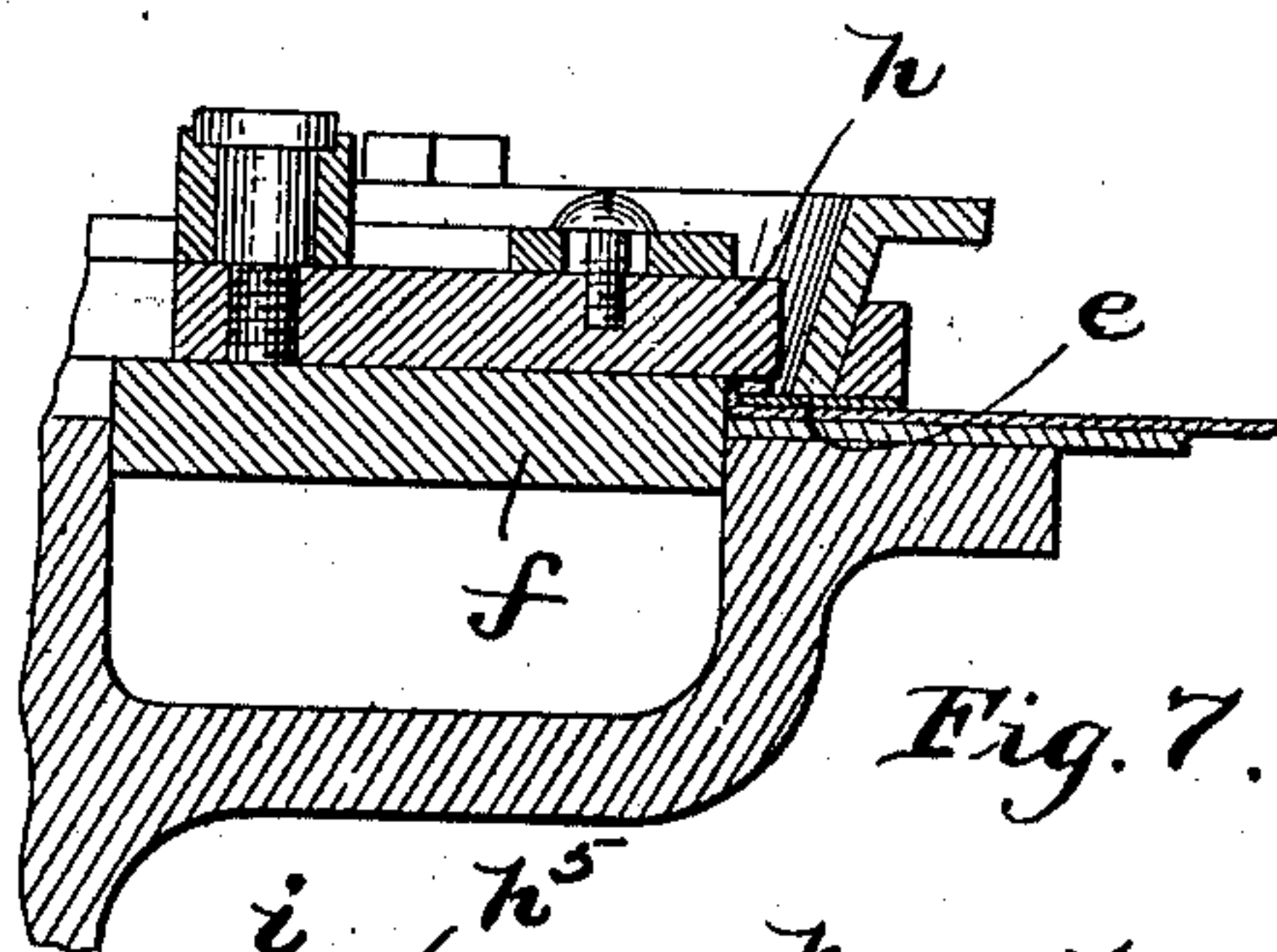


Fig. 7.

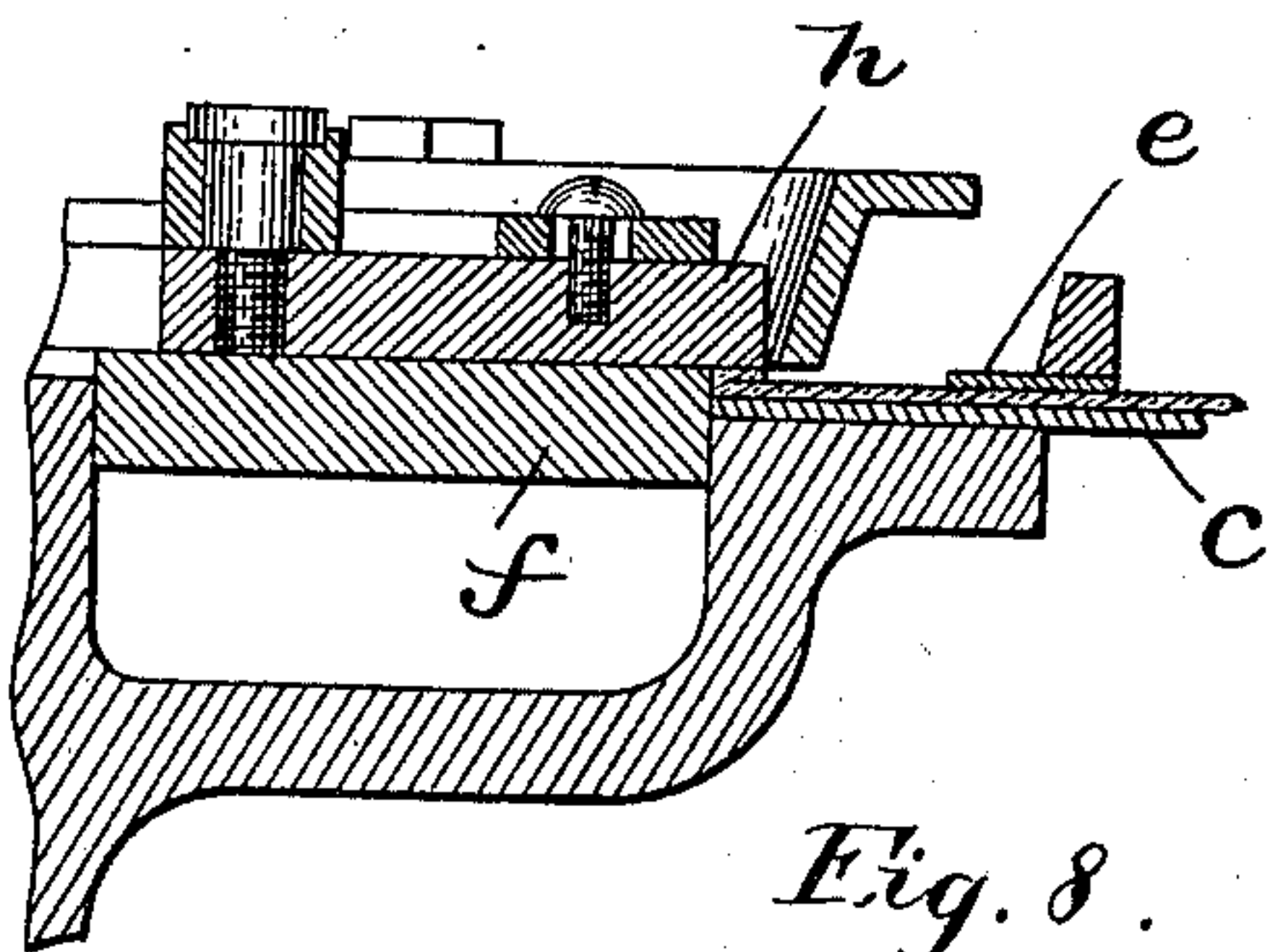


Fig. 8.

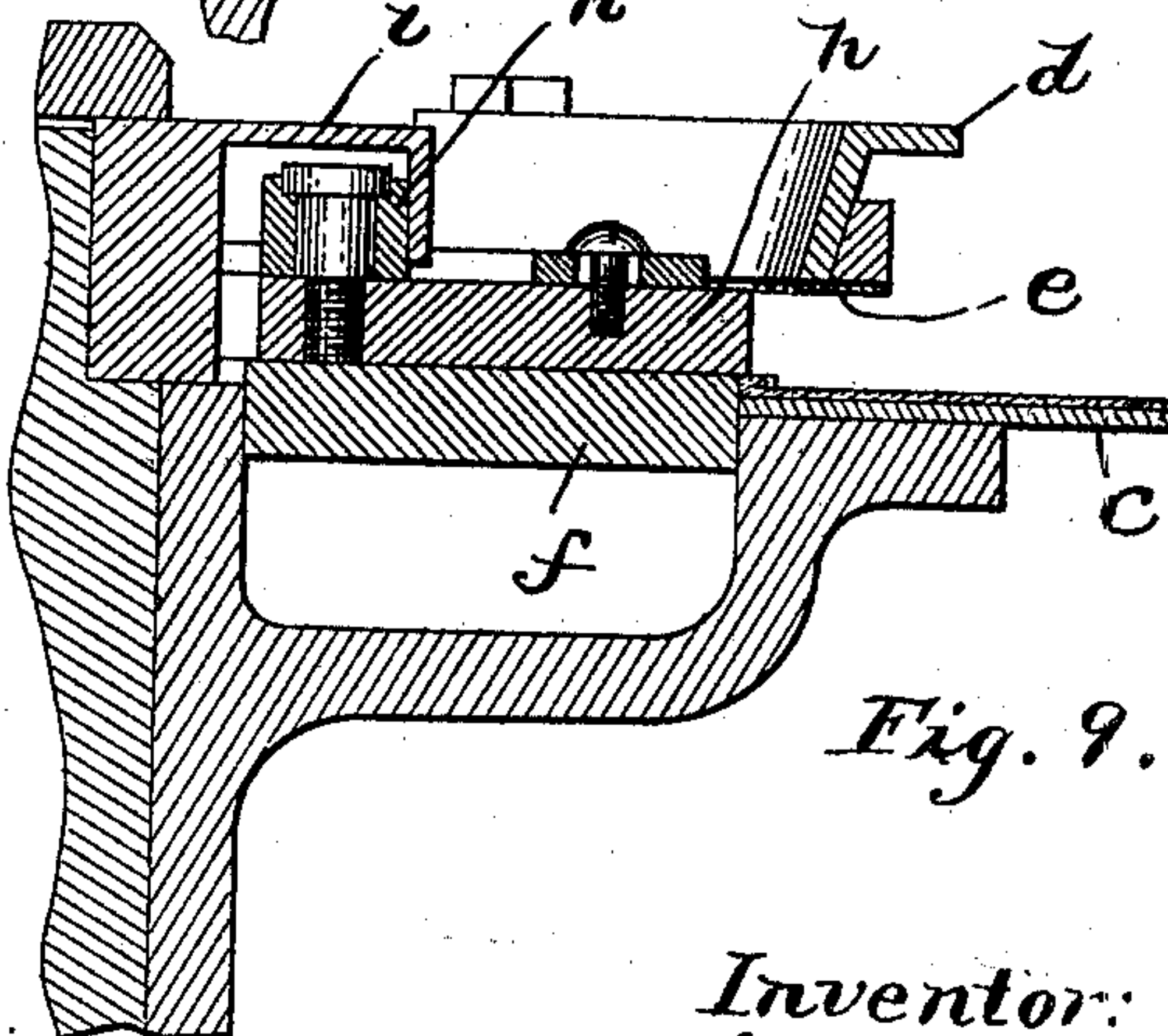


Fig. 9.

Witnesses:
A. D. Harrison,
P. W. Pezzetti

Inventor:
Nathan Hayward
by Night & Son
Attys.

No. 628,798.

Patented July 11, 1899.

N. HAYWARD.
FOLDING MACHINE.

(Application filed May 23, 1898.)

(No Model.)

4 Sheets—Sheet 4.

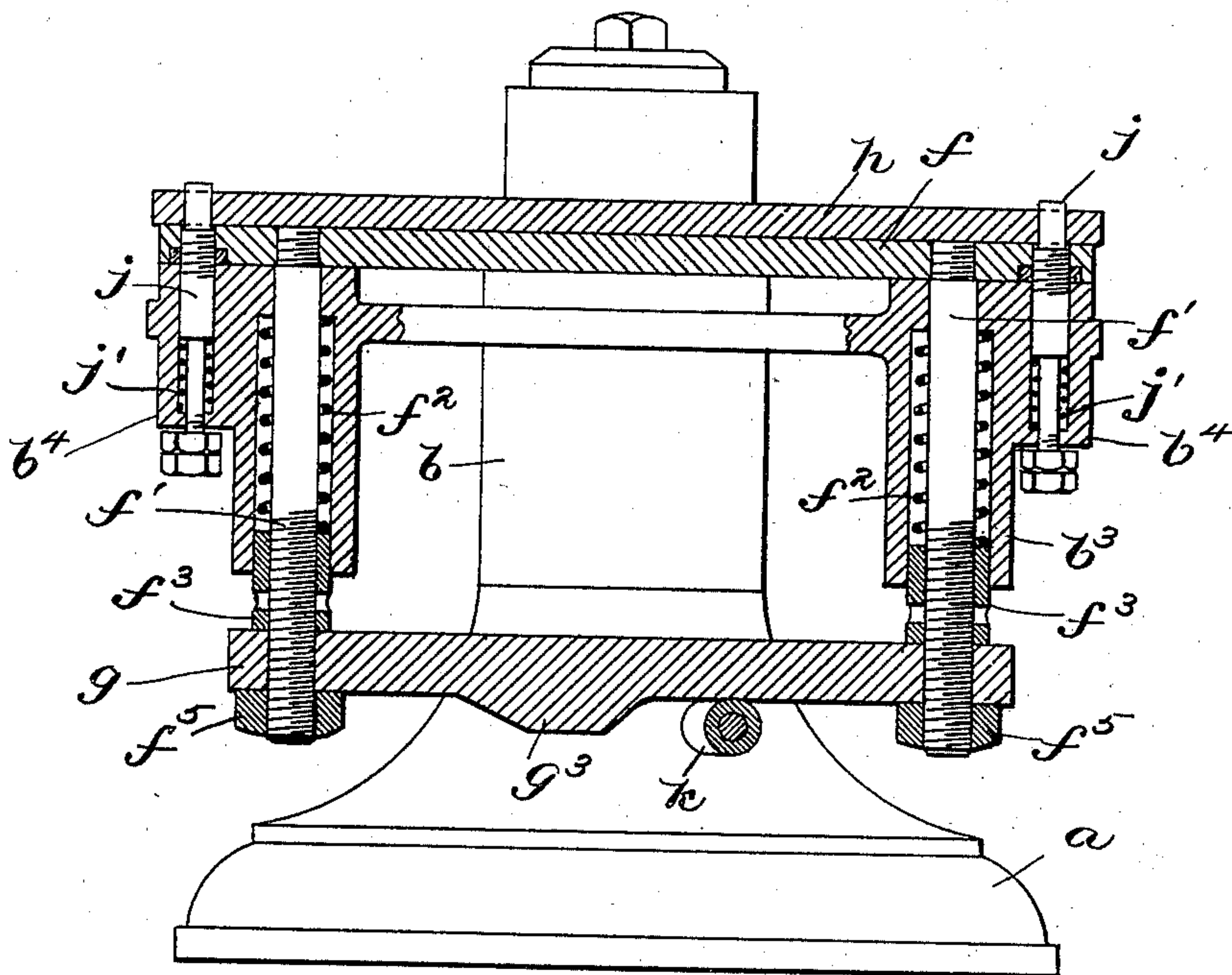


Fig. 5.

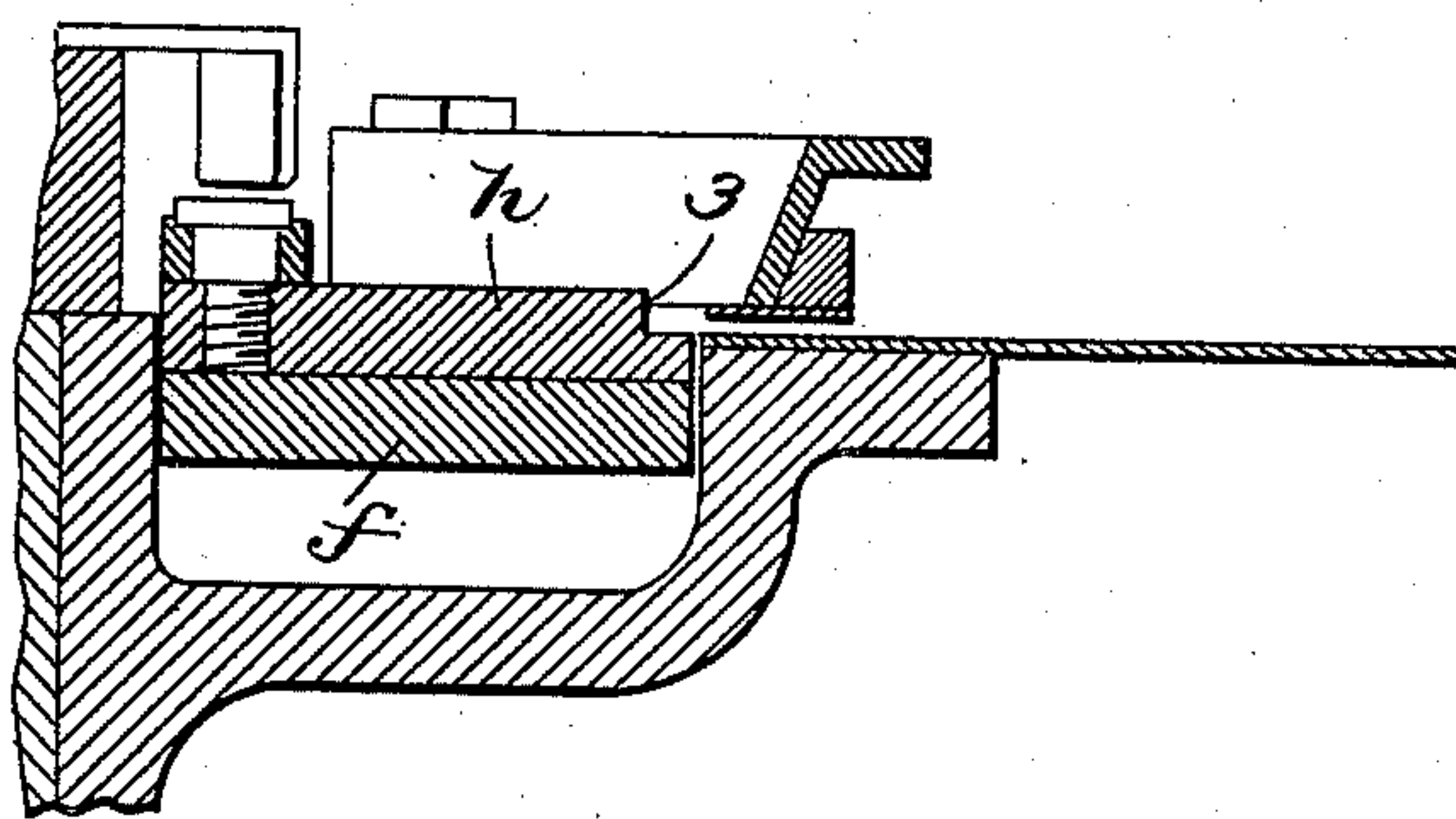


Fig. 10.

Witnesses:

A. D. Harrison

P. W. Pezzetti

Inventor:

Nathan Hayward
by Wright & Smith, Attys.

UNITED STATES PATENT OFFICE.

NATHAN HAYWARD, OF BROCKTON, MASSACHUSETTS.

FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 628,798, dated July 11, 1899.

Application filed May 23, 1898. Serial No. 681,411. (No model.)

To all whom it may concern:

Be it known that I, NATHAN HAYWARD, of Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

This invention relates to machines employed for folding pieces of flexible material, such as parts of shoe-uppers.

It has for its object to improve the operation and simplify the construction of machines of this class.

The invention consists in the improvements which I shall now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a folding-machine constructed in accordance with my invention. Fig. 2 represents an end elevation of the same, partly in section. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents a side elevation. Fig. 5 represents a section on line 5 5 of Fig. 2. Figs. 6 to 9, inclusive, are detail sectional views, showing the successive operations of folding a piece of material. Fig. 10 represents a sectional view showing a modification of structure.

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

The general features and manner of operation of the machine illustrated in the drawings may be briefly described as follows: I provide a double or compound machine, which permits one piece of work to be under pressure while another piece is being inserted or removed. The two folding mechanisms employed are mounted on a rotary frame and are similar in construction, embodying each a vertically and horizontally movable former, a vertically-movable folder-carrier supporting a horizontally-sliding folder, and means for operating these parts to fold the work and retain the same under pressure for a period of time and then release the work for its removal.

Referring to the drawings, a is a base or standard formed with an internal steam-conduit a' , the ends of which may be connected with steam-supply pipes a^2 a^2 . The upper part of the base a is constructed with a stud

or shaft a^3 , in which the steam-conduit is formed and on which is mounted a rotary frame b . On this frame are mounted two fixed work-supporting tables c c and the two folding mechanisms. A description of one of these mechanisms will suffice, as the two are alike.

d is a former-carrier secured to the tops of two rods or posts d d' , extending through sockets d^2 d^2 formed in the frame. Springs d^3 d^3 surround these rods inside the sockets and exert an upward pressure thereon. The lower ends of the rods are connected by a yoke d^4 , at the middle point of which is formed a downwardly-projecting hooked plate d^5 . The inwardly-projecting lip or hook on the latter is arranged to be engaged by a hooked treadle-rod d^6 , normally projected upwardly by a spring d^7 and operated by a treadle d^8 . When the treadle d^8 is depressed, the former-carrier d is moved downwardly toward the table c , and when released the carrier returns to its normal raised position.

e is a former-blade secured to a bar e' , which is supported by its ends on short parallel rods e^2 e^2 , held in brackets e^3 e^3 , which are formed on the carrier d . Springs e^4 , interposed between the ends of the brackets e^3 and the said bar e' , operate to normally project the former inwardly. A mechanism for retracting the former is provided, consisting of a lever or handle e^5 , secured to the end of a rod e^6 , to which are attached arms e^7 e^7 , engaging the ends of the bar e' . When the handle e^5 is depressed, the former-blade will be retracted, and when released the said blade will be returned to its normal position by the springs e^4 .

f is a folder-carrier occupying a depression or recess b' in the frame b and supported at the upper ends of two posts f' f' , which extend through sockets b^3 b^3 , formed in the frame b . The upper ends of said sockets are reduced to make a bearing for the posts and to form shoulders against which springs f^2 f^2 abut. The lower ends of these springs are confined by cylindrical nuts f^3 f^3 of a slightly-smaller size than the bore of the sockets b^3 and adapted to enter the latter. The springs exert tension which normally draws the carrier f downwardly. To the lower ends of the posts f' is attached a bar g by means of nuts f^5 f^5 . The bar is held between the nuts f^5

and f^5 , and its position with respect to the posts f' may be changed by adjusting said nuts. When the rotary frame b is turned to bring this side of the apparatus in front of the operator, the bar g comes over the top of a rod g' , which is operated by a treadle g^2 . When said treadle is depressed, the rod g' is projected upwardly against the bar g , and thereby raises the carrier f . On the upper side of the latter there is mounted a sliding folder-plate h , which is shown as guided by headed screws $h' h'$, mounted in the carrier f and occupying slots $h^2 h^2$ in the sliding plate, though other suitable mounting may be provided for the plate. Two springs $h^3 h^3$, occupying sockets in the folder h and abutting against ears or lips $h^4 h^4$, attached to the carrier f , normally project the folder in the direction of the work-supporting table c .

i is a cam-hook attached to the top of the stud or shaft a^3 on the base a and adapted to engage a roller-stud h^5 on the plate h when the frame b is rotated in order to retract said plate when required. The cam-hook i is, as here shown, formed on a sleeve i' , which surrounds the reduced upper end of the shaft a^3 and operates to retain the rotary frame b in place on the shaft. The sleeve or collar i' is held between a shoulder 2 on the shaft and a cap-plate a^5 , which is secured to the shaft by means of a bolt a^6 .

$j j$ are release-pins mounted in sockets $b^4 b^4$ on the frame b and normally projected upwardly by means of springs j' in said sockets. The pins project through apertures in the carrier-plate f and are arranged to extend into apertures in the folder h . The upward movement of the pins is limited and their vertical adjustment provided for by means of lock-nuts $j^2 j^3$, engaging the screw-threaded lower ends of the pins. When the plates f and h are in their normal depressed positions, (shown in Fig. 2,) the apertures in the plates register, and the pins serve to hold the plates from relative horizontal movement. When, however, the plates are raised by means of the action of the treadle-rod g' on the bar g , these pins are gradually withdrawn from the apertures in the upper plate or folder h , and when the plates have risen a sufficient distance the folder-plate slides over the tops of the pins, as I shall hereinafter explain.

m is a gage which may be made in a separate piece and adjustably secured to the upper side of the folder-plate h , as shown in Figs. 1 to 9, inclusive, by means of screws $m' m'$, occupying slots in the gage, or said gage may be formed, as shown in Fig. 10, by cutting out the edge of the folder-plate, so as to form a fixed shoulder 3.

In operating the folding-machine a piece of work is placed on one of the tables c with its edge against the gage m and projecting over the inner edge of the table, the rotary frame b being in such a position that the bar g on the corresponding side of the machine is lo-

cated directly over the treadle-rod g' , and the hooked plate d^5 is in position to be engaged by the other treadle-rod d^6 . The first operation is then to depress the treadle d^8 and bring the folder down against the work, as shown in Fig. 6. The treadle g^2 is then depressed to raise the plates $f h$ from the position shown in said figure to the position shown in Fig. 7. This causes the folder-plate h to rise above the tops of the release-pins j and allows the springs h^3 to project said folder toward the clamping member. The point at which the folder is released depends upon the vertical adjustment of the release-pins j , and this is determined by adjusting the nuts $j^2 j^3$ on the lower ends of said pins. While the folder is rising it causes the edge of the work to be bent up at right angles to the main portion thereof, and then as the folder slips over the edge of the former e it produces the fold, as shown in Fig. 7. The former is then withdrawn to the position shown in Fig. 8 by manipulating the handle e^5 . The tension of the springs in the sockets b^3 causes the folder h to be pressed down against the work and prevents the latter from being displaced by the withdrawal of the former-blade. The springs $j' j'$ permit the release-pins $j j$ to yield downwardly when the folder h is thus projected and exerting a downward compressing action on the material. The parts are left in the position shown in Fig. 8, so as to set the fold while the operator rotates the frame b and brings the other side of the apparatus in front of him. The bar g and hooked plate d^5 in this movement are removed from operative relation with the treadle-rods. This same movement of rotating the table to bring the other side of the apparatus before the operator causes the release of the piece of work which has been under pressure in the folding mechanism on said other side. The release is accomplished by means of a cam g^3 , with which the under side of each of the bars g is provided, coming in contact with a roller-stud k , mounted on the base a . This raises the cam slightly, so as to relieve the pressure of the folder h upon the fold in the work, while the cam i at the same instant engages the roll h^5 and draws the folder h back into its normal position. This operation is shown in Fig. 9. The folded piece may then be removed and a fresh one put in place and the operation of folding and pressing the new piece proceeded with, as previously described.

I do not wish to be confined to the exact details of construction above set forth, as the same may be variously modified without departing from the spirit of my invention.

I claim—

1. A folding-machine comprising a base, a frame rotatable thereon, two folding mechanisms supported by said frame, and each comprising a table rigidly secured at the outer portion of the frame, and a folder located between the table and the axis of rotation of

the frame, and means for alternately operating the two folders, substantially as set forth.

2. A folding-machine comprising a base, a frame rotatable thereon, two tables affixed to the frame at opposite sides of its axis, two folder-carriers vertically movable between the tables, two folders mounted on said carriers and movable vertically therewith, the folders being also movable horizontally over the inner edges of the tables, and means for operating the said carriers and their folders alternately.

3. A folding-machine comprising a base, a frame rotatable thereon, two tables rigidly secured to the outer portion of the frame, two folders located between the tables and the axis of the rotary frame, means for alternately actuating said folders to fold pieces of material, and means operated by the rotation of the table, for alternately retracting said folders to release the folded pieces.

4. A folding-machine comprising a work-supporting table, a former, a vertically-movable spring-depressed folder-carrier, means for elevating said carrier, a horizontally-movable folder mounted on said carrier, and having its upper edge normally flush with the work-supporting table, the work initially overlapping said upper edge and means for operating said folder.

5. A folding-machine comprising a vertically-movable folder-carrier and means for actuating the same, a folder mounted on said carrier, a spring normally projecting said folder in the direction of the work means adapted to restrain the folder during a portion of an upward movement of the carrier and to release the folder during a subsequent portion of said movement and allow the same

to be projected to fold the work, and means for positively retracting the folder.

6. A folding-machine comprising a vertically-movable folder-carrier and means for operating the same, a spring-projected horizontally-movable folder mounted on said carrier, means adapted to restrain the folder during a portion of an upward movement of the carrier and to release the folder during a subsequent portion of said movement, and provisions for adjusting said means to vary the point of release.

7. A folding-machine comprising a frame, a folder-carrier vertically movable thereon, means for operating said carrier, a spring-projected horizontally-movable folder mounted on said carrier, release-pins yieldingly attached to the frame and adapted to engage the folder to prevent its projection during a portion of an upward movement of the carrier and to release the folder during a subsequent portion of said movement, and means for vertically adjusting said pins.

8. A folding-machine comprising a frame, two tables rigidly secured thereto, two vertically-movable spring-depressed folder-carriers, means for elevating the same, two folders mounted on said carriers and movable horizontally toward and away from each other, means for automatically projecting each folder away from the other after a predetermined upward movement of its carrier, and means for retracting the folders.

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

NATHAN HAYWARD.

Witnesses:

C. F. BROWN,

A. D. HARRISON.