

(Model.)

3 Sheets—Sheet 1.

E. W. FOWLER.

DEVICE FOR OPERATING SAFE BOLT WORK.

No. 317,986.

Patented May 19, 1885.

Fig. 1.

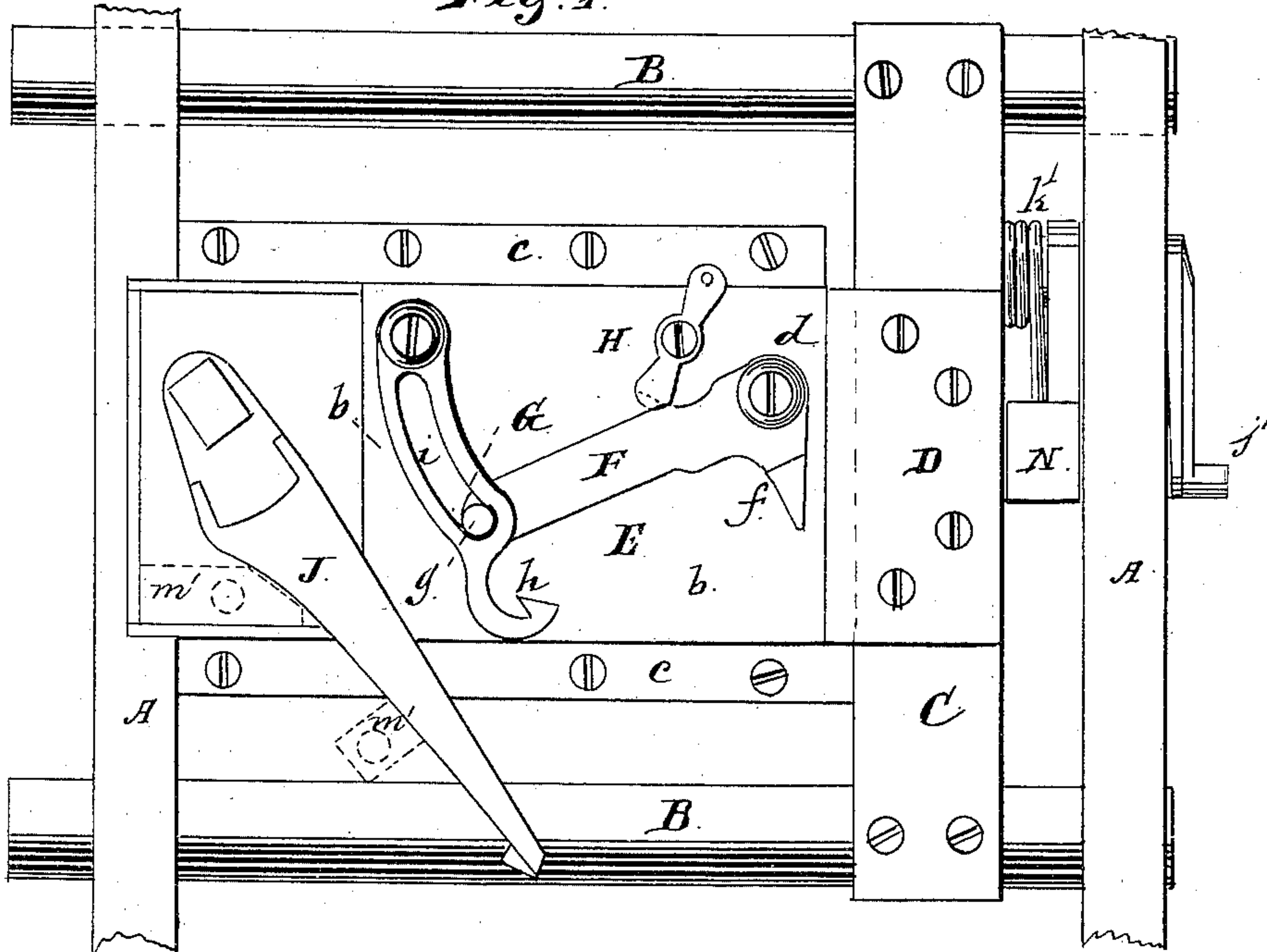
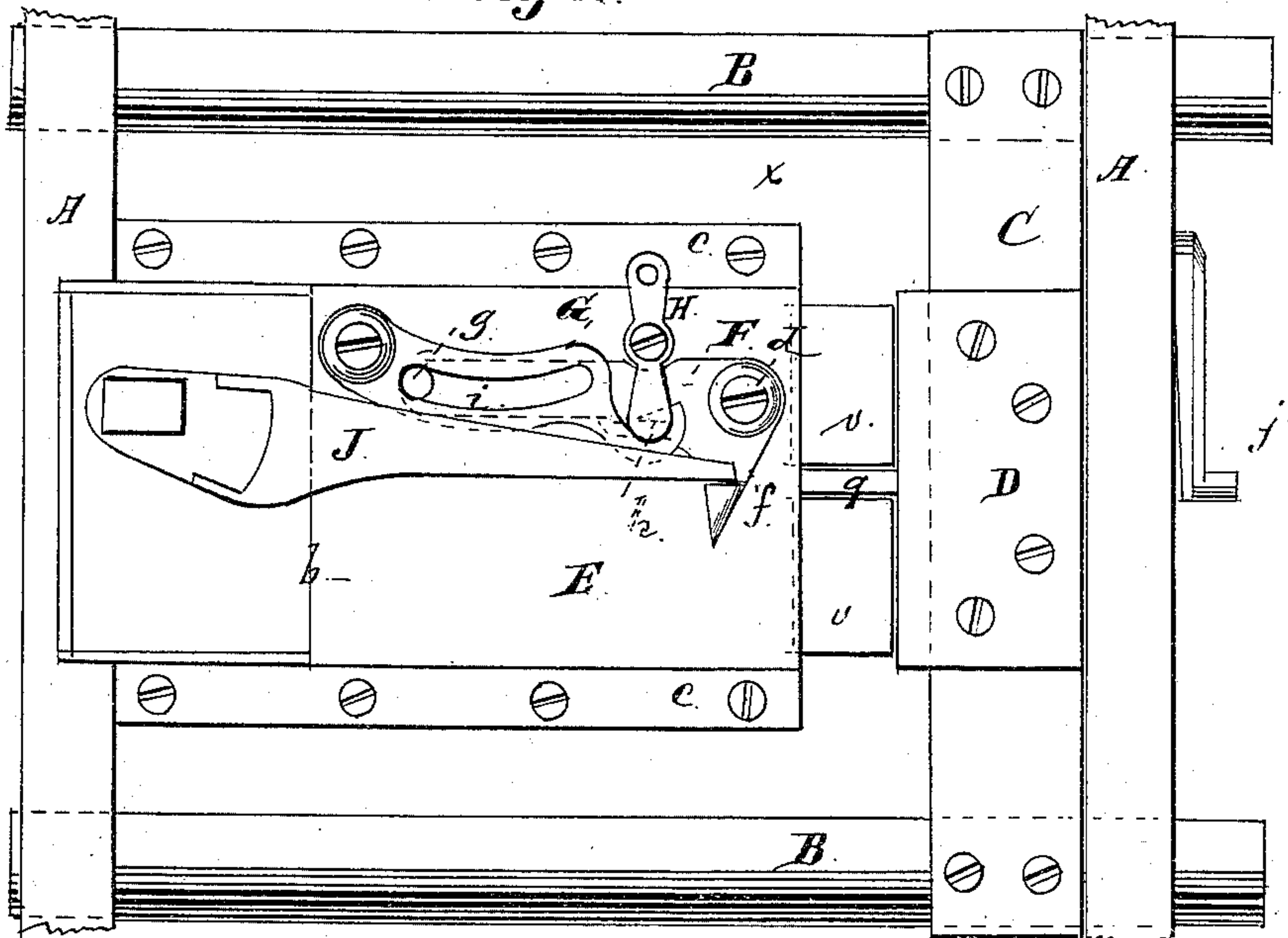


Fig. 2.



Witnesses:

E. A. West.
Harry J. Jones

Inventor:

Edw. W. Fowler

(Model.)

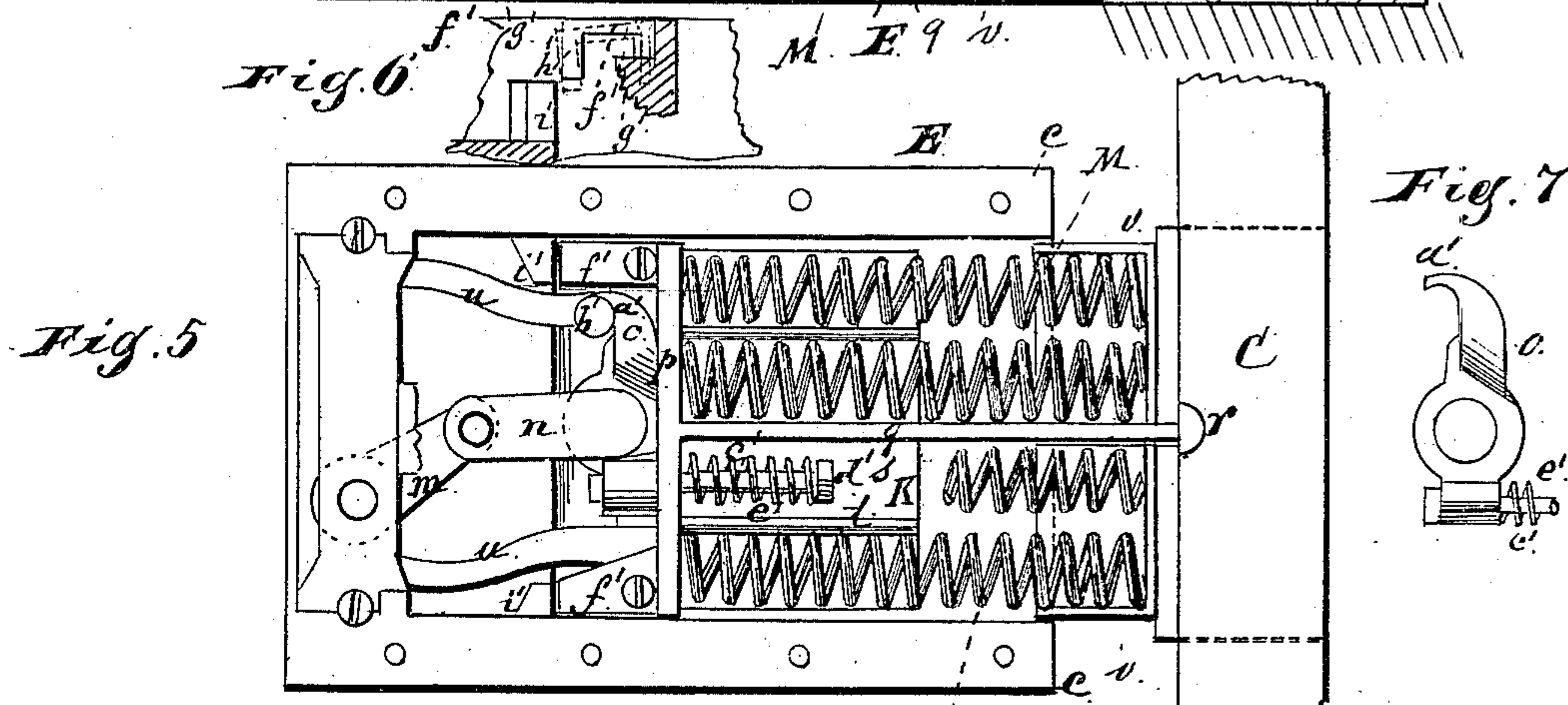
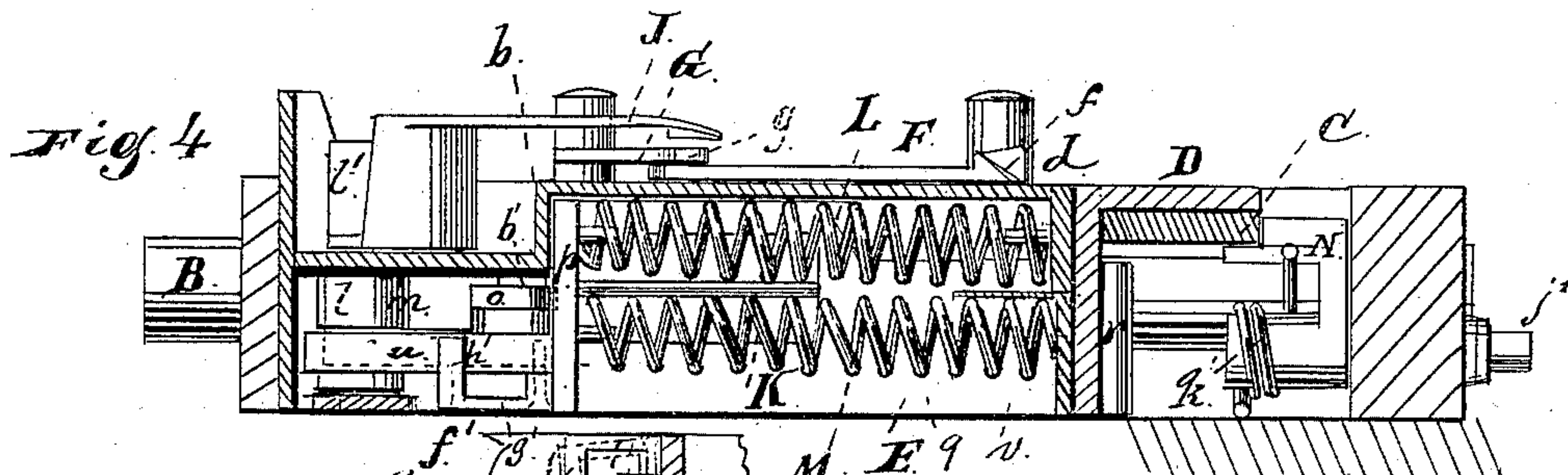
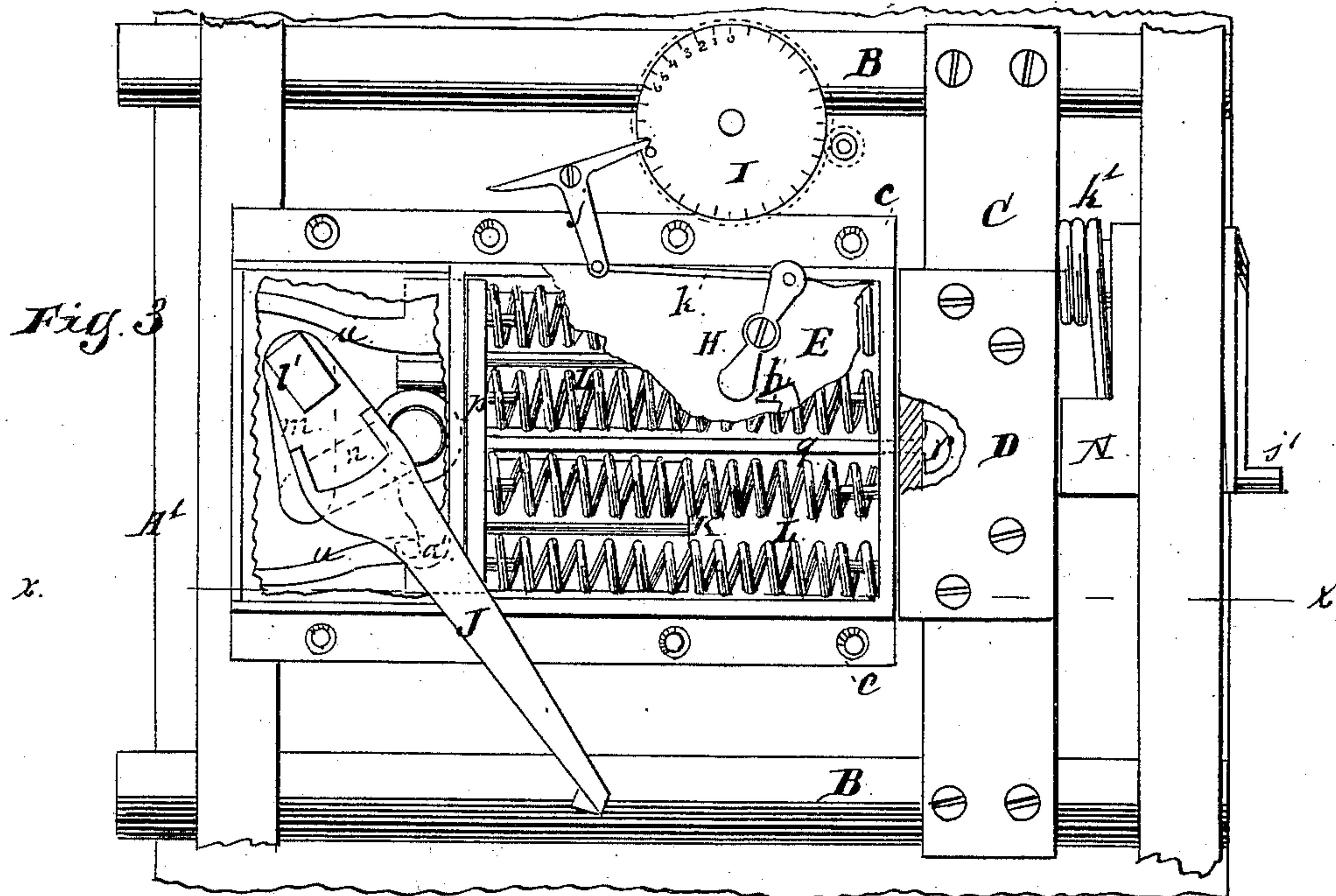
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Harry Jones.

Inventor:

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(Model.)

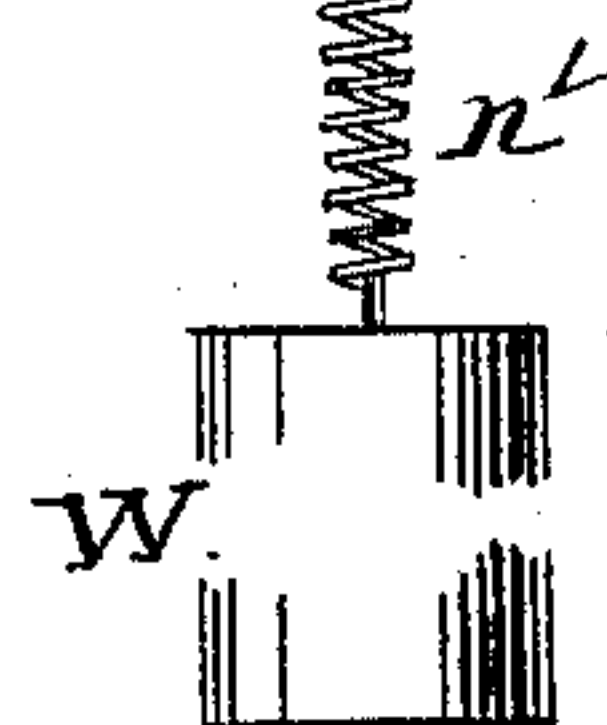
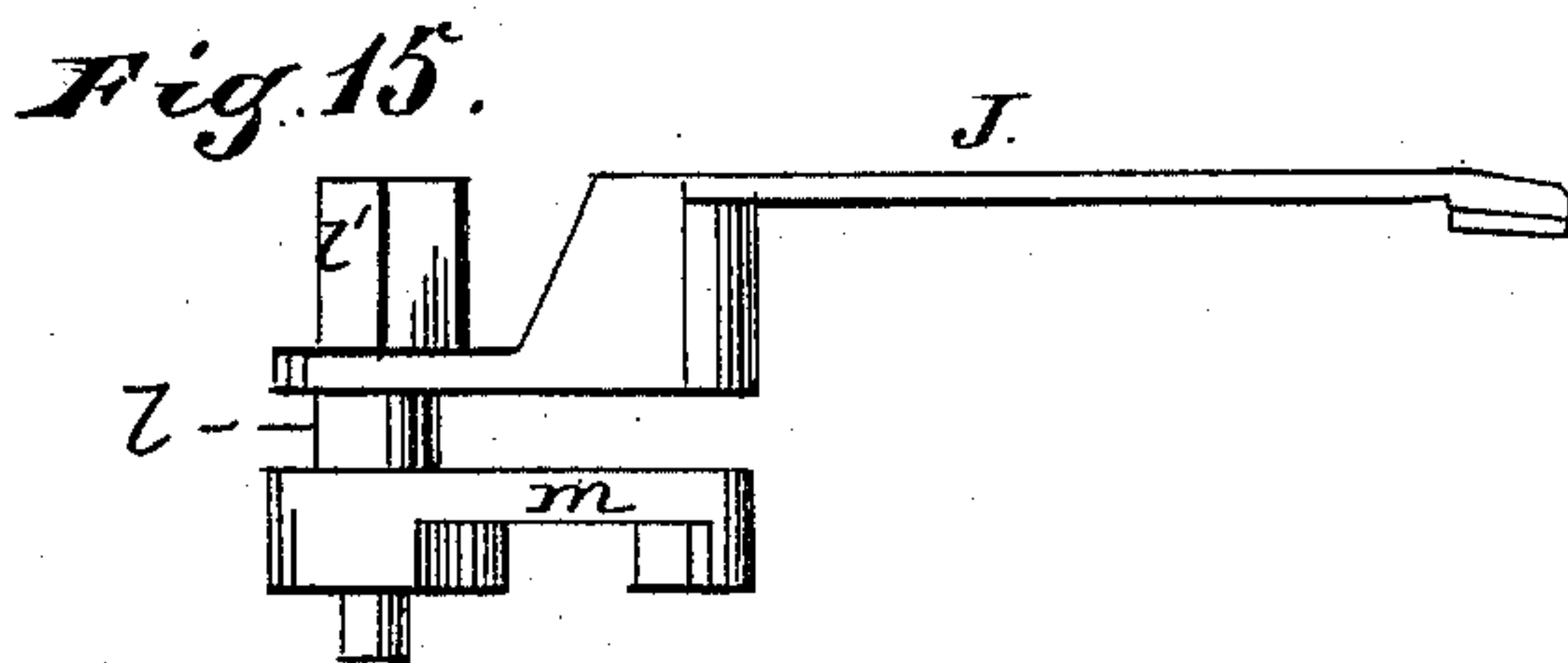
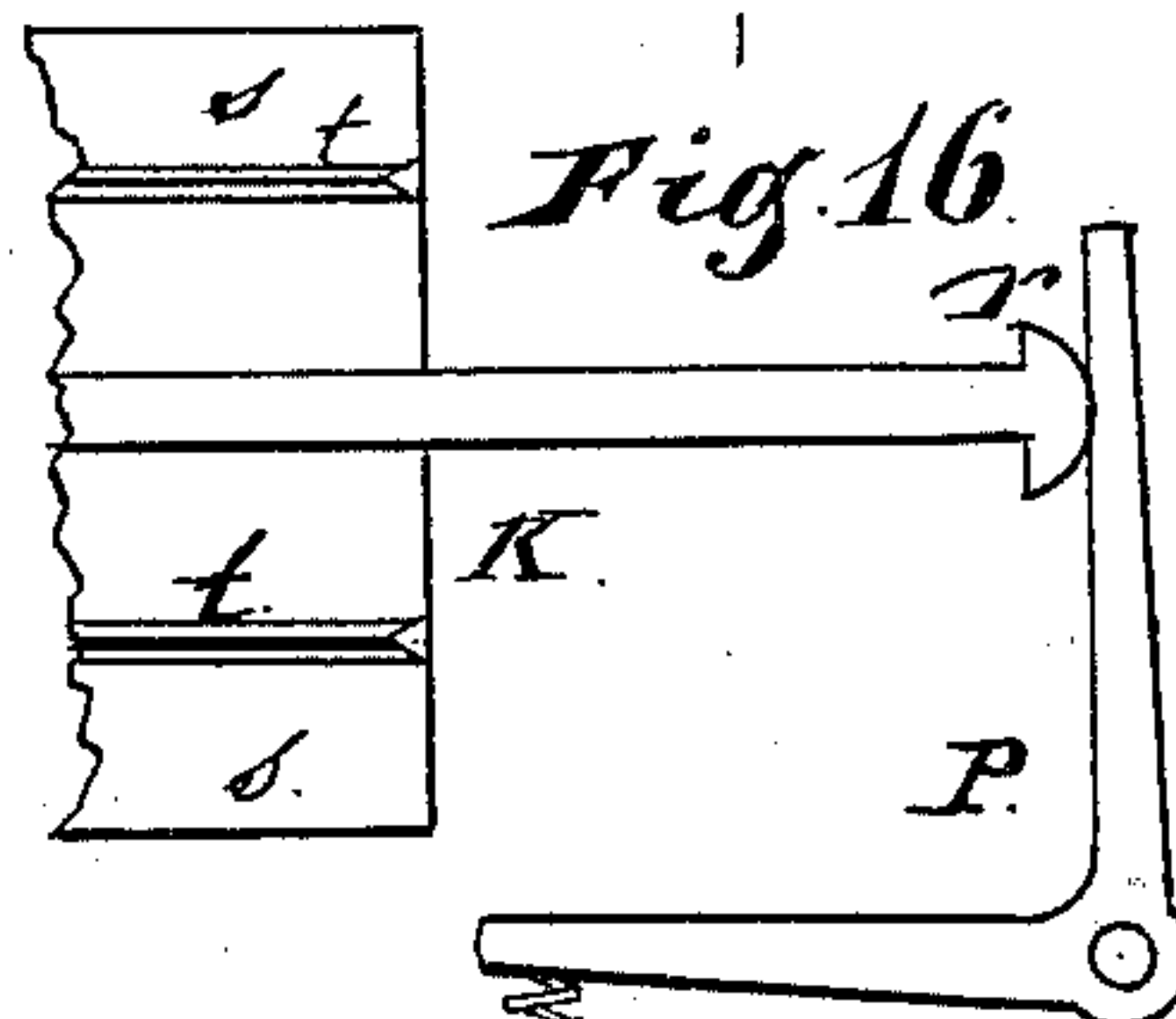
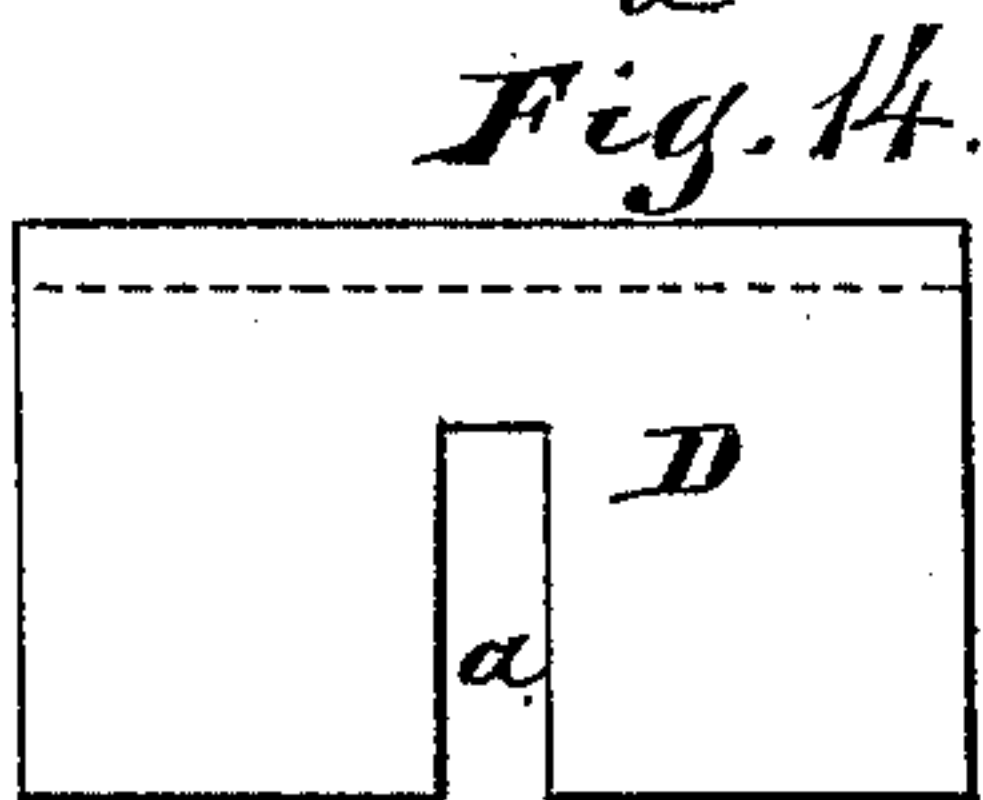
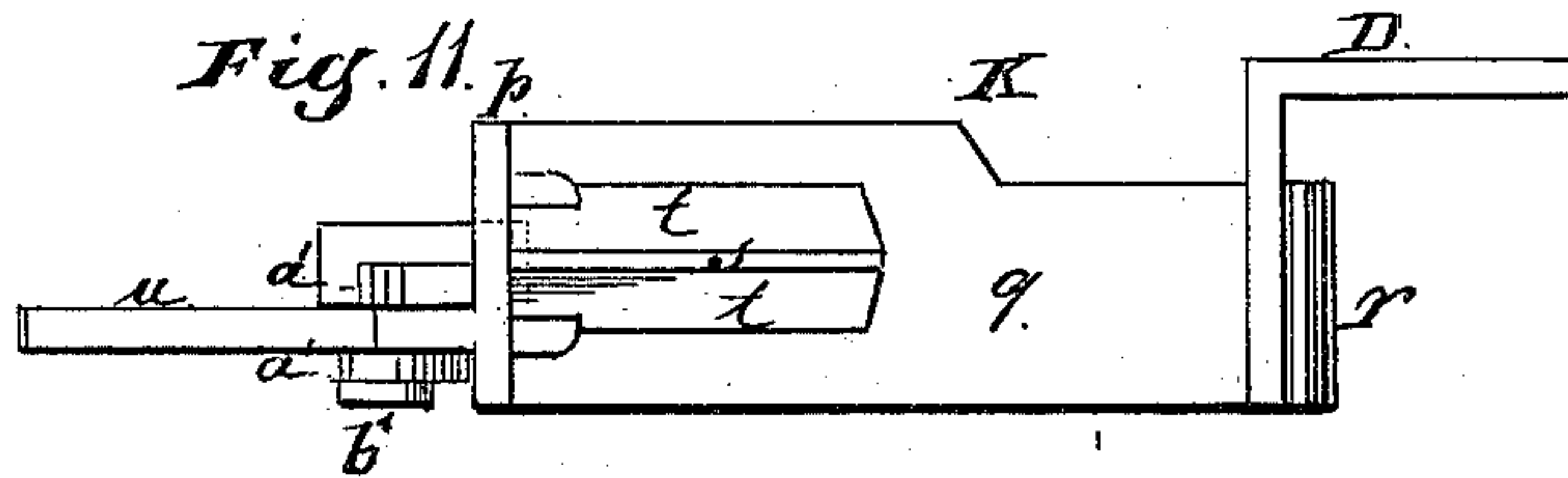
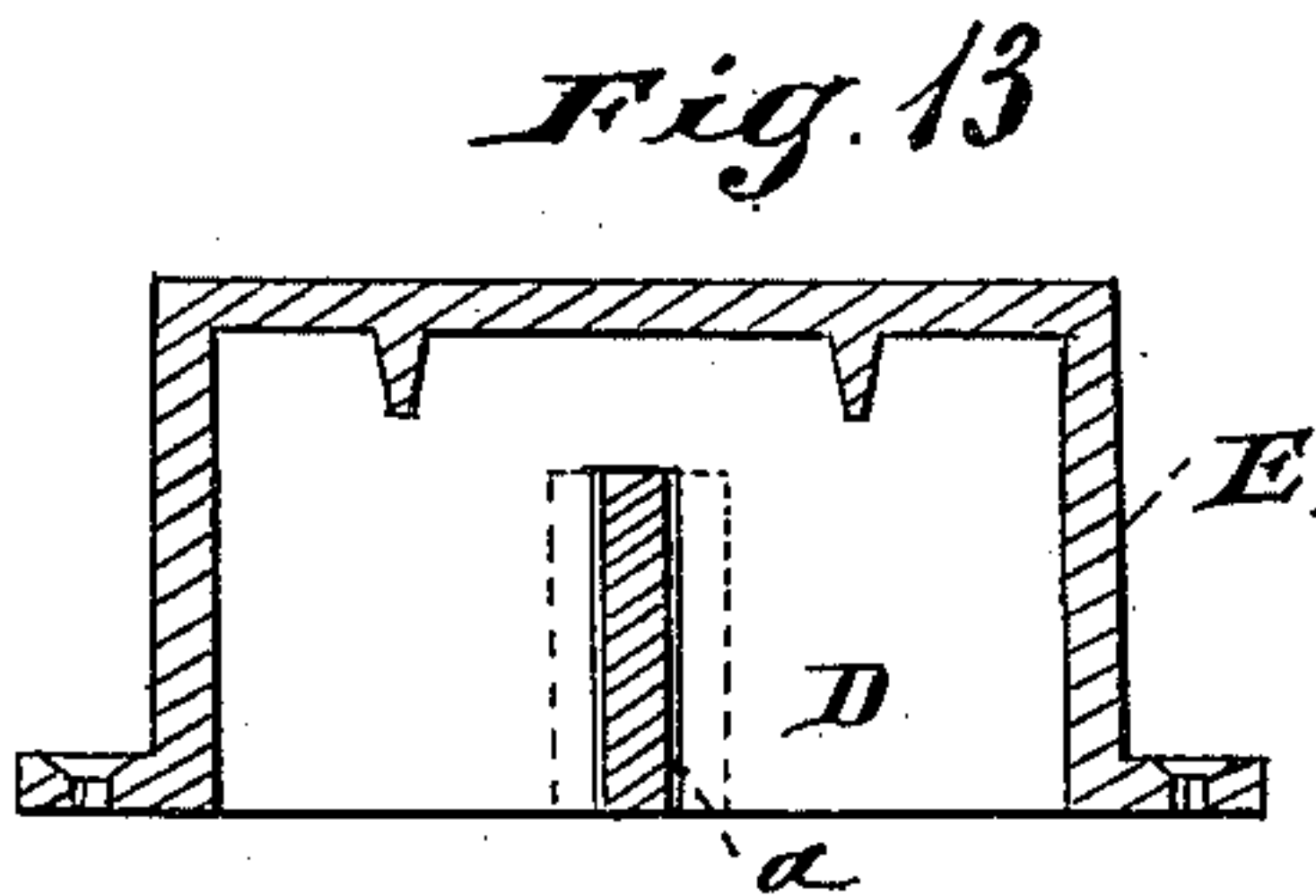
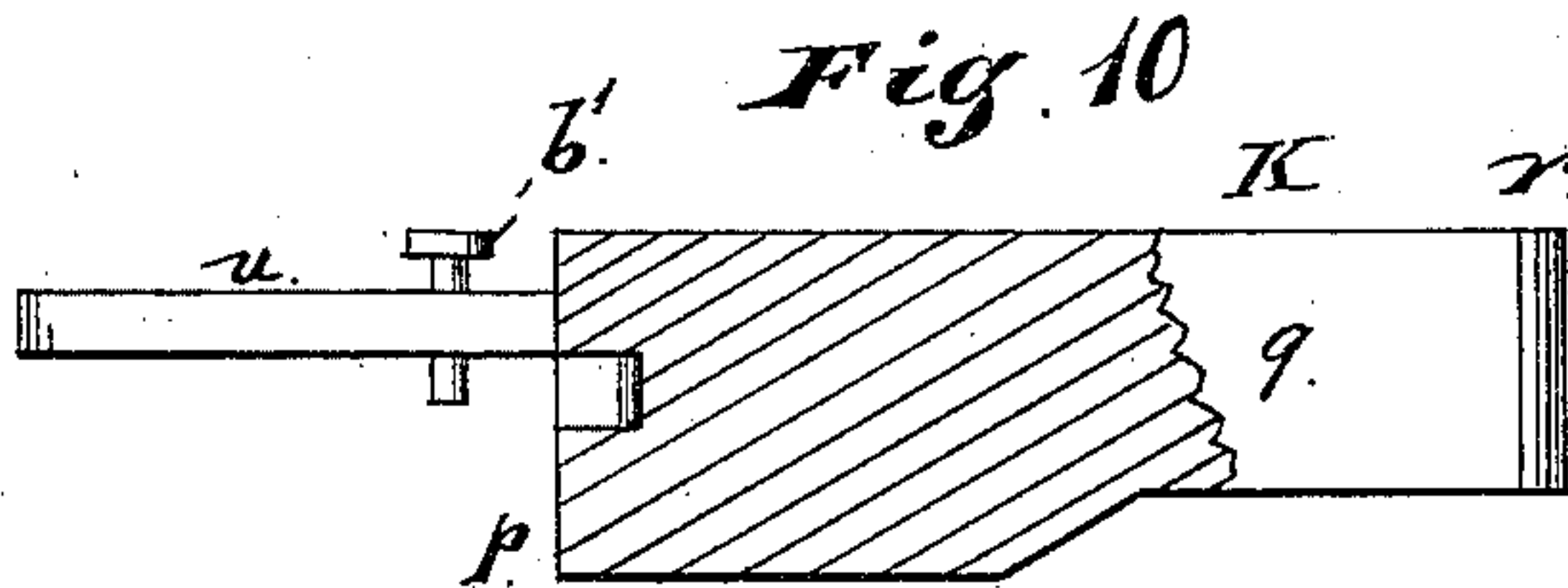
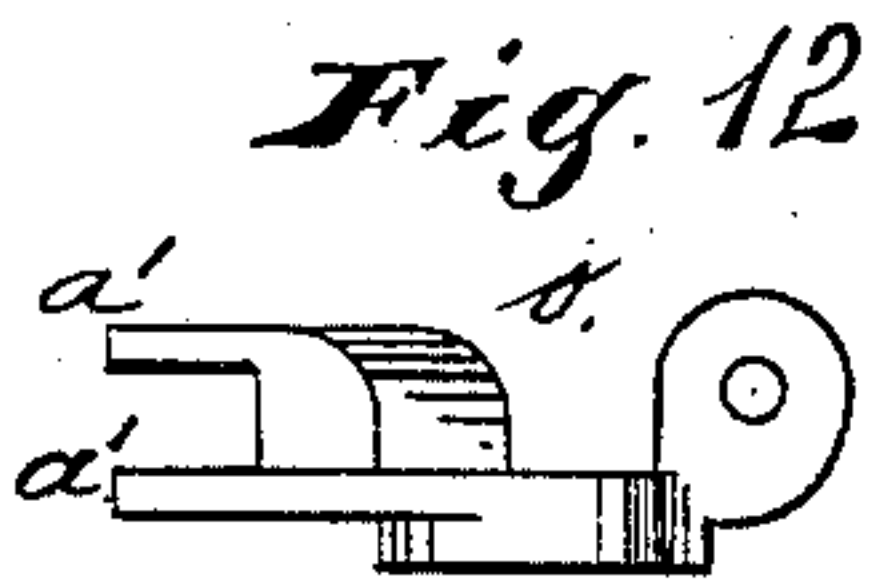
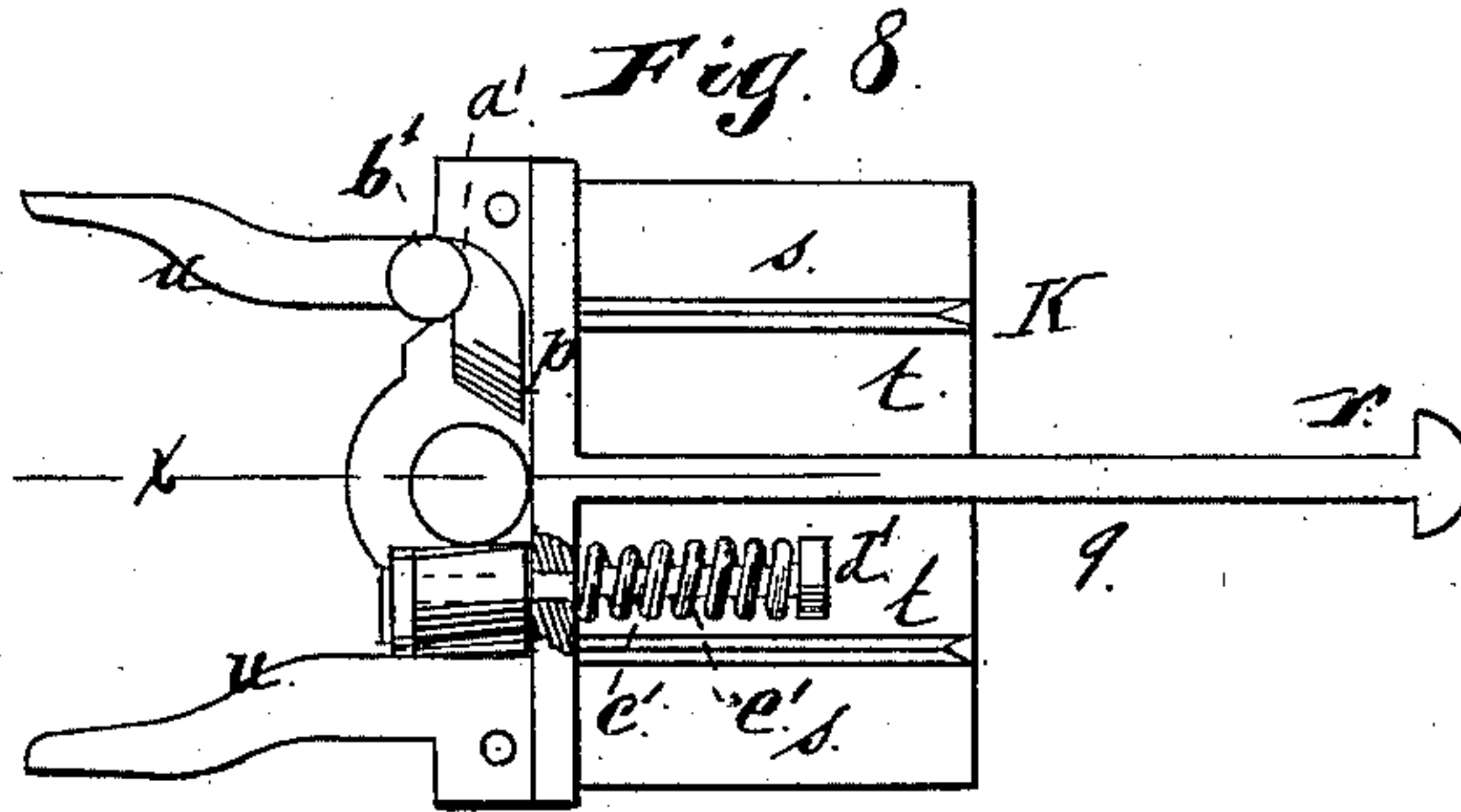
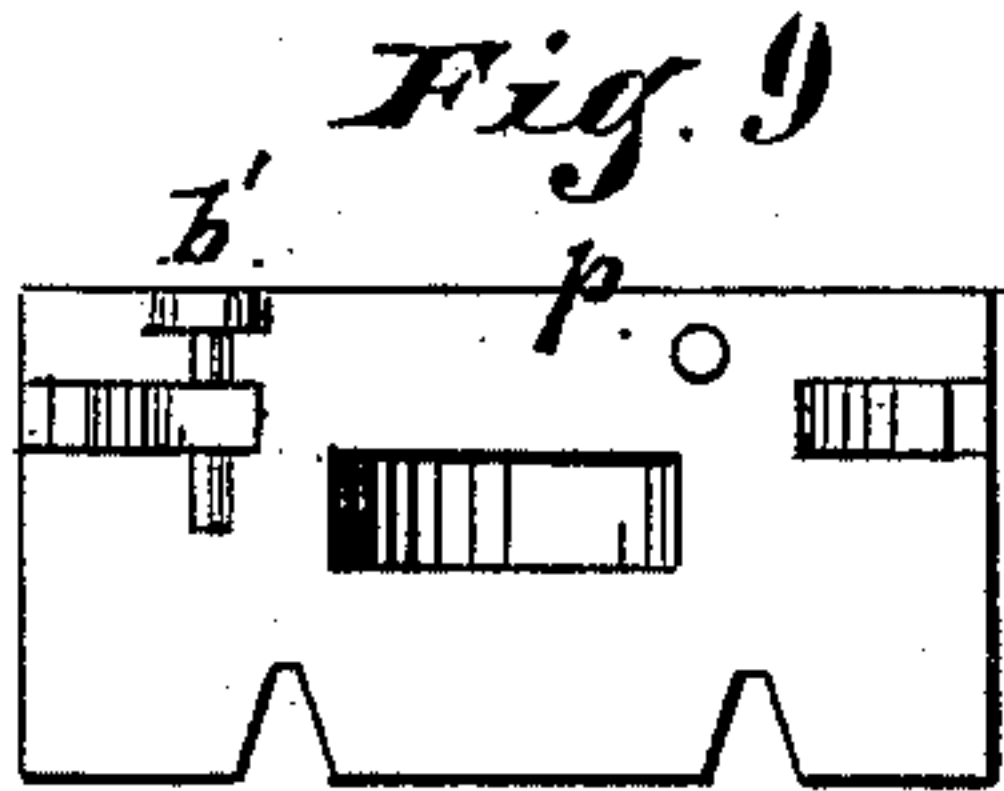
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Patented May 19, 1885.



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E. A. West,
Harry Jones.

Inventor:

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UNITED STATES PATENT OFFICE.

ELBERT W. FOWLER, OF CHICAGO, ILLINOIS.

DEVICE FOR OPERATING SAFE BOLT-WORKS.

SPECIFICATION forming part of Letters Patent No. 317,986, dated May 19, 1885.

Application filed March 5, 1885. (Model.)

To all whom it may concern:

Be it known that I, ELBERT W. FOWLER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a certain new and useful Improvement in Devices for Operating Safe Bolt-Works, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation showing the bolts retracted; Fig. 2, a front elevation showing the bolts cast; Fig. 3, a front elevation with a portion of the case removed, showing also a connection with a time mechanism; Fig. 4, a section at line *x* of Fig. 3; Fig. 5, a rear view of the case and parts therein; Figs. 6 and 7, details; Fig. 8, a rear view of the parts shown; Fig. 9, an end view of the part K; Fig. 10, a section at line *x* of Fig. 8, the part *o* being removed; Fig. 11, a reverse view of Fig. 10, showing also additional pieces; Fig. 12, a detail of the part *o*; Fig. 13, a section of the parts shown at line *x* of Fig. 2 looking to the right; Fig. 14, a detail; Fig. 15, a detail; and Fig. 16 a modification showing one way of using my cushion with a weight.

I have heretofore obtained Letters Patent of the United States dated September 2, 1879, No. 219,084, for improvements relating to devices for automatically casting and retracting safe bolt-work by means of springs, and adapted to be used with a time mechanism. The shock produced by the sudden stopping of the operating parts upon the parts which hold the power until released is liable to break or otherwise injure some part, so as to interfere with the use of the mechanism. One object of this invention is to overcome this difficulty, which I do by cushioning the parts, or some of them, which hold the retracting-power.

For heavy bolt-work it is necessary to use a strong retracting-power, and when the device which holds the power until released is directly connected with the time mechanism, as in my former patent, considerable force is required to release it, and, as before stated, there is danger to the parts. I provide a compound leverage for holding the power until released, which requires but slight force to release it, and combine the same with a cushion, which permits the use of great retracting-power without danger.

Another object of my invention is to provide a device which is usually inoperative, but is so constructed and arranged that violence to the door, when locked, sufficient to prematurely release the retracting-power, will be likely to act upon such device and bring it into such position that it will prevent the retracting-power from acting upon the bolts.

Those features which I claim to be new, including the features above mentioned, as well as other combinations, will be specifically set forth in the claims, all of which are illustrated in the drawings.

In the drawings, A are bars on the inside of a vault-door.

A', Fig. 3, is the inside plate of the door, the jamb and outer plates not being shown.

B are bolts, which move in the bars A, as usual.

C is a cross-bar secured to the bolts.

D is an angle-iron secured to the bar C. This iron has a slot, *a*, in one side.

E is a case, open on the back side, in which the springs which cast and retract the bolts are located. The front *b* of the case does not cover the entire front, but has the form shown in Fig. 4, so that there is a recess or open chamber at one end of the case in front. *c* are flanges on the case, to receive screws for securing the same to the door.

F is a lever pivoted at *d* to the front of the case, and *f* is a catch upon a downward projection from the lever F. *g* is a stud on the other end of this lever.

G is an arm pivoted at one end to the front of the case, and having upon its other end a hook, *h*. *i* is a slot in the arm G, to receive the stud *g*.

H is an arm pivoted to the front of the case, having upon its lower end a stud or projection to engage with the hook *h*.

I, Fig. 3, is a disk operated by a time mechanism, having a pin upon its face, arranged to act upon a lever *j*. *k* is a rod connecting one arm of the lever *j* with the upper end of the arm H.

J is a lever adapted at its free end to engage with the catch *f*. The other end has a projection, *l*, upon one side, which is pivoted in the case.

m is an arm secured to the projection upon the end of the lever J. On the inner end of

this arm *m* is a stud which enters a hole in one end of the short arm or bar *n*. The other end of this arm or bar *n* is provided with a stud which enters a hole in the piece *o*.

5 K is a sliding piece in the case E. It consists, in effect, of a plate, *p*, a bar or plate, *q*, extending out at right angles from *p*, having upon its outer end a head, *r*, two webs or thin plates, *s*, having flanges *t* upon each side, and
10 arms or guides *u*. All of these parts *p q r s t u*, which form the sliding piece K, are cast together in one piece.

v are loose angular pieces, one on each side of the bar *q*, arranged to slide back and forth
15 as the bolts move, their front sides coming in contact with one part of the angle-iron D.

L are strong springs. One end of each of these springs is in contact with the permanent part of the case, and the other end is in contact with the plate *p*, which is a part of the
20 sliding piece K. These springs retract the bolts.

M are other strong springs, one end of which is in contact with the part *p*, and the other end
25 in contact with the parts *v*. These springs cast the bolts.

The piece *o* is in effect hinged by means of two hooks, *a'*, to a pin, *b'*.

c' is a pin, which passes through the free end
30 of *o* and through the part *p*, and has a head, *d'*.

e' is a coil-spring encircling the pin located between the head *d'* and *p*. As shown, a portion of *o* enters a slot in *p*.

f' are pieces of metal, of the form shown in the drawings, having a thin part, *g'*. These
35 pieces are riveted or otherwise secured at one end to the arms *u* or some other part of the sliding piece K. The free ends *h'* of these pieces *f'* extend downward, as shown.

40 *i'* are projections upon the inside of the case E. The lower ends of the parts *h'* are so arranged that when in their normal position they do not come in contact with *i'*.

N is a stop pivoted in one of the bars A, and
45 having connected with it a crank-arm, *j'*.

k' is a short coil-spring arranged to act upon the stop N.

The operation is as follows: Suppose the safe or vault door to be open and the bolts retracted, the parts being in their normal position, as shown in Figs. 1 and 3. Then the operator, having set the time mechanism preparatory to locking the safe, will first move the lever F and arms G H into the position
50 shown in Fig. 2, engaging the hook *h* on the end of arm G with the projection on the lower end of the arm H. Then by lifting the lever J, the sliding piece K can be thrown forward. If desired, the lever may be raised by means
60 of a wrench applied to the angular projection *l'*, and upon engaging the free end of J with the hook *f*, the sliding piece K will be held in position, and all of the springs L M will be compressed by the movement of the sliding
65 piece K, the bolts being, for the time being, held in their open position by the stop N, which is between the bar A and the edge of

the bar C. If, now, the door of the vault or safe be closed, the crank *j'*, coming in contact with the door-jamb, will be moved, and the
70 stop N will be turned away, so that it will not interfere with the movement of the bar C, and then the action of the springs L will immediately cast the bolts, and they will remain in that position until the action of the time mechanism, through the lever *j* and rod *k*, releases
75 the arm H from the hook *h*, and then the action of the springs M will cause the parts F G K to come into the position shown in Fig. 1, and at the same time the bolts will be suddenly retracted. It is the sudden stoppage
80 of the parts which is liable to injure the mechanism, and to prevent such injury I have provided the spring-cushion *e'* and other parts, so that the movement of the lever J is not as
85 suddenly arrested as before; but through the arms *m* and *n* the piece *o*, which is hinged at one end, will move upon its hinge a little, compressing somewhat the spring *e'*, which
90 thus receives the shock which would otherwise be injurious; but this spring *e'* will at once return the part *o* to its normal position.

The head *r* upon the bar *q*, which is a part of the sliding piece K, engages with the angle-iron D, which is secured to the bar C,
95 which is connected with the bolts, so that the backward movement of the piece K retracts the bolts; but the piece *q* can move forward in the slot in the angle-iron D without acting upon the bolt-work.
100

By using the lever F and arm G, constructed as described, the lever J can be held in the position shown in Fig. 2 without producing any perceptible strain upon the holding-hook
105 *h*, the points *d*, the end of the lever J, and the hook *f* being almost in line, so that the power required to release the arm H from the hook *h* is scarcely appreciable; but when released F and G will fall by gravity, releasing the lever J, and allowing the springs M to come into
110 action.

If a sudden shock should be applied to the outside of the vault-door sufficient to prematurely release the retracting-power, such force would also act upon the parts *f'*, and would
115 probably bend their thin parts, so that the projections *h'* would come in contact with the projections *i'*, as indicated by the dotted line in Fig. 6, and prevent the retracting-springs from throwing the bolts back.
120

I am aware that it is common to use a device for dogging the bolts; but I do not use any such device.

The parts *f'* do not in any way act upon or affect the bolt-work, which is free to move
125 without regard to the position of the parts *f'*; but these parts, if they come in contact with the projections *i'*, will prevent the springs M from acting upon the bolt-work in substantially the same way that the stop N prevents
130 the springs L from casting the bolts while it is between the parts A C.

I thus provide a vault with bolt-work and devices for automatically casting the bolts, a

device for holding the bolts retracted until released by closing the door, devices for automatically retracting the bolts, a cushion to prevent injury by the force of the retracting-power, and a device to prevent the retracting-power from acting upon the bolt-work in case such power be released prematurely by violence applied to the door. I have not shown any time mechanism.

Any one skilled in the art can easily apply such mechanism to a safe containing my devices.

I do not limit myself to the number of casting and retracting springs shown. I use no spindle or other connection upon the outside of the door to operate the bolts, they being cast by the springs L and retracted by the springs M. Both sets of springs are made ready for operation by the movement of the lever J, so that the safe cannot be locked without first setting the power which unlocks it.

I have shown my improvement in connection with the reciprocating bolt-work of the ordinary kind; but its use is not limited to such simple bolt-work.

Weights are now sometimes used for operating the bolt-work of safes, and they may be substituted for my retracting-springs.

I do not limit myself to the spring-cushion shown. Other known cushions may be used. For example, a rubber cushion might be placed behind the lever. I have indicated by dotted lines m' in Fig. 1 two places where such rubber cushions might be located. When such cushion is used, a slotted connection should be provided between m and n or between n and o , to provide for a little yielding of the parts.

In Fig. 16 I have shown one way of retracting the bolts by means of a weight instead of the springs M. In this figure P is a bell-crank lever, the end of one arm of which is in contact with the head of the part q , which is a part of the sliding piece K; and W is a weight suspended from the other arm of the bell-crank lever. n' is a spring interposed between the weight and the lever, and acting as a cushion. The weight W is the retracting power in this case. When the lever J is brought into the position before described, and the bolts have been cast by the closing of the door, the parts will be held in position until released by the time mechanism, and then, through the action of the weight W, the sliding piece K will be thrown back and the bolts retracted, and the spring n' will relieve the mechanism from the sudden shock which otherwise would be produced by the sudden stoppage of the weight W, which serves as the retracting-power.

The spring e' may, if desired, be used in connection with the weight and spring-cushion n' .

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

1. In combination with springs for automatically retracting the bolts of a safe or vault

door, a cushion adapted to receive the shock produced by the sudden stopping of the retracting-power, so that the casting and retracting mechanism may not be disarranged or injured thereby, substantially as specified.

2. The combination, with the bolt-work of a safe or vault door, and springs for automatically retracting the bolts, and a time mechanism for releasing the retracting-power at a predetermined time, of a compound lever located between said springs and the time mechanism for the purpose of reducing the power required to be exerted by the time mechanism to release the springs, and a cushion to relieve the casting and retracting mechanism from the shock produced by the sudden stopping of said springs, substantially as specified.

3. In combination with the bolt-work of a safe or vault door, a time mechanism capable of being set to release the retracting-springs at a predetermined time, a cushion to prevent injury to the casting and retracting mechanism by the action of the power when released, and springs to automatically retract the bolts, substantially as specified.

4. In combination with a frame and springs for automatically retracting the bolt-work of a safe or vault door, a dogging-piece, f' , which will ordinarily be inoperative, but which in case the retracting-springs be prematurely released by violence applied to the door will then be brought in contact with said frame, whereby said springs will be inoperative to retract the bolts, substantially as specified.

5. In combination with the bolt-work of a safe or vault door, a hook for holding an automatic retracting-spring in check, a cushion to protect the casting and retracting mechanism from injury by the action of the retracting-springs when released, a time mechanism capable of being set to release such hook at a predetermined time, and a dogging-piece which will ordinarily be inoperative, but which in case the retracting-springs be released prematurely by violence applied to the door will then be brought into such position that the said springs will be inoperative to retract the bolts, substantially as specified.

6. In combination with the bolt-work of a safe or vault door, and springs for automatically retracting the bolts, and a time mechanism for releasing the retracting-springs at a predetermined time, a compound lever located between the said springs and the time mechanism for the purpose of reducing the power required to be exerted by the time mechanism to release the said springs, and a dogging-piece which will ordinarily be inoperative, but which in case the retracting-springs be prematurely released by violence applied to the door will then be brought into such position that the retracting-springs will be inoperative to retract the bolts, substantially as specified.

7. In combination with the bolt-work of a safe or vault door, springs for automatically casting the bolts, the stop N, for holding the

bolts retracted after the casting-power has been set preparatory to closing the door, which stop will release said casting-springs automatically when the door is closed, springs
5 for automatically retracting the bolts, and a cushion to prevent injury by the action of the retracting-springs, substantially as specified.
8. In combination with the bolt-work of a safe or vault door, springs for automatically
10 casting the bolts, the stop N, for holding the bolts retracted after the casting-springs have been set preparatory to closing the door, which stop will release said casting-springs

automatically when the door is closed, springs for automatically retracting the bolts, and a
15 dogging-piece which will ordinarily be inoperative, but which in case the retracting-springs be prematurely released by violence applied to the door will then be brought into
such position that the retracting-springs will
20 be inoperative to retract the bolts, substantially as specified.

ELBERT W. FOWLER.

Witnesses:

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