

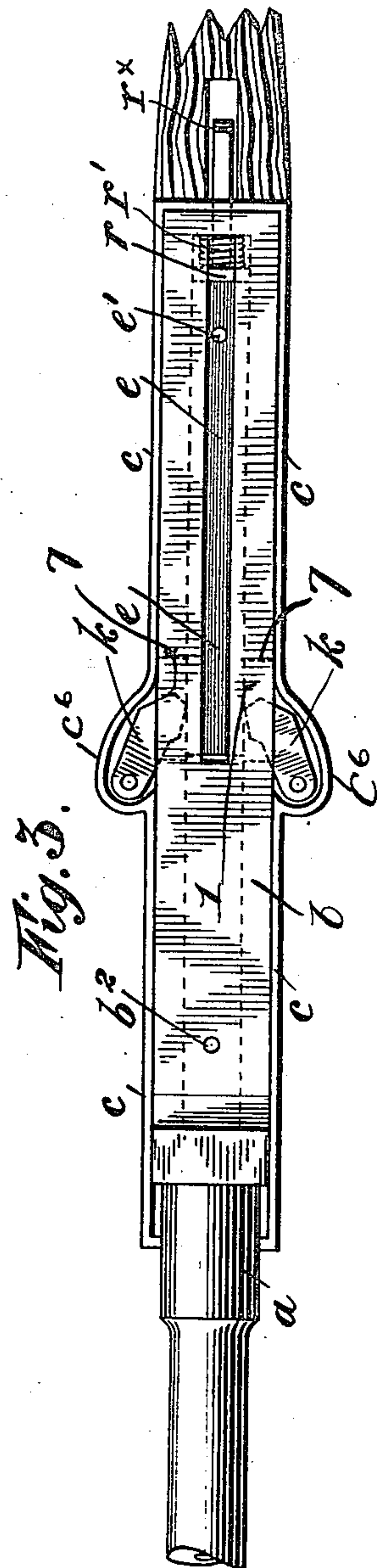
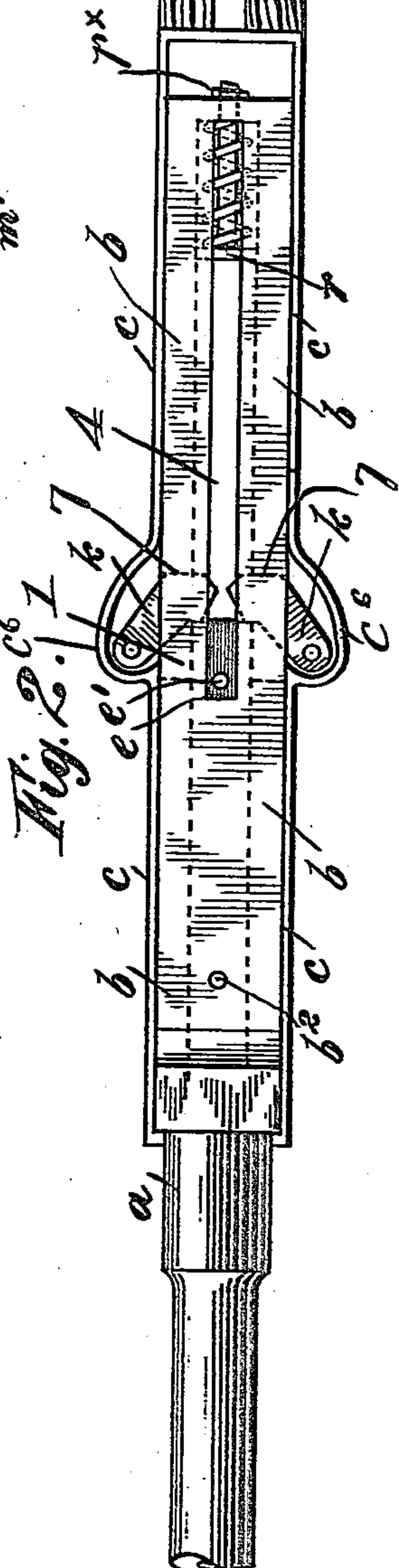
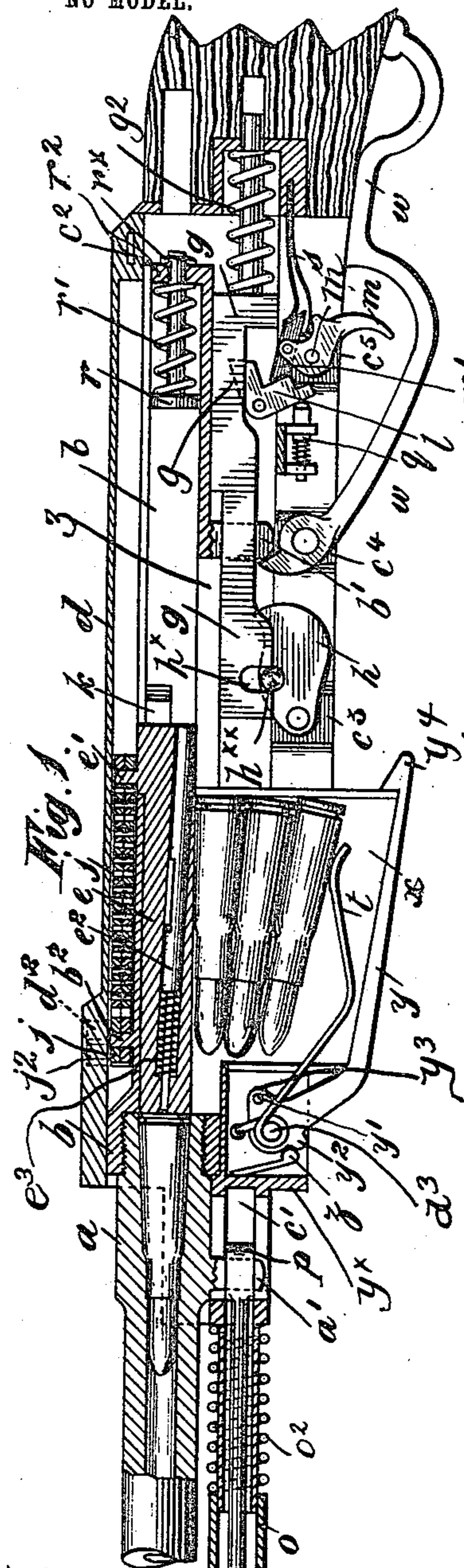
No. 755,482.

PATENTED MAR. 22, 1904.

C. R. S. J. HALLÉ.  
RECOIL OPERATED FIREARM.  
APPLICATION FILED OCT. 13, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

*W. B. Keefe*  
*Brice S. Elliott*

*Inventor*  
*Clifford R. S. J. Halle*  
*By* *James L. Norris*  
*Atty.*

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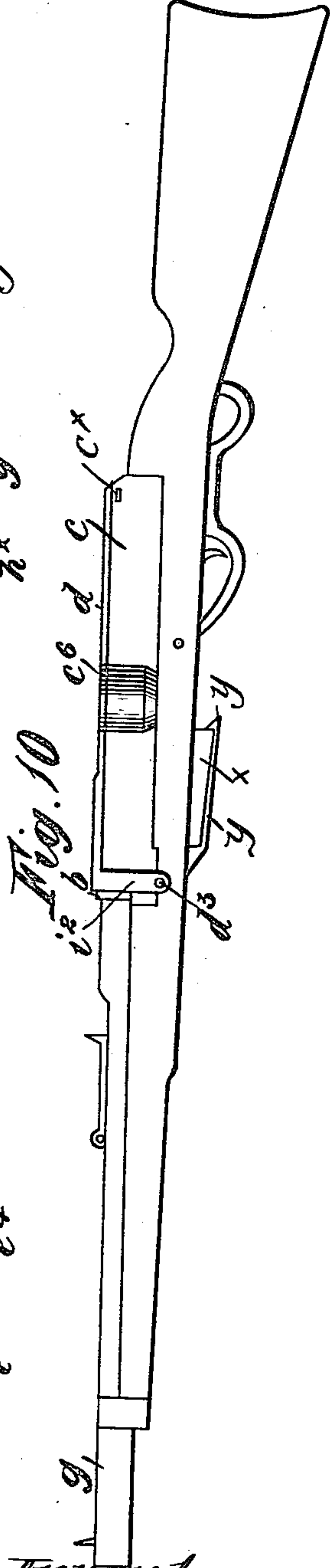
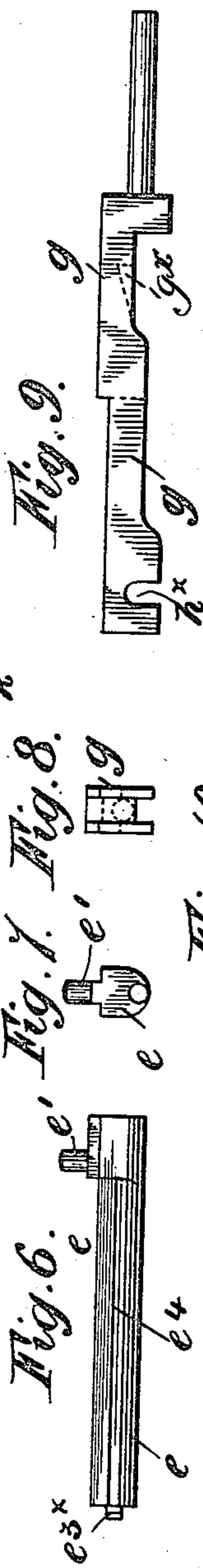
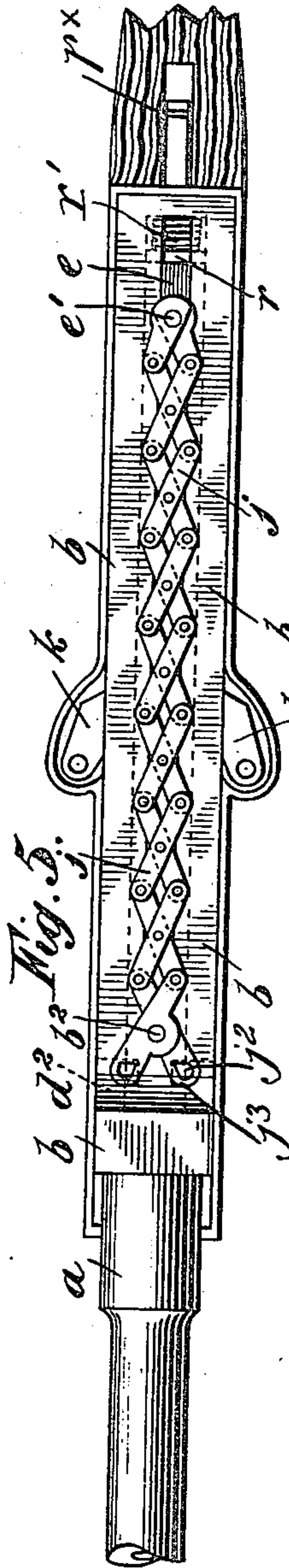
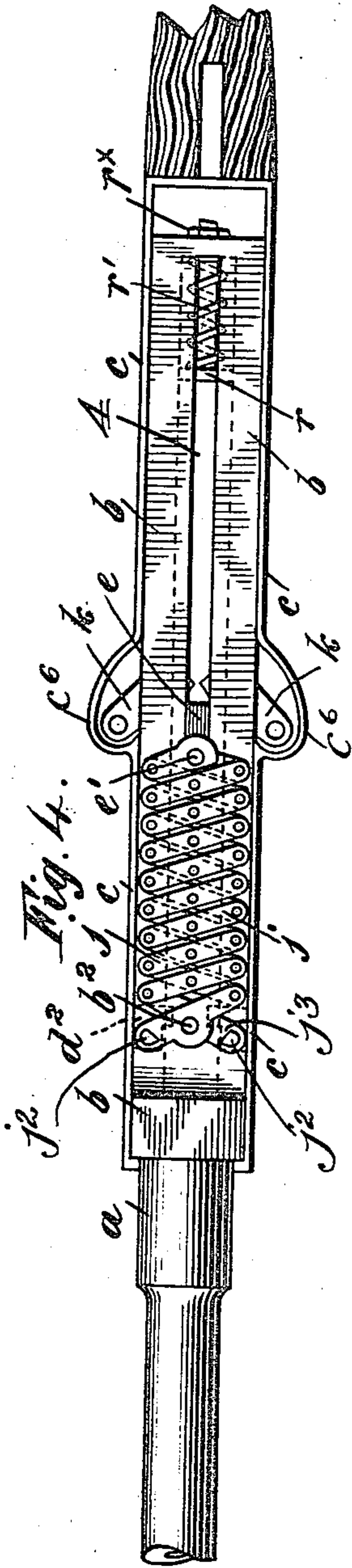
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3 SHEETS—SHEET 2.



Witnesses:  
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By James L. Norrie  
Atty.



No. 755,482.

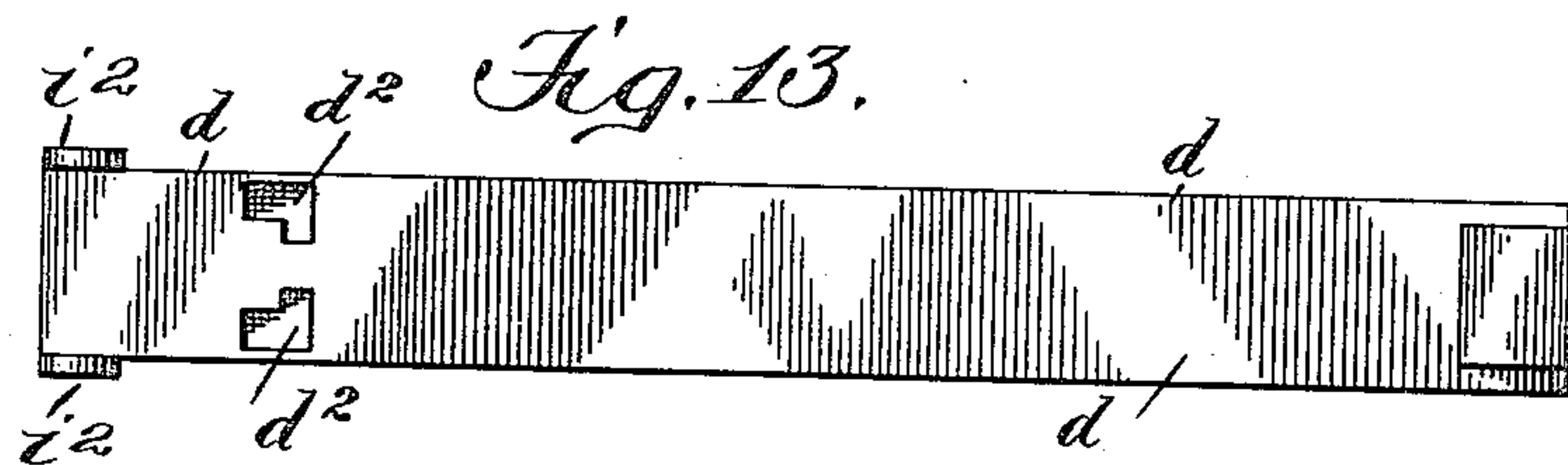
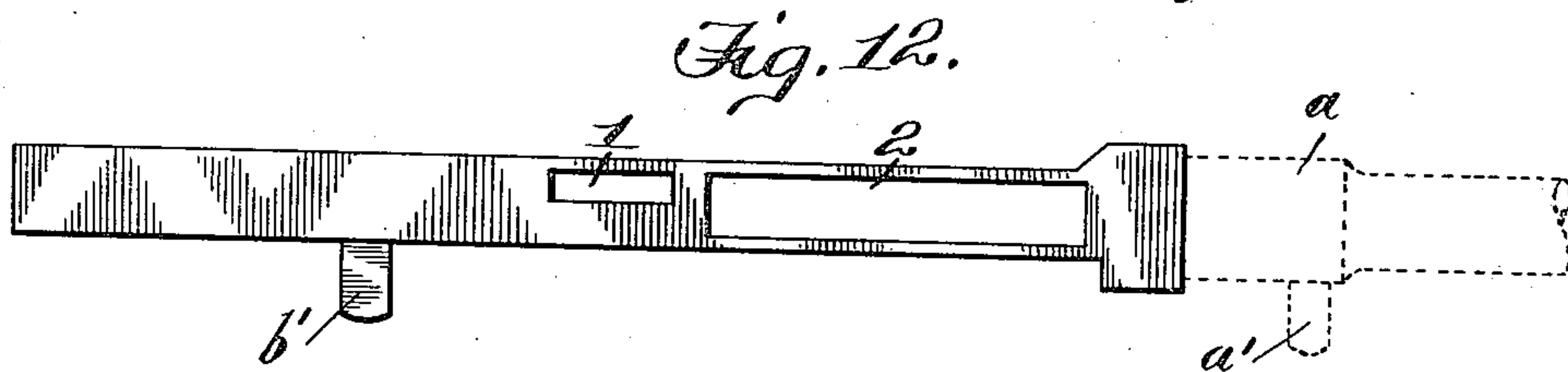
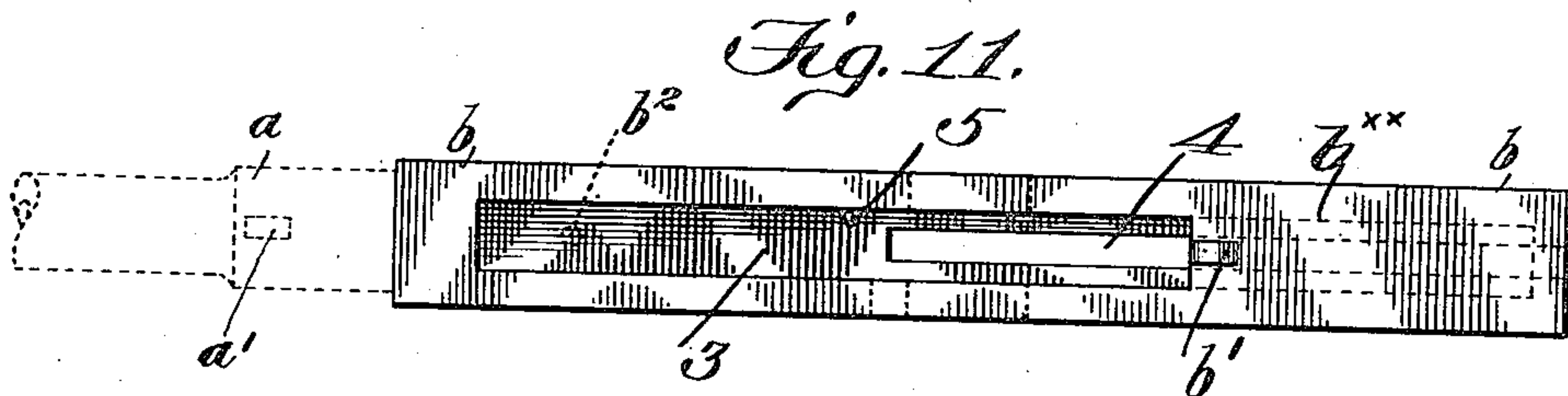
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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

CLIFFORD ROBERT STEPHEN JOHN HALLÉ, OF HAMPTON WICK, ENGLAND,  
ASSIGNOR TO THE HALLÉ AUTOMATIC FIRE ARMS SYNDICATE, LIMITED,  
OF LONDON, ENGLAND, A CORPORATION OF GREAT BRITAIN.

## RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 755,482, dated March 22, 1904.

Application filed October 13, 1902. Serial No. 127,087. (No model.)

To all whom it may concern:

Be it known that I, CLIFFORD ROBERT STEPHEN JOHN HALLÉ, a subject of the King of Great Britain, residing at Cleveland, Station Road, Hampton Wick, county of Middlesex, England, have invented certain new and useful Improvements in Recoil-Operated Firearms, of which the following is a specification.

This invention relates to recoil-operated firearms.

The object of the invention is in a ready, simple, thoroughly feasible, and practical manner to secure positive action of the breech-bolt in lieu of the ordinary system generally employed of bringing the recoiling barrel to a sudden stop and leaving the kinetic energy of the free breech-bolt to compress a spiral spring independently of the barrel, which has to be locked in its backward position during the flight and return of the bolt and is then released and pushed forward by separate mechanism.

By the mechanism of the present invention the full power of the recoiling barrel is utilized, whereas in the arrangements generally employed the greater portion of the recoil is lost by the sudden stoppage of the barrel and is received by the shoulder of the firer of the gun.

The invention further contemplates certain improvements in the sear, trigger, and hammer-shifting mechanism, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of the specification, and in which like characters of reference indicate corresponding parts, there is illustrated one form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the elements therein exhibited may be varied or changed as to shape, proportion, and exact manner of assemblage without departing from the spirit thereof, and in these drawings—

Figure 1 is a view in longitudinal section showing the general arrangement of the parts of the gun. Fig. 2 is a view in plan of the gun with the top plate removed, exhibiting the position of the parts when the gun is ready for firing. Fig. 3 is a similar view showing

the position of the parts when the gun has been fired. Fig. 4 is a similar view showing the position occupied by the lazy-tongs controlling the travel of the bolt with that of the barrel, the bolt being in position for firing and the cover or lid being removed. Fig. 5 is a similar view exhibiting the barrel and bolt in their backward position or that assumed when the gun is fired. Figs. 6 and 7 are side and end elevations, respectively, of the breech-bolt. Figs. 8 and 9 are end and side elevations, respectively, of the hammer-shifter. Fig. 10 is a view in side elevation of a completed firearm constructed in accordance with the present invention. Fig. 11 is a view in inverted plan of the barrel extension. Fig. 12 is a view in side elevation of the barrel extension. Fig. 13 is a view in vertical plan of the cover or lid.

Referring to the drawings, *a* designates the barrel, which is screwed into the block of the barrel extension *b b*, which, as shown in Figs. 11 and 12, is provided with a channel *b<sup>x</sup>* for the passage of the bolt *e*, has lateral slots 1, one on each side, for the passage of the grips *k*, has a lateral orifice 2 for the passage of used cartridges, an opening 3 at its bottom for the passage of new cartridges and for the hammer, and a slot 4 in its top to receive a pin *e'* on the bolt. It is also further provided with a downward-extending projection *b'*, by which the barrel and cartridge are moved backward by the lever and trigger-guard *w*. Projecting upward from the extension is a cylindrical stud or pin *b<sup>2</sup>*, which passes through the two end levers of the lazy-tongs *j* and serves to open the latter as the barrel recoils, as will hereinafter appear.

The end of the channel for the passage of a bolt houses a buffer-plunger *r*, backed by a strong spiral spring *r'*, (clearly shown in Fig. 1,) the shank of the plunger being mounted for reciprocatory movement in a bearing *r<sup>2</sup>* at the end of the passage and carries a collar or stop *r<sup>x</sup>* to limit its forward movement.

The firing-pin *e<sup>2</sup>* passes on an inclined plane through the bolt and is held back out of normal engagement with a cartridge by a spring *e<sup>3</sup>*. (Clearly shown in Fig. 1.)



The lazy-tongs and other operative parts of the gun are shielded by a cover or lid  $d$ , which is secured to the gun-frame  $c$  at its rear by a flat key or bar  $c^x$ , Fig. 10, which passes through a transverse slot  $c^2$  in the frame, as shown in Fig. 1. At its front end the lid is provided with two arms  $i^2$ , Fig. 10, which pass over the frame and are fixed by a pin  $d^3$ , that passes through the gun below the barrel-block. The frame is further provided with two outward-extending approximately semi-circular projections  $c^6$  for housing the grips  $k$ , as clearly shown in Figs. 2, 3, 4, and 5. The front end of the lid is thickened and the under side is provided with two rectangular slots  $d^2$  to receive pins  $j^2$ , carried by the forward ends of the lazy-tongs and by which they are actuated, the position of these slots being indicated by dotted lines in Figs. 1 and 4 and in full lines in Fig. 13.

At the forward end of the frame there is a tubular projection  $c'$ , that is adapted to receive a plunger  $p$ , into which fits a downward-extending projection  $a'$  on the barrel. This plunger is attached to the cap  $o$ , against which bears at one end a strong coiled spring  $o^2$ , constituting the mainspring, the opposite end of which bears against the outer end of the projection  $c'$ .

The back end of the frame is bored out for the reception of a coiled spring  $g^2$ , which works the hammer-shifter  $g$ , as clearly shown in Fig. 1. The frame is made in such manner that the upper portion is wide enough to take the barrel extension; but below this may be a smaller one, just large enough to receive the hammer-shifter  $g$ , and this portion fits inside of the wooden stock of the gun.

At the rear or grip portion of the gun are three pairs of lugs which project downward into the wood, the lugs  $c^3$  being designed to receive the pivot of the hammer  $h$ , the lugs  $c^4$  to receive the pivot of the lever  $w$ , and the lugs  $c^5$  to receive the pivot  $m$  of the trigger. At the forward end of the magazine there is a downward-projecting extension  $y^x$  to receive the pivot  $d^3$  of the magazine-lever  $y$ .

The magazine  $x$ , which is attached to the frame in any suitable manner, is a box-like structure open at top and bottom. The bottom is closed by the lever  $y$ , which is flattened for that purpose, and the cartridges are pushed up by the spring  $t$ , the lever being held in locked engagement with the magazine by an ordinary catch. The head end of the lever is provided with an extension  $y'$ , from which projects a pin  $y^3$ . When it is desired to insert one or more fresh cartridges in the gun, it is turned upside down, and the lever  $y$  is thrown back by a projecting thumb-piece  $y^4$ , and as the lever is moved the pin  $y^3$  catches on the spring  $t$  and forces it back also. The forward end of the lever is provided with a projection  $y^2$ , which engages with a knob or projection on a spring  $z$ , and thus holds the

lever open until the cartridges are dropped in, after which the lever is thrown back to its normal position.

The hammer-shifter  $g$ , Figs. 1, 8, and 9, is vertically orificed at its forward end for the passage of the hammer  $h$  and at its rear end is provided with a recess  $g^x$ , providing a shoulder with which the sear engages. The recesses  $h^x$ , which receive the pintles  $h^{xx}$ , that project from each side of the hammer, constitute hooks by which the hammer can be pulled back. When the barrel extension recoils, the hammer-shifter is pushed back with it against the tension of the spring  $g^2$ , before referred to, and when the hammer-shifter reaches the limit of its backward movement the sear  $l$  springs up into the recess  $g^x$ , (indicated by dotted lines in Figs. 1 and 4,) the sear being pressed upward by a spring-plunger  $q$ . The hammer-shifter is thus held in a backward position until the trigger is pulled, whereupon it is forced forward and throws the hammer against the firing-pin. By reason of the fact that the recess  $g^x$  is approximately triangular in shape there will be no possibility of the hammer-shifter having any play that will permit the firing-pin to be engaged by the hammer until the barrel extension is entirely home.

The trigger  $m$  has a short lever  $m'$  pivoted to it, and the trigger and said lever are actuated independently of each other by a double spring  $s$ , so that the lever can trip behind the sear when the latter has sprung into position to engage with the recess in the hammer-shifter. This prevents the gun from firing more than one shot if the finger remains on the trigger.

The bolt is fitted with an ordinary spring-extractor  $e^{xx}$ , Fig. 6, which is adapted in the usual manner to nip the cartridge-rim and draw the shell back, the groove  $e^4$  of the bolt running along the stop 5, Fig. 11. On reaching this stop the cartridge-rim receives a sharp blow on one side from the stop 5, causing the shell to be tilted to the opposite side and thrown out of the opening 2, Fig. 12.

To cause the bolt to close immediately after it opens, the upwardly-projecting pins  $j^2$  are made square at one corner, as shown at  $j^3$  in Figs. 4 and 5. The lazy-tongs are of course closed by the return of the barrel and extension and with them the projection  $b^2$ .

When the bolt is home, the buttresses 7 of the extension meet the grips and push them forwardly, thus firmly locking the bolt, as the grips are between the back of the bolt and the said buttresses, and the bolt cannot thus escape until the extension is back again the required distance. To operate the gun by hand, the user presses down the lever  $w$ , which by acting on the projection  $b'$  on the barrel extension forces it back in the same manner as the recoil.

Experiment has shown that with a system



of lazy-tongs such as shown little or no work in the way of resisting shock is to be overcome by the lazy-tongs. Their duty is to synchronize the action of the gun, and if the bolt has a tendency to travel slower relatively to the barrel than it should then the lazy-tongs accelerate its flight, or if, on the contrary, the momentum of the bolt is greater than it should be relative to the barrel the right-angled slots for the pins of the lazy-tongs check the flight of the bolt and regulate it in accordance with the movement of the barrel.

The action of the gun is as follows: When the cartridge is exploded, the bolt presses against the grips  $k$ , and these in turn give a sharp blow to the buttress of the barrel extension behind them, and then as the barrel and extension recoil in response to this blow the grips swing out of the way and at a certain point permit the bolt to pass, as shown in Figs. 2 and 3. Until the grips are opened the pins or studs  $j^2$  pass along the members of the slots  $d^2$ , extending parallel with the sides of the cover; but when the grips are open these pins enter the portions of the slots extending at right angles to the length of the cover, and as the barrel extension continues to move, and with it the pin  $b^2$ , the lazy-tongs are forced open.

The bolt from its own kinetic energy has a tendency to fly away from the barrel, but is retarded by the mainspring, so that there is little or no strain thrown on the lazy-tongs beyond that regulated by the speed of the flight of the bolt in accordance with that of the barrel. If the barrel has a tendency to travel relatively faster than the bolt, the lazy-tongs increase the speed of the bolt, and vice versa. The shock of the rapidly-traveling bolt is taken up by the plunger  $n$ , which also serves to start the bolt on its return movement.

It would appear at first glance with the gun of this invention that the user's shoulder would yield before a spring that starts at a tension equal to a weight of two hundred and fifty pounds or more, this being the resisting force of the spring; but experiment has shown that a rifle constructed with a mainspring of such power can be fired from the wrist, and that the spring will undergo its full compression and the gun will work as usual without the wrist of the firer experiencing any perceptible shock. This great power of the mainspring renders the gun to all intents and purposes rigid for the purpose of bayoneting, as an ordinary gun with a fixed barrel.

To the action of the breech-bolt supports or grips is generally due the possibility of obtaining the full power of the recoil. The ordinary means in vogue for this purpose permit the grips to travel with the barrel and to force them apart by means of projections fixed to the gun which engage with inclined

surfaces on the opposite ends of the grips. As the bolt presses on the grips, and thus forces them tightly against their supports, the frictional resistance of their opening is thus very great. In the present arrangement there is no friction of any kind between the grips and their supports. The bolt gives a hard blow to the grips, which is immediately communicated to the grip-supports of the breech-frame, and then the grips simply swing out of the way of the bolt as the barrel, bolt, and frame recoil in response to the blow of the explosion, the grips being pivoted to a fixed portion of the gun instead of traveling with the barrel and breech-frame.

Having thus described the invention, what I claim is—

1. In a magazine-gun, the combination with the extension, provided at its forward end with a pin, and a stationary member disposed thereover and provided with angular slots, of a bolt provided at its rear end with a pin, and a series of lazy-tongs pivotally connected with the pins of the extension and of the bolt, and having studs to engage the angular slots.

2. In a magazine-gun, the combination with the extension, provided at its forward end with a pin, and a stationary member disposed thereover and provided with angular slots, of a bolt provided at its rear end with a pin, a series of lazy-tongs pivotally connected with the pins of the extension and of the bolt and having studs to engage the angular slots, and gripping means disposed in the path of movement of the bolt.

3. In a magazine-gun, the combination with the extension provided at its forward end with a pin, and a stationary member disposed thereover and provided with angular slots, of a bolt provided at its rear end with a pin, a series of lazy-tongs pivotally connected with the pins of the extension and of the bolt, and having studs to engage the angular slots, and a grip arranged on each side of the gun and in the path of movement of the bolt.

4. In a magazine-gun, the combination with the extension, provided at its forward end with a pin, and a stationary member disposed thereover and provided with angular slots, of a bolt provided at its rear end with a pin, a series of lazy-tongs pivotally connected with the pins on the extension and of the bolt and having studs to engage the angular slots, grips carried by the extension-frame and buttresses for holding the grips in locked engagement with the bolt.

5. In a magazine-gun, an extension provided with a passage-way, intermediate of its ends with abutments and at its forward end with a stud or projection, a bolt mounted in the passage-way and provided with an upward-projecting pin, a cover for the extension having its under side provided with angular recesses, grips carried by the extension-frame and adapted to engage with the abutment, and a series of lazy-tongs pivotally connected with



the pins of the bolt and of the extension and having its terminal links provided with pins to engage the angular recesses.

6. In a magazine-gun, an extension provided with a passage-way and with a stop therein, a bolt having a cartridge-extractor and provided with a slot to engage the stop and with an upward-projecting pin, means carried by the extension for cushioning the bolt, lazy-tongs operatively connected with the bolt and with the extension, grips carried by the extension-frame and adapted to engage buttresses on the extension, and a lid or cover for the carriage-case and provided with means to interlock with the studs or projections on the forward terminal links of the lazy-tongs, substantially as and for the purpose specified.

7. In a magazine-gun, a hammer-shifter provided at its forward end with a slot and with lateral recesses, and at its rear end with a recess, a hammer having pintles to engage the lateral recesses, a sear adapted to engage the rear recess, a trigger, a spring-pressed lever carried by the trigger to engage the sear, a lever to retract the hammer-shifter, and a spring to project it.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CLIFFORD ROBERT STEPHEN JOHN HALLÉ.

Witnesses:

H. MAYKELS,  
WM. O. BROWN.