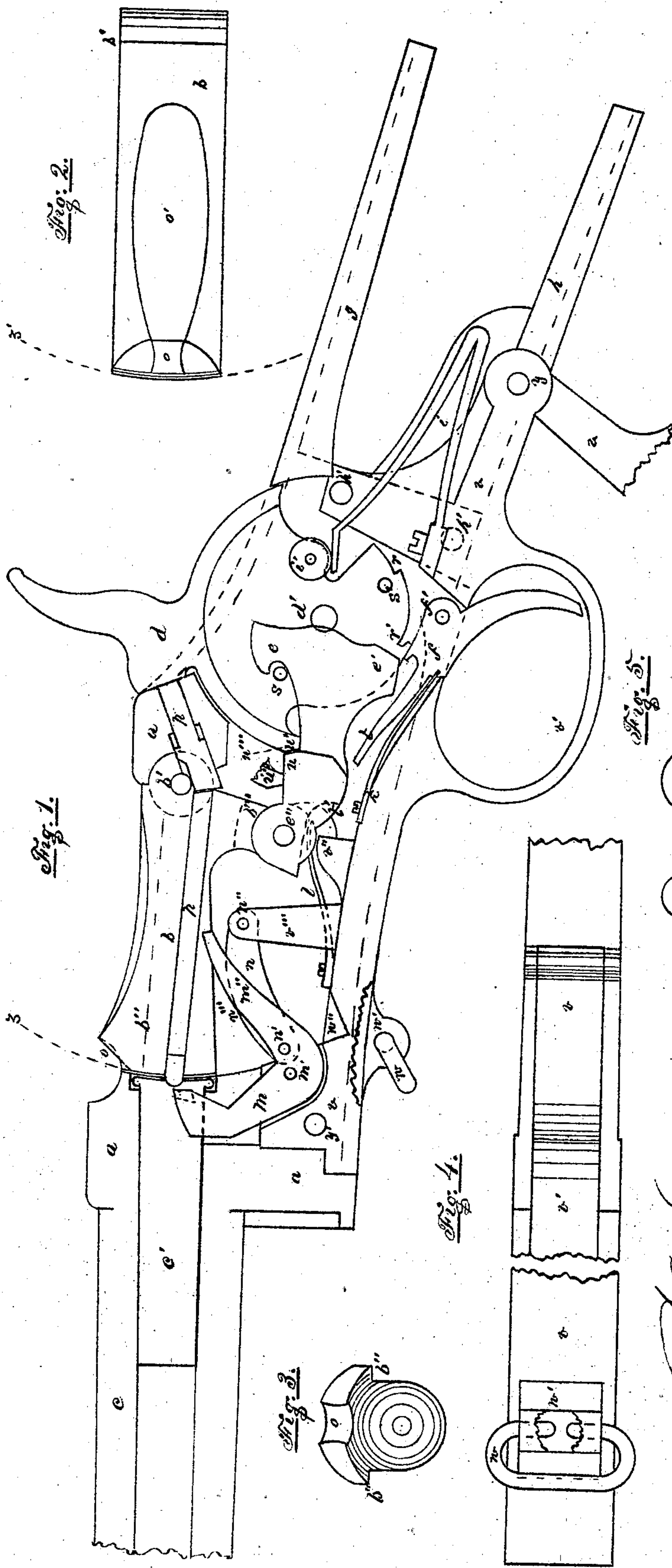


W. H. ELLIOT.  
Improvement in Breech Loading Fire Arms.

No. 121,499.

Patented Dec. 5, 1871.



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# UNITED STATES PATENT OFFICE.

WILLIAM H. ELLIOT, OF NEW YORK, N. Y.

## IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. 121,499, dated December 5, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM H. ELLIOT, of the city, county, and State of New York, have invented a new and Improved Breech-Loading Fire-Arm; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

Similar letters of reference indicate the same devices in all the figures.

To enable others skilled in the art to comprehend, make, and use my invention, I will proceed to describe its nature, construction, and operation.

The nature of my invention consists in certain improvements on the arm patented by me December 13, 1870, as follows: In curving the forward end of the breech-block, or that portion upon which the head of the cartridge rests, in two directions, vertically and horizontally, so that it shall represent a portion of the surface of a globe, having its center in or near the axis of the breech-block. In combining with the shell-retractor an auxiliary lever, which shall take effect after the cartridge has been started by the simple lever power of the retractor, for the purpose of giving greater rapidity of motion to the point of the retractor than can be obtained practically by a single lever. In extending an arm from the trigger forward under the double pawl, so that it may be used as a lever for operating upon the pawl to change its action upon the breech-block by throwing it from one catch to the other on the hammer. In making the guard-strap detachable at one or both ends, and attaching thereto the retractor, trigger, and other small parts, so that these devices may, with little trouble, be brought out of the receiver, and all the bearings of the limb-work exposed to view for the purpose of cleaning and oiling. In arranging the swivel-base on the guard-strap in certain relation to the cut in the same, made to provide room for the free end of the breech-block, thereby preserving the strength of the guard-strap and the symmetry of the arm. In constructing the shoulder for locking the breech-block on the pawl and its opposite point on the hammer in such a way that when the hammer is down upon the stop or face the breech-block shall be held firmly in the firing position;

but when the hammer is at half-cock the breech-block shall have a little movement, sufficiently to allow the double pawl to engage the catch *s*, but still be prevented from falling by the locking-shoulder; and in combining the locking-shoulder and hammer-rest with the double pawl in such a way as to make the hammer assist in operating the double pawl during the manipulation of the arm.

Figure 1 is a vertical section of my improved arm, showing the double pawl, trigger, retractor, swivel, and the springs in elevation. Fig. 2 is a plan of the breech-block, showing the horizontal curve of the forward end or cartridge-rest. Fig. 3 is an elevation of the forward end of the breech-block. Fig. 4 is a plan of the guard-strap, showing the swivel and part of the lower tang. Fig. 5 is a section of the swivel in different stages of construction.

*a*, receiver or frame of the arm; *b*, breech-block; *b'*, pivot and joint of the same; *b''*, ledge or shoulder which operates the retractor; *c*, barrel; *c'*, cartridge-shell in the chamber; *d*, hammer; *d'*, pivot of the same; *e* and *e'*, double pawl; *e''*, pivot of the same, joining it to *b'''*, the arm of the breech-block; *f*, trigger; *f'*, pivot of the same; *g*, upper tang; *h*, lower tang; *h'*, tang-screws; *i*, mainspring; *i'*, roller of the same; *k*, trigger-spring; *l*, pawl-spring; *m*, retractor; *m'*, pivot of the same; *m''*, arm of the same; *n*, auxiliary lever; *n'* and *n''*, pivots of the same; *n'''*, point at which the breech-block acts upon it; *o*, bevel on the forward end of the breech-block; *o'*, cut in the top of the breech-block to facilitate loading; *p*, firing-pin in two parts; *r*, full-cock notch; *r'*, half-cock notch; *s*, pin or catch for opening the chamber; *s'*, catch for closing the chamber; *t*, arm projecting forward from the trigger; *t'*, its point of action upon the pawl; *u*, locking-shoulder, to prevent displacement of the breech-block; *u'*, point on the hammer opposite to shoulder *u*; *u''* indicates the place on the double pawl upon which point *u'* rests while inserting the cartridge or hammer-rest; *u'''*, dotted lines indicating the position of point *u'* when the trigger is in the safety-notch; *v*, guard-strap; *v'*, guard; *v''*, stop to the upward movement of the breech-block; *v'''*, support of one end of the auxiliary lever; *w*, swivel; *w'*, swivel-base; *w''*, cut in upper side of guard-strap opposite swivel-base to make room for the breech-block; also serves



as stop to same;  $x$  and  $x'$ , swivels in different stages of construction;  $y$ , hinge of guard-strap;  $y'$ , fastening for the free end of the same;  $z$  and  $z'$ , dotted lines showing the curve of the cartridge-rest.

My improvements refer especially to the arm covered by my patent of the 13th of December, 1870; and for the better understanding of said arm, and the application of these improvements to it, I make special reference to said patent. These improvements are also applicable to other arms.

The operation of my improved arm is as follows: Presuming that it has just been fired, and the parts in the position represented by Fig. 1, by drawing the hammer back the pawl catches on pin  $s$ , bringing the double pawl back and the forward end of the breech-block down. The ledge or shoulder  $b''$ , coming down upon the arm of the retractor, depresses it and draws the shell partly out, when the ledge strikes the auxiliary lever at  $n'''$ , giving to the point of the retractor a very rapid movement, which throws the shell entirely out of the chamber. The hammer is then allowed to sweep forward and rest upon the double pawl, as seen at  $u''$ . By this operation the catch  $s'$  is carried back till the pawl  $e'$  falls in front of it. A fresh cartridge is now inserted, and as it is pushed into the chamber its head catches the point of the retractor, carrying it forward, and causing the breech-block to rise a little and so partly close the chamber. The hammer now makes the second sweep backward to full-cock, during which operation the catch or pin  $s'$  strikes pawl  $e'$ , carrying the double pawl forward and the breech-block to the position for firing, when the arm may be fired in the usual way. This completes the manipulation for one shot. By reference to  $z$  and  $z'$ , Figs. 1 and 2, it will be seen that instead of making the forward end of the breech-block, upon which the head of the cartridge rests, flat, I give it a curve both vertically and horizontally, so that it represents a portion of a globe, having its center in or near the axis of the breech-block, and I make the cartridge head concave, so as to fit exactly the convexity of the forward end of the breech-block or cartridge-rest. I also concave the rear end of the barrel vertically and horizontally, so as to conform perfectly to the shape of the cartridge-rest. Then, by placing the axis of the breech-block in or very near the center line of the bore of the barrel, I obtain an equal and exact rest for the cartridge-head, the same as if the cartridge-head and cartridge-rest were both flat, while at the same time the breech-block completely fills the opening made for it in the frame in whatever position it may be, whether the chamber be opened or closed, which effectually prevents sand and small bits of metal, of which the cartridge is sometimes partially composed, from dropping into the receiver and interfering with the movements of the limb-work. By curving the rear end of the barrel only vertically, but preserving both the vertical and horizontal curve of the cartridge-rest, a better outlet for escaping gas would be

provided than if the rear end of the barrel were a perfect fit to the cartridge-rest; but in that case the opening in the receiver would not be so perfectly closed by the breech-block as if the rear end of the barrel and cartridge-head formed one perfect concavity, representing a portion of the inner surface of a globe, exactly conforming to the shape of the cartridge-rest. A cartridge with a flat head may be fired with perfect safety in my improved arm; but after the discharge the head of the cartridge will be found concave. The process of concaving the head of the cartridge by the pressure of powder seems to resist, to a certain extent, the expansion of the rear end of cartridge, and thus render it less liable to stick in the chamber after firing. By rear end of the barrel I mean all that surface which is opposed to and swept over by the forward end of the breech-block, and is partly upon the barrel and partly upon the receiver. By reference to  $n$ , Fig. 1, it may be seen that I employ an auxiliary lever, in combination with the simple lever-retractor. This lever is pivoted to the retractor at  $n'$ , and to the support  $v'''$  by an oblong hole at  $n''$ . At the moment the breech-block has fallen low enough so that the cartridge may start, the ledge  $b''$  comes in contact with the end of the arm  $m''$  of the retractor and depresses it, drawing the cartridge about one-fourth of an inch, or sufficient to clear it from any tendency it may have to stick in the chamber. At this moment the ledge  $b''$  comes in contact with the auxiliary lever at  $n'''$ , giving the point of the retractor a motion sufficiently rapid to throw the shell completely out of the arm. Thus the shell is thrown out entirely by positive motion, the first part of which, being effected by the retractor alone, is slow but powerful, and is intended to free the shell from the chamber; the last part of which is rapid, but proportionably weak, and is intended to throw the shell away from the arm.

The lever  $n$  is one of the third order, having its fulcrum at  $n''$ , its power at  $n'''$ , and its weight at  $n'$ , while the retractor is a lever of the first order, having its fulcrum at  $m'$ , its power at the end of the arm  $m''$ , and its weight at its point; but when the auxiliary lever takes effect its power is moved to  $n'$ .

There are several other ways of combining the auxiliary lever with the retractor. It may be joined to the retractor at  $n'$  by a stop-joint, and serve as an arm of the retractor till its free end, coming in contact with a stop in its downward movement, it would suddenly be changed to a lever. The bearing of ledge  $b''$  is first at the end of the arm, but gradually moves as the arm descends to the point  $n'''$ , where the ledge comes upon the auxiliary lever.

It frequently happens, in consequence of fouling the arm, or of bruises in the side of the cartridge-shell, that the cartridge sticks fast before it has been pushed home in the chamber. In such cases it becomes necessary to retract the cartridge without first raising the breech-block; and to do this there must be some means of reversing the action of the hammer and pawl upon the breech-



block and retractor independent of the movement of the hammer and pawl-spring. For this purpose I extend an arm of the trigger forward, as shown at *t*, Fig. 1. When the double pawl is drawn back and resting in front of catch *s'*, as it is in the act of raising the breech-block and driving the cartridge into the chamber, the extremity of the arm will touch the pawl at *t'* and the point of the trigger will be between the notches *r* and *r'*. Now, if anything prevents the cartridge from being forced into the chamber, the action of the hammer may be reversed so as to draw the cartridge without first closing the chamber, by pressing the free end of the trigger in the guard forward, when the arm *t* will raise the double pawl from the catch *s'* and cause it to engage upon catch *s*, thereby reversing the action of the hammer and throwing out the cartridge, instead of pushing it into the chamber. That portion of the double pawl forward of the locking-shoulder *u* is about five-sixteenths of an inch in thickness, and that portion in the rear of the locking-shoulder is about one-eighth of an inch in thickness, and the arm *t* and the point of the trigger are split so as to pass up upon each side of the thin part of the double pawl without touching it; but when the double pawl is drawn back by the hammer the arm *t* acts as described upon the thick part of the pawl at *t'*.

For the purpose of obtaining free access to all the bearings of the arm, I hinge the guard-strap *v* at *y* and secure the forward end by some easily-adjustable fastening at *y'*. To this strap I attach the retractor, with its auxiliary lever, the trigger, and several springs. This affords great facility in examining and cleaning all parts of the limb-work, particularly the retractor, which in all arms is more exposed to fouling than other parts. By disengaging the guard-strap at *y'* it swings open upon hinge *y*, bringing out the retractor and completely exposing to view the cut in the side of the receiver, in which it works, so that if it becomes fouled while in use it can be instantly relieved without completely disengaging any part of the arm. The hammer and breech-block may both be attached to and supported by the guard-strap and swing out of the arm with it, and the guard-strap may be made detachable at both ends; but for purposes of examining and cleaning the arrangement shown in the drawing is sufficient.

In the construction of my arm I have found it necessary to make a deep cut at *w''* on the upper side of the guard-strap, for the reception of the forward end of the breech-block when the chamber is opened. In arms of large bore it would be necessary to cut entirely through the guard-strap to obtain the required room, or else destroy the symmetry of the arm by making it deeper at that point. To avoid this I place the swivel base *w'* on the lower side of the guard-strap, exactly opposite the cut *w''*. This restores to the guard-strap the strength that has been taken from it to provide room for the breech-block without injuring the symmetry of the arm.

Fig. 5 shows my improved swivel in different stages of construction. In making it I first drill

the swivel-base from both sides, stopping a little short of the center, as seen in Figs. 4 and 5; then cut a piece of wire of suitable length; turn a long hook on one end and a short one on the other, the short one being turned a little one side, as seen at *x*, Fig. 5. The long hook is then inserted in one side of the swivel-base and the swivel twisted so that the short hook will stand over the hole in the other side of the swivel-base, as seen at *x'*, Fig. 5. It is then taken to a press and, while the lower end of the swivel and swivel-base are held firmly in jaws, a die fitted to the upper end of the swivel is brought down upon it, forcing the end of the wire into the hole on the upper side of the swivel-base, as seen in Figs. 4 and 5. In this operation the wire slides under the die, straightening the end of it as it passes into the hole, carrying the curve of the hook nearer the center of the wire and making both sides alike. Thus I make a cheaper and better swivel than has been made by any other process.

For the purpose of unloading the arm conveniently without firing, I cut the stop-shoulder *u* and the points *u'* of the hammer at such an angle in relation to the movement of the point that when the hammer is down, resting upon its face, the breech-block will be firmly locked in position; but when the hammer is at half-cock or in the safety-notch the surfaces of the shoulder *u* and of the point *u'* will be a little apart, as indicated by dotted line *u'''*, thereby allowing the breech-block to be depressed enough to cause the pawl *e* to engage catch *s*. When it becomes necessary to unload the arm from half-cock, the forward end of the breech-block is depressed till the shoulder *u* and the point *u'* come in contact, which allows the pawl *e* to engage catch *s*. The chamber is then opened by a backward movement of the hammer.

By combining with the double pawl a locking-shoulder to secure the position of the breech-block while firing, and a rest for the hammer while loading, as indicated at *u* and *u''*, Fig. 1, the hammer is made to operate the pawl with or without the action of spring *l*. When the hammer is raised for the purpose of opening the chamber the friction of the point *u'* upon shoulder *u* draws the pawl upward and causes it to engage upon catch *s*, and when the hammer is let down upon the double pawl while loading it forces the pawl *e'* down in front of catch *s'*. Thus the hammer is made to assist in securing the positions of the double pawl during the manipulation of the arm.

Like the arm described in my said patent of December 13, 1870, the double pawl works centrally in the breech-block, hammer, and trigger, these devices being split through the center to make room for it, though it would work equally as well if placed upon the side of them. To open the receiver for the purpose of examining or cleaning the limb-work, I first remove the screw through the forward end of the guard-strap, then bring the breech-block to the loading position, pass the free end of the trigger forward in the guard, and pull the guard-strap out of the receiver by the swivel.

I do not, in this application, claim the method



herein described of constructing and attaching the swivel.

Having described my improved arm, I claim and desire to have secured to me by Letters Patent of the United States—

1. In combination with a breech-block pivoted at its rear end in a line with the bore of the barrel, whose front end falls or is drawn downward into the receiver in the act of opening the chamber and is forced upward to close the same, the globe-shaped cartridge-rest, whereby a uniform support is provided for the cartridge-head and the opening in the receiver in which the breech-block swings is kept at all times closed, substantially as specified.

2. The auxiliary lever *n*, in combination with the retractor *m* and breech-block *b*, when operating substantially as specified.

3. The combination of the trigger, with its arm *t*, with the double pawl *e* and *e'*, when operating substantially as and for the purpose specified.

4. The combination of the retractor *m* with the hinged guard-strap *v*, whereby it may be brought out of the receiver, substantially as and for the purpose set forth.

5. The arrangement of the swivel-base on the guard-strap opposite to the cut *w''*, as shown and described.

6. The combination of the breech-block *b*, pawl *e* with its stop-shoulder *u* cut at the angle described, and hammer *d* with its point *u'* and catch *s*, all operating for unloading the arm, substantially as set forth.

7. The combination of the locking-shoulder *u* and hammer-rest *u''* with the double pawl *e* and *e'*, whereby the hammer is made to assist in giving the proper movements to the pawl while manipulating the arm, as described.

W. H. ELLIOT.

Witnesses:

D. LEWIS,  
O. JEWELL.

(18)