J. MOORE.

Bullet-Machine.

No. 222,933. Patented Dec. 23, 1879.

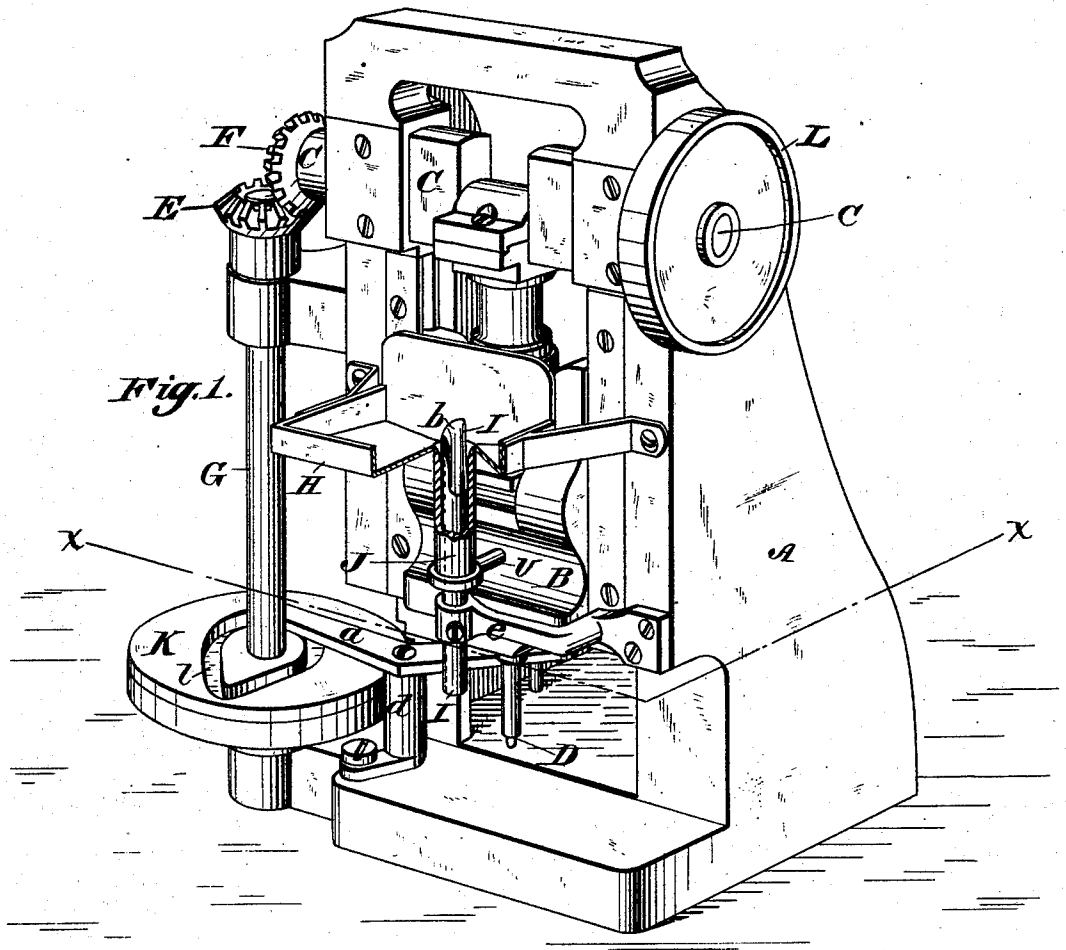


Fig. 1.

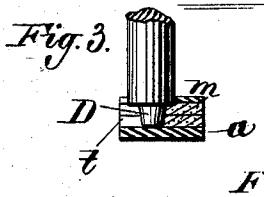


Fig. 3.

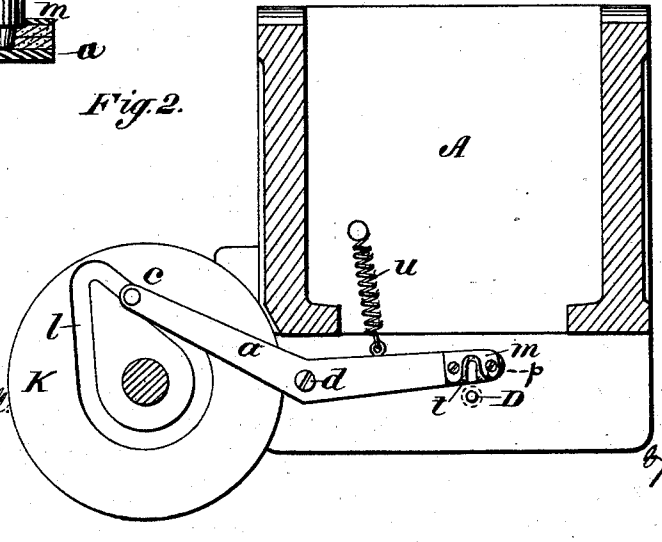


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN MOORE, OF NEW HAVEN, CONN., ASSIGNOR TO THE WINCHESTER REPEATING ARMS COMPANY, OF SAME PLACE.

IMPROVEMENT IN BULLET-MACHINES.

Specification forming part of Letters Patent No. **222,933**, dated December 23, 1879; application filed October 18, 1879.

To all whom it may concern:

Be it known that I, JOHN MOORE, of New Haven, in the county of New Haven and State of Connecticut, have invented certain Improvements in Bullet-Machines, of which the following is a specification.

My invention relates to machines for swaging bullets; and the invention consists, first, in a device or means for applying oil or an equivalent lubricant to the point or end of the swaging-punch at each stroke; and, second, in an improvement in the feeding apparatus, whereby the blanks are prevented from clogging and made to pass with uniformity to the die, all as hereinafter more fully set forth.

Figure 1 is a perspective view of a machine having my improvements applied thereto. Fig. 2 is a transverse horizontal section on the line *x x* of Fig. 1, and Fig. 3 shows the position of the wiper and punch at the time the latter is operating on the former.

In the manufacture of bullets it is customary to swage or press them into the required shape by forcing them point foremost into a hollow die by means of a punch; and it frequently happens, especially when they are made with a hollow base, that the bullet, after being compressed, adheres to the punch, and is lifted out of the die by the punch as the latter is withdrawn, and as the punch again descends it carries the adhering bullet down with it upon the top of the blank, which, in the meantime, has been fed into the die, thereby destroying both the bullet and the blank, and often stopping or injuring the machine.

The first part of my invention is designed to remedy or prevent this difficulty, and this I accomplish by slightly oiling the end of the punch at each stroke while it is raised and before it comes in contact with the blank in the die. This may be accomplished in a variety of ways; but, whatever plan is adopted, care must be taken to prevent applying an excess of oil to the punch, because if there be too much it is apt to get into the die, or between the punch and the lead in the die, and thereby render the bullet imperfect in form, which will destroy the accuracy of its flight when fired from the arm. The best means, therefore, of applying the oil is to use a wiper so arranged as to be brought in contact with the end of the punch at each stroke, and thus coat the same with a mere film of oil or similar lubricant.

In the drawings I have illustrated a simple and efficient method of applying this feature of my invention to an ordinary vertical press or swaging-machine, it, of course, being understood that the special means or method of operating the wiper may be varied as may be found necessary to apply it to the various styles of machines used.

In the drawings, A represents the frame of an ordinary vertical bullet-press or swaging-machine, the punch D being carried by a cross-head, B, to which a reciprocating movement is imparted by the crank-shaft C, driven by the pulley L, which may be connected with any suitable motor, in the usual manner.

At the side of the frame is arranged a vertical shaft, G, upon the upper end of which is a bevel-gear wheel, E, which engages with a similar wheel, F, upon the projecting end of the crank-shaft C, as shown in Fig. 1. Upon this shaft G is secured a disk, K, which has a cam-groove, *l*, cut in one side, as shown. I then provide a lever, *a*, which is pivoted at the point *d*, and which has at its outer end a stud or pin carrying a friction-roller that works in said cam-groove *l*, as shown in Figs. 1 and 2, thereby imparting a reciprocating movement in a horizontal plane to the opposite end of said lever *a*. This lever *a* is arranged in such a position, and its movement is so timed in relation to the movements of the punch D, that at the instant the punch has risen to its highest point the inner end of the lever will be brought directly under the point of the punch, and upon this inner end of the lever I secure the wiper, which consists of one or more layers of cloth, felt, or other fibrous material that will absorb a quantity of oil, and, as the end of the lever is brought under the punch, come in contact therewith, thus applying a film of oil to the end of the punch.

As represented in Fig. 2, the felt or cloth *t* is secured upon the upper face of the lever *a* by means of a notched plate, *m*, and the cloth or pad *t* has a notch or slot cut in it, at shown, so that as it is brought forward it will wipe the sides and end of that part of the punch which acts upon the blank when pressing it in the die. By this means I not only

lubricate the end of the punch, and thereby prevent the bullet from adhering to it, but I also prevent the accumulation of an excess of the oil upon the punch. Moreover, the wiping action of the pad will remove from the punch any bullet or particles which may from any cause be left adhering to it.

By making the pad or wiper of a suitable size it will absorb and retain a sufficient quantity of oil to last for a considerable time, and it can readily be replenished by the attendant from time to time, as required; or, if preferred, a small reservoir or fountain may be arranged in such a position that as the pad *t* reaches the limit of its backward stroke it will occasionally be supplied with a small quantity therefrom, though in practice I have not thus far found this necessary.

In order to remove the wiper quickly from under the punch, so as to get it out of the way of the punch in its descent, it will be observed that the cam-groove *l* has a very sharp turn at the point where it operates upon the lever at the instant that the wiper is brought in contact with the punch; and, in addition to this, I apply a spring, *u*, in such a manner as to assist in drawing back the inner end of the lever *a*.

It is obvious that the wiper may be arranged to slide in a right line instead of swinging in the arc of a circle, as shown, and that any suitable mechanical appliances may be used in lieu of the cam and lever for imparting to it the required motions, the essential requisite being that it shall be made to operate upon the point of the punch while the latter is raised from the die; and hence I do not limit myself to the particular means here shown for operating it.

The second part of my invention is an improvement upon the feeding device contained in the patent of G. R. Stetson, dated November 12, 1872, No. 133,066. In that, as in this, the blanks were fed from a hopper down through a stationary tube to the die below, and there was also an outer reciprocating tube, the upper end of which, as it rose, entered the hopper for the purpose of agitating the mass of blanks, and preventing them from lodging across or at the mouth; and it also shows the upper end of the inner tube cut at an angle, or diagonally, to prevent the blanks from catching and lodging thereon after they had entered the outer tube. In that the hopper was made deep and narrow, and the outer or agitating tube was so arranged that its upper end never rose above the bottom of the hopper, or but slightly so, if at all, the upper end of the inner tube being located some distance below the hopper-bottom. This arrangement of the tubes permits a blank to occasionally lodge directly across the opening in the hopper-bottom, so that when the outer tube rises its end, which is at right angles to the body thereof, will strike square against the blank thus lodged, and merely lift it straight up for a short distance, and as the tube recedes will again leave the blank across the mouth of the opening, unless accidentally dislodged, which is not at all certain to occur.

Now, instead of this arrangement I have devised the following: I first make the hopper H much broader and more shallow, as shown in Fig. 1, so that while it will contain a sufficient quantity of the blanks it will enable the operator to have a clear view within it, so that he can at all times watch the operation. I then so locate or arrange the inner tube, I, that its upper inclined point, *b*, shall project above the hopper-bottom, as shown in Fig. 1. I then so arrange and connect the outer tube, J, to the operating part which moves it that on its upstroke its upper end shall pass some distance above the point *b* of the tube I within the hopper, and on its downstroke shall pass below said point and stop at or near the bottom of the hopper, as shown in Fig. 1.

The result of this arrangement of the tubes I and J is, that the tube J, as it rises through the mass of blanks, thoroughly agitates them, and if a blank lies with one end in the open or cut-away side of tube I on the hopper-bottom it is tipped up by the tube J striking and raising its opposite end, thereby causing it to enter and slide down the tube; or if, when the tube J ascends, it happens to strike square against a blank in such a manner as to cause it to rest upon or across the end of the tube, and thus be lifted up by the tube J, said blank, as the tube descends, will strike upon the inclined point *b* of tube I, which will either tip the blank up endwise, so it will enter and pass down the tube I, or throw it off into the hopper.

By this improvement the feeding operation is rendered much more certain and uniform, and this, in connection with the wiping and lubricating of the end of the punch, as above described, renders the operation of the machine far more perfect, and much time is saved thereby, besides greatly reducing the chances of straining or breaking the machine.

As the die forms no part of this invention, and is not necessary for the illustration of the same, it is not shown.

Having thus fully described my invention, what I claim is—

1. The combination, in a bullet-machine or similar punching-press, of the reciprocating punch D and a pad or wiper, *p*, arranged to operate upon the end of the punch while the latter is raised from its die, substantially as and for the purpose set forth.

2. The stationary tube I, having its inclined point *b* located above the hopper-bottom, with the reciprocating tube J, arranged to have its upper end pass above the point *b* within the hopper on its upstroke and to pass below said point on its downstroke, substantially as described.

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