3 Sheets--Sheet 1.

J. V. MEIGS.

Machine for Making and for Heading Cartridge Cases.

No. 167,005. Patented Aug. 24, 1875.

FIG. 1.

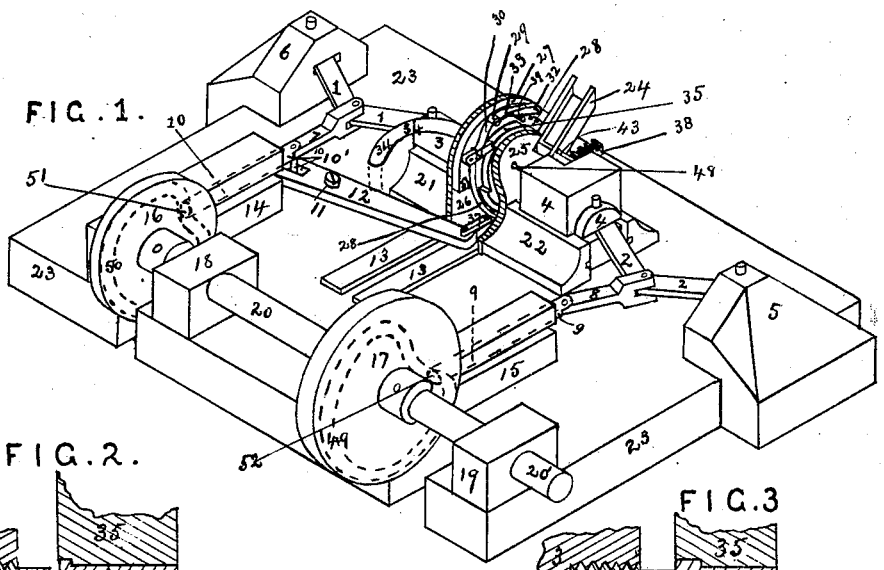


FIG. 2.

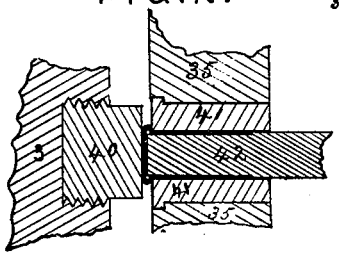
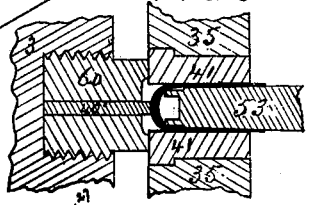


FIG. 3



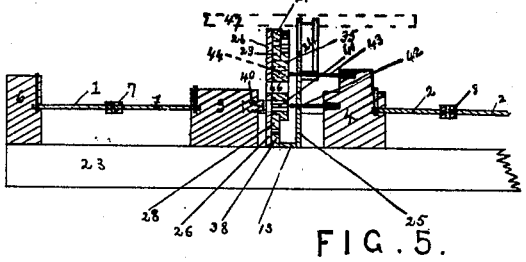


FIG. 5.

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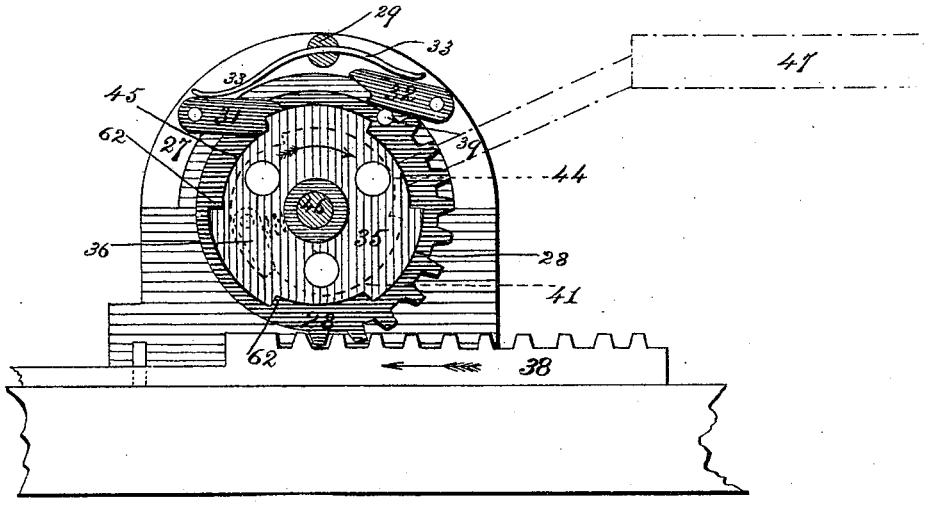
Fig: 4.



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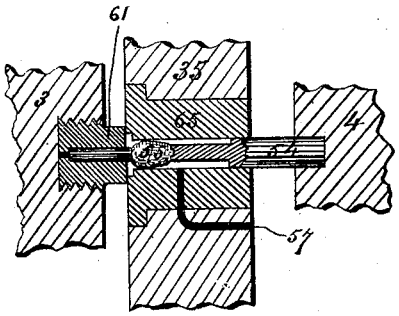

Fig: 6.

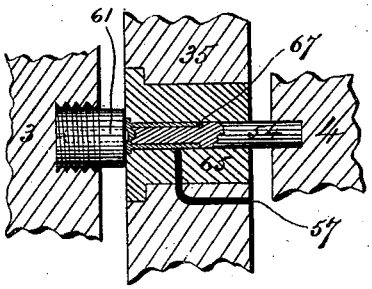

Fig: 7.

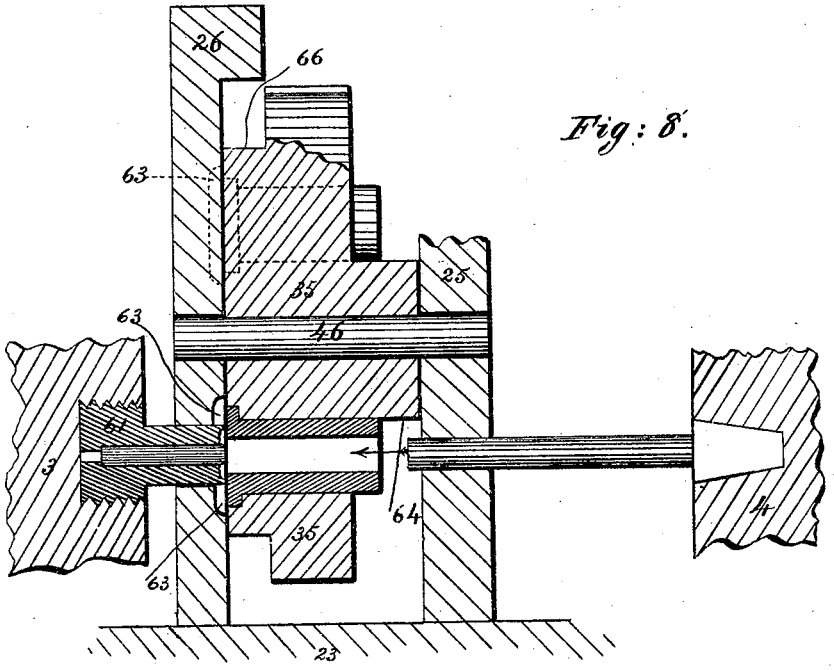

Fig: 8.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOE V. MEIGS, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR MAKING AND FOR HEADING CARTRIDGE-CASES.

Specification forming part of Letters Patent No. **167,005**, dated August 24, 1875; application filed December 8, 1874.

CASE A.

To all whom it may concern:

Be it known that I, JOE V. MEIGS, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Heading Cartridge-Cases and for Making Cartridge-Cases, of which the following is a specification:

My invention relates to making complete cartridge-cases from pieces of metal and to heading cartridge-cups or partially-completed cases by machinery by which the cartridge-cups or pieces of metal are fed to a point in line with a die, into which they are inserted, one at a time, headed or formed therein, and discharged therefrom, these steps being accomplished successively by a continuous connected operation of the mechanism.

The improvements claimed will hereinafter be set forth.

In the accompanying drawings, which show one way of carrying out my improvements, Figure 1 is a view, in perspective, of my machine; Fig. 2, a sectional view of a sliding head, its punch, a die-plate, and hollow die in the position they occupy when heading an ordinary rim-fire shell; Fig. 3, a view similar to Fig. 2, with the parts adapted to making a solid-head center-fire cartridge-shell; Fig. 4, an elevation of the die-plate and the devices for intermittently and partially revolving it; Fig. 5, a section through the machine on the line of the toggle-joints; Fig. 6, a view similar to Fig. 3, with the parts adapted to form a complete shell from a piece of metal; Fig. 7, a similar view, with the parts in the position assumed when the operation of forming the shell has been completed; Fig. 8, a cross-section of the die-plate with its supporting-pieces, with the devices for operating the die-plate omitted.

In the arrangement of parts shown a bed-plate, 23, carries upon it suitable boxes, 18 and 19, in which a shaft, 20, revolves, the motion to which is imparted in any of the ordinary ways, such as by crank, gears, or belts applied at 20′, or at any suitable point. Keyed to the shaft are cams 16 and 17, for operating toggle-joints or levers 1 and 2, in this instance by means of jointed pitmen 7 10 and 8 9, the wrists 51 and 52 of the pitmen working in the slots 50 and 49 of the cams. These toggle-joints 1 and 2 are, respectively, pin-jointed or pivoted at their outer ends in stationary boxes 5 and 6, and their inner ends are connected with reciprocating or sliding heads 3 and 4, guided by ways 21 and 22 as they are reciprocated by the bending and straightening of the toggles. On the inner face of the reciprocating or sliding head 3 is arranged an adjustable resisting-die, as at 40, Figs. 2 and 5, at 60, as in Fig. 3, and at 61, as in Figs. 6, 7, and 8. Stationary supporting-pieces 25 and 26 project from the bed-plate 23. Between these supports a die-plate, 35, is pivoted upon an axle, 46, supported in the pieces. The die-plate is revolved by a sleeve-gear, 28, Figs. 4 and 5, into which a reciprocating rack, 38, moving in a suitable guideway meshes. This rack is given its reciprocating motion in this instance by a lever, 12, linked to the rack at 37, Fig. 1, and rocked upon its fulcrum 11 (which may be adjustable) by means of the pitman 10 acting through a pin, 10′, upon the slotted end of the lever.

Fig. 8 shows the construction of the plate 35, one side of which is turned down, so as to form a shoulder, 66, around which the gear 28, Figs. 1, 4, and 5, plays. Upon the outer periphery 62 of the die-plate a ratchet is formed. (Shown in Fig. 4.) Upon the supporting-piece 26 is a projecting shoulder, 27, to which are attached two pawls, 31 and 32, (see Fig. 4,) which are pressed upon the periphery of the die-plate in this instance by springs 30 and 33, attached to the supporting-piece at 29. Upon the die-plate within the gear-sleeve 28 is a pawl, 36. (Shown in dotted lines in Fig. 4.) On the inner surface of the gear 28 (see dotted lines, Fig. 4) are cut ratchets, equal in number to the dies used, into which the pawl 36 takes when the rack has been thrown to the limit of its outward motion, the rack thus partially revolving the sleeve-gear 28, and at the same time causing a pin, 39, projecting from the face of the gear to come in contact with the pawl 32, and disengage it from the die-plate. During the motion of the rack producing this action of the parts the pawl 31 prevents the die-plate from revolving accidentally by friction or otherwise with the gear. When the reverse motion of the rack takes place in

the direction of the arrow, Fig. 4, the pawl 32 having been raised, the internal pawl 36 in the die-plate having engaged the gear, said pawl moves with the gear, carrying the die-plate as the rack moves. The pin 39 being a part of the gear 28, and moving with it, retreats after having released the pawl 32, and the latter then descends upon the periphery of the die-plate, ready to catch into the first ratchet presented to it, preventing the die-plate from turning too far from the impetus it may have attained. Thus a very great speed can be attained with absolute accuracy of the movement of the die-plate. In this instance I have shown the die-plate provided with three dies, which successively receive the shell to be headed, or the lump of metal to be made into a cartridge-case, carry it to the point to be operated upon and to the point of discharge, as will presently be explained.

The reciprocating head 4 carries three punches, two of which are shown at 42 and 43, Fig. 5, and the other at 48, Fig. 1. The punches are so arranged in relation to the dies in the die-plate that when the latter is stationary the punches are always in line with the dies. A trough, 24, or feed-channel is attached to the support 25, so that the blanks fed through it are presented in line with the punch, which performs the office of inserting them one at a time into the die opposite the punch.

When both toggles are bent, as in Fig. 1, the punches have just been withdrawn from the dies. In the next movement the toggle 1 commences to straighten. At the same time the rack 38 partially revolves the die-plate, bringing the dies in line with the punches, and by the straightening of the toggle 1 the sliding head 3, carrying a solid resisting-die, as shown at 40, Fig. 5, is brought against the hollow die 41 in the die-plate containing the shell, forcing the dies firmly together, and retaining them so while the punches are advanced by the straightening of toggle 2, one of the punches in its passage through the feed-trough inserting a case in the hollow die in line with it. The punch in line with the hollow die against which the solid or resisting die has been brought, is at the same time advanced (all the punches being fixed in the same head) in the first part of its motion rapidly, and then gradually, by means of the cam-groove 49 in the cam 17, and forces the lump of metal or the metal of the thick-headed shell (which had, by a previous motion, been inserted in the die) to flow into the sinuosities of the dies and punch, shaped in the form of the outside and inside of the cartridge-case, filling the space between them. The toggles next are simultaneously bent, (at the same time the rack advances,) withdrawing the punches and resisting-die, the rack moving the gear into the position to take up the die-plate without moving the die-plate (owing to the pawls and clutch mechanism heretofore described) preparatory to partially revolving it. The toggle 1 now closes, and at the same time the rack 38 is withdrawn, partially revolving the die-plate, so as to bring the die containing the shell just headed opposite and in line with the ejecting-punch 48, Fig. 1. The toggle 2 now closes, pushing the shell just formed from the hollow die into a tube, 34, or other conveyance, to a suitable receptacle. At the same time the inserting-punch 43, Fig. 5, passing through the trough, inserts a new lump or blank case in the hollow die, which had previously been brought opposite the inserting-punch, the heading and ejecting being simultaneously carried on as each of the hollow dies becomes in turn the receiving-die, the flowing or heading die, and the die from which the case is ejected, by the successive partial revolutions of the movable die-plate. These operations are thus repeated indefinitely by the continuous revolution of the driving-shaft, which may have stop-motions suitable for this class of machine for arresting the operation of the machine at any desired moment.

In Fig. 3 I have shown the arrangement of the dies in making a solid-headed shell from a blank-case, in the position of the parts just before the advance of the punch which performs the operation. In this figure 60 is the solid die, which is provided with a renewable center-pin, 40′, which, together with the indentation in its face, shapes the face of the head of the shell. When, as in this figure, the face of the head is made in the resisting-die, the supporting-piece against which the die-plate revolves is cut away, so as to permit of the passage of the head, as in Fig. 8, at 63. This figure also shows a shoulder, 64, which surrounds the axle of the die-plate, and abuts against the piece 25. Thus the die-plate at this place fills the space between its supporting-pieces.

Obviously the entire die-plate may be thickened so as to fill the space between its supports, thus giving greater strength and solidity. When the toggle connected with the sliding head 3 is straightened it brings the solid or resisting die, as shown in this figure, against the face of the hollow die in the die-plate, which, being shouldered, cannot be displaced. The die-plate, by means of its hub 64, fills the space between its supporting-pieces, so that when the heading or flowing punch advances into the dies there cannot be any separation of them. Thus the dies are securely held together during the great pressure required to head the shell.

It will thus be seen that, as the die-plate is firmly held between its supports against lateral pressure, or pressure lengthwise of the dies, and the resisting-die is firmly held by its toggle-levers against the die-plates, the two are firmly locked or fastened together at the moment of heading the shell, so as, in effect, to constitute but one die into which the heading or flowing punch advances.

When I desire to form shells from pieces or lumps of metal, the pieces of metal are fed into

line with the inserting-punch in the same arrangement of dies before described, or varied to suit shells of any desired shape. When, by a partial revolution of the die-plate, the hollow die, containing a piece of metal, is brought in line with the heading or forming punch, such as already described, the punch is driven into the die, forcing or flowing the metal into the cavities between the punch and the locked dies, thus forming the complete shell at one operation, which is expelled as described.

Fig. 6 shows the position of the shouldered flowing and heading punch 54 and dies 65 and 61, the former containing a lump of metal, 55, just before the operation of flowing the shell by the closing of the toggle-joint 2, Fig. 1.

In Fig. 7 the same parts are shown in the position they would occupy when the shell is completed, the shoulder 67 limiting the length of the shell.

In case there should be surplus metal, its escape is provided for by one or more openings, 57, leading from the die, this surplus metal being cut off when the shell is ejected from the die.

It is obvious that my machine can be used for making the ordinary rim-fire cartridge-case, but slight changes being necessary in the construction of the machine, so that, as in Fig. 2, the punch 42, against which the shell is headed, shall be stationary at the moment of the operation of heading by bringing up the heading-die 40.

It is obvious that the die-plate could be allowed a longitudinal motion on its axis, by the interposition of a spring between it and the support 26, so as to force the die-plate against the support 25, from which it is moved at the moment of heading by a shouldered punch, the shoulder of which would bear against the face of the die-plate, and the end of its shouldered portion force the thin shell, which had previously been inserted, against a solid die, thus heading it against the end of the punch.

Instead of cams, other equivalent means for operating the toggle-joints might be substituted; and the machine might be arranged vertically instead of horizontally, as shown, to economize space.

It is obvious from the foregoing description that my improved machine can readily be adapted to the manufacture of either thick headed or thin cases, the latter being either center or rim fire, and the former necessarily center fire.

In making thick-headed cases the resisting-die is stationary, while the heading or flowing punch forms the head or makes the case, while in heading thin cases the punch may be stationary, while the resisting-die moves up against the punch to do the work, the latter being the common well-known way of accomplishing this result, by mechanism differing, however, from mine in construction and mode of operation; but, so far as I am aware, I am the first to form a solid-headed case by means of a punch, which is the active agent in forming the head. I also believe myself to be the first to head a case by the action of a punch in a sectional die, the parts of which are automatically locked or closed during the heading of the case, the parts subsequently being separated simply to permit of the removal of the case.

In a machine for heading or forming cartridge-cases, I claim—

1. The combination, substantially as hereinbefore set forth, of a die-plate, a hollow die mounted therein, in which die the blank cases or lumps of metal are headed or formed, a punch acting within the hollow die to head or make the case, and a resisting die, which is held or locked in contact with the hollow die during the operation of the punch in heading or forming the case, for the purposes specified.

2. The combination, substantially as hereinbefore set forth, of a die-plate, a hollow die mounted therein, a reciprocating die, a punch reciprocating in the hollow die, and mechanism, substantially such as described, for holding the hollow and reciprocating dies together during the action of the punch in heading or forming the case, whereby both dies are held or locked together while the punch is acting, for the purposes specified.

3. The combination, substantially as hereinbefore set forth, of a bed-plate, supports thereon, an intermittently-revolving die-plate mounted between the supports, hollow dies carried by the die-plate, a resisting-die, and a reciprocating punch acting in succession in the hollow dies as they come into line with the resisting-die, for the purposes specified.

4. The combination, substantially as hereinbefore set forth, of an intermittently-revolving die-plate, hollow dies mounted therein, a resisting-die, and a reciprocating head carrying a series of punches, each acting simultaneously in its corresponding hollow die, whereby the blank-cases or lumps of metal are inserted, formed, and ejected by a continuous operation, each punch acting simultaneously on its respective blank or case, and successively upon each.

5. The combination of a reciprocating rack, the gear-sleeve, its internal ratchets, the die-plate, its internal pawl, the ratchets on the periphery of the die-plate, and pawls on the die-plate support, substantially as set forth.

6. The combination of a bed-plate, a driving-shaft, cams, jointed pitmen, the toggle-joints, a sliding punch-head, a resisting-head, a die-plate, its rack, gear, and lever, substantially as and for the purposes set forth.

In testimony whereof I have hereunto subscribed my name.

JOE V. MEIGS.

Witnesses:

JOSEPH I. PEYTON,

B. H. MORSE.