D. McFarland,

Card-Setting Machine,

No. 66,098, Patented June 25, 1867

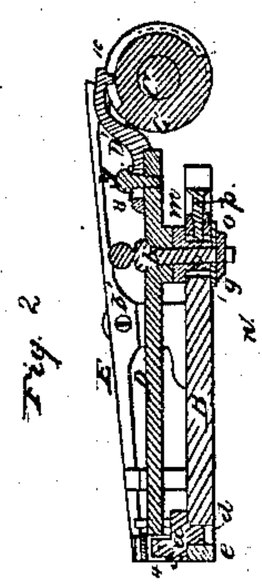
Fig. 2

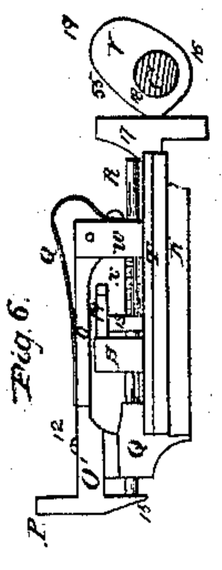
Fig. 6.

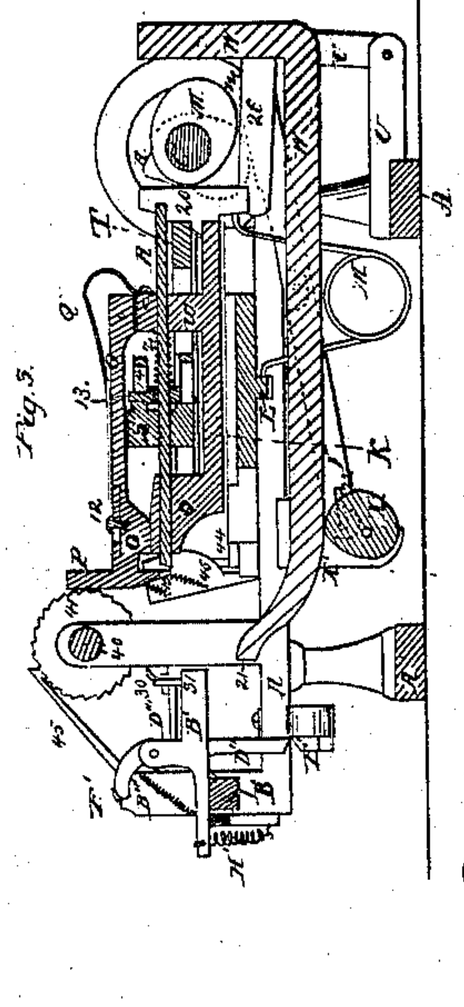
Fig. 3.

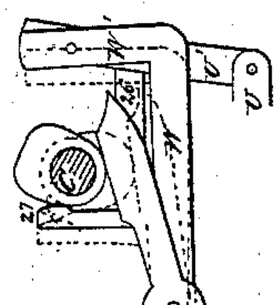
Fig. 7.

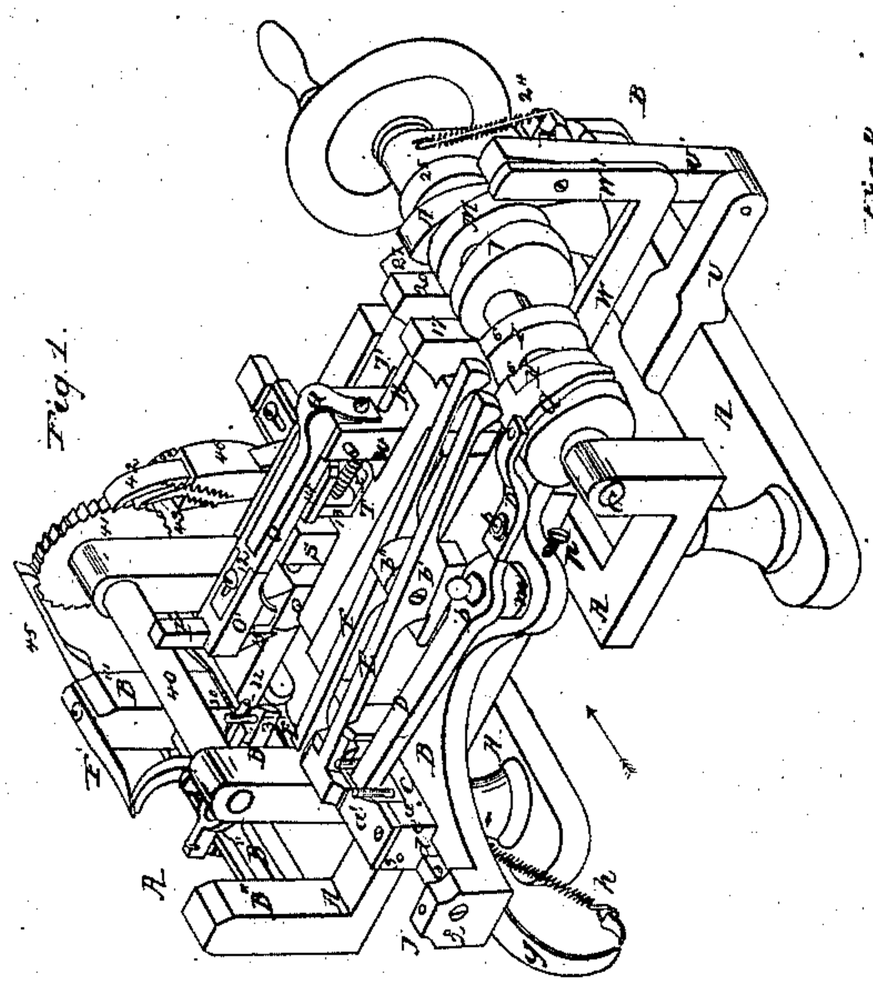
Fig. 1.

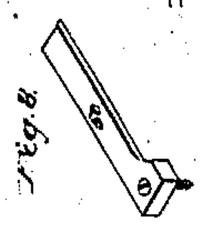
Fig. 8.

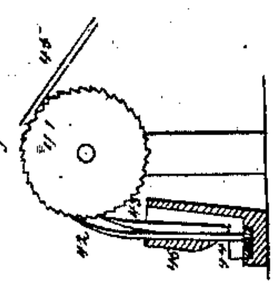
Fig. 5

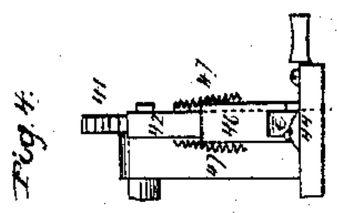
Fig. 4.

Witnesses

Thos. H. Dodge

C. Tillson

Inventor

David McFarland

United States Patent Office.

DAVID McFARLAND, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 66,098, *dated June* 25, 1867.

IMPROVEMENT IN MACHINES FOR SETTING CARD-TEETH.

The Schedule referred to in these Letters Patent and making part of the same.

KNOW ALL MEN BY THESE PRESENTS:

That I, DAVID McFARLAND, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machines for Setting Card-Teeth; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents an isometrical perspective view of so much of a card-setting machine as is necessary to illustrate my improvements.

Figure 2 represents a longitudinal central section through feed-bar D, some of the parts connected with it also being shown in section.

Figure 3 represents a longitudinal central section on line A B, fig. 1, looking in the direction indicated by the arrow, same figure.

Figures 4, 5, 6, and 7 represent sections of detached parts to be hereafter referred to.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it in detail.

My present improvements relate, first, to an improved mode of feeding the wire to form the teeth; second, to an improvement in the construction of a part of the mechanism by which the wire is held and receives its first bind; third, to an improved mode of operating the perforating bar; fourth, to an improved mode of feeding the leather; fifth, to an improved device whereby the stopping of the machine is more perfect when a tooth is missed or other derangements occur.

In the drawings, the part marked A represents the main frame of the machine, upon which the table or platform B is fastened. The main cam-shaft C is supported in suitable bearings at the rear end of the machine as indicated in the drawings. The feeding device proper consists of levers D E F and the clamp *a*. Levers D E F are fulcrumed at the points *b b'* and *b''* respectively, and receive their motion from the cams G H I respectively. Lever D moves the clamp *a* back and forth as it is vibrated by its cam G, the front end of lever D being arranged to work between the pins 1 1, which are placed on the lower part of the clamp *a*. Clamp *a* is composed of two principal parts, viz, the base or lower part *c*, and the upper or spring part *a'*. The base part *c* is made to rest on the table piece B, which is grooved or slotted out, as seen at *d*, to receive the tongue part *e*, which projects from the lower part of the base *c*, (see figs. 1 and 2.) A stop-block, J, is arranged upon the table B, and through which passes an adjusting-screw, *f*, against which the base *c* of clamp *a* strikes when in operation. A curved strap-spring, *g*, is fastened to the under side of the stop-block J, and to the lower end of which is fastened or connected one end of a coiled or spiral spring, *h*, the other end of which spring *h* is fastened to the tongue *e*, so that the combined action of both springs is to draw the clamp *a* back against the end of the adjusting-screw *f*. By the use of the bow or strap-spring *g*, the spiral spring *h* can be set at an angle to the line of motion of the clamp *a*, and consequently it works much better. Again, by the use of the bow or plate-spring *g* the spiral spring is not as liable to set as it would be if used separately.

The operation of feeding the wire from the coil in equal and exact length, to form the card-teeth, by the mechanism above described, is as follows: The end of the wire is passed through hole 2 in stop-block J, and thence through hole 3 in the base of clamp *a*, and along under a projection, 4, on the end of spring *a'*, and under and between the front end of lever F and a stationary block on table B. Motion now being imparted to the cam-shaft C, the point 5 of cam I raises the rear end of lever F, which forces down the front end of lever F upon the end of the wire, which rests upon the stationary block or stand directly under the front end of lever F. After the wire has been clasped by the front end of lever F the rear end of lever E falls into the depression 6 in cam H, which allows its front end to rise and free the spring part *a'* of clamp *a* from the wire, while the projection 7 on the grooved cam G throws the rear end of lever D in, and the front end out, which carries with it the clamp *a*, until the latter strikes the end of the adjustable screw *f*, which is set so as to prevent all back play of the clamp, but not far enough to cause any strain upon lever D. Just before the motion of lever D is reversed again the front end of lever E is forced down upon the spring part *a'* of clamp *a*, thereby holding the wire securely in clamp *a*, which moves the wire with it as it moves to the position shown in fig. 1. In the mean time the front end of lever F is raised to release the wire until it has been fed forward by clamp *a* and levers D

and E, as above described. The functions of levers D, E, and F, and clamp *a*, it will be seen, are therefore as follows: Lever D moves clamp *a*, which, when acted upon by lever E, clasps, holds, and moves the wire with it when being moved in, but leaves the wire free when moving out, lever F holding the wire in place while clamp *a* is being returned or moved out to take a new hold of the wire. In some cases when only a moderate speed is desired, and therefore a positive feed not so essential, a simple face-cam can be used in lieu of the grooved cam G, the combined action of the springs *g* and *h* being sufficient to withdraw the clamp *a* and lever D, but when speed is desired it is advisable to use the grooved cam G to give a positive motion to lever D, and allow the springs *g* and *h* to simply take up any play or looseness of the parts.

It is important in a card-setting machine to have some simple and effective means for adjusting the machine to set the teeth of different lengths, and in my machine I have two different modes of accomplishing it, viz: Lever D is fulcrumed upon pin *b*, which is screwed into a thimble or collar-piece, *m*, the small or lower part *n* of which passes through an oblong hole in the table B, the lower end resting upon the washer or cap-piece *o* upon the under side of the table B. A set-screw, *p*, is passed through table B into the oblong hole, as shown in fig. 2, and by means of which the collar *m* and fulcrum *b* of lever D can be moved forward, thus making the front or long arm of lever D (that is the length or distance between the fulcrum *b* and the pins 1 1 upon clamp *a*) shorter or longer, as the case may be, while the rear end can also be shortened or lengthened by loosening screw *y* and sliding the rear part D′ forward or back as desired, the front end of the part D′ having a slot, 8, for the purpose as fully indicated and shown in fig. 2. When the collar *m* and fulcrum-pin or bolt *b* are once properly adjusted they are retained securely in place by means of a wedge, 9, passed through the lower end of the pin or bolt *b*; a nut may be used in lieu of the key 9. Screw *p* may be made so and combined with collar *m*, that the latter can be drawn back as well as forced forward by the screw. One way in which this can be effected is by swivelling the front of screw *p* in the collar-piece *m*. It will thus be seen that the throw of lever D can be very accurately adjusted to give any desired length of tooth, and that, too, while pin 10, which works in cam G, is kept in such a position as to be over the centre of shaft C, when lever D is at right angles to said shaft, so that there is no danger of binding or straining of the parts if properly adjusted, even though the machine be run at great speed. Instead of making lever D in two parts it can be made in one piece, and pin 10 fitted in a slot in the lever and provided with a nut, so that it can be adjusted forward or back. From the feeding device the wire is received, after being cut, by the mechanism by which it is bent into staples and inserted into the leather. So much of this device as is necessary to illustrate my present improvements thereon is shown in the drawings, which will now be described.

The part marked K is the doubler-plate, which is arranged upon suitable guides supported upon bed-piece L, so that it is free to slide back and forth when acted upon by cam M and spring M′, the former throwing it forward and the latter drawing it back. From the rear end of the doubler-plate rises a stand, *w*, to the top of which is hinged the rear end of the doubler-bar O, the front end of which is slotted to receive the screw-bolt 12, by which it is fastened in a recess in the doubler-box O′, which projects back from the doubler P. The lower side of the doubler-box O′ rests, when down, upon the front projection Q, upon the doubler-plate K. Doubler-bar O is held down by spring Q′. The crowner-bar R is supported in loose bearings in the stands or projections *w* and Q on the doubler-plate K. It is also encircled by a coiled or spiral spring *x*, the rear end of which spring bears against the projection *w*, while the front of the spring presses against a stud or stop-pin 13, fast on the crowner-bar R. The top of pin or stud 13 is turned to fit a slot in the projection 14 in the stand S on the wing-plate T, which is fitted to slide on top of the doubler-plate K, side guides supported from the bed L keeping it in proper position while it is forced forward by the wing-cam V on shaft C, and drawn back by a spring similar to the spring M′ which withdraws the doubler-plate K, (see fig. 3.) The point 15 of the doubler P is slotted out to receive the tenon on the end of the crowner-bar as indicated in the drawings. The point of the crowner-bar has a horizontal slit or notch cut in it, as shown in fig. 3. This slit or notch is for the purpose of holding the wire while it is being doubled or bent into a loop by benders or wings, which are fastened to the wing-plate T in the usual manner. They are not shown in the drawings. As the wire is fed forward it passes between the end of the crowner-bar and the point 15 of the doubler, when the narrowest part 16 of the wing cam V is against the cam-block 17, and as soon as the wire has ceased to move forward the projection 18 on cam V strikes the cam-block 17 and drives forward the wing-plate T a sufficient distance to allow the crowner-bar R to be moved forward by the action of spring *x* upon its stud 13 until the slotted points of the bar close upon and straddle the wire, which they press against the rear of the point of the doubler. In fig. 6 the relative positions of the crowner-bar, cam V, and wing-plate T above described are more fully shown. After the point 18 on cam V has passed the cam-block 17, and thus thrown the wing-plate forward sufficiently to allow the slotted end of the crowner-bar to press the wire against the point of the doubler P, the wing-plate remains at rest while the part 55 of the cam V is passing the cam-block 17, which rest to the wing-plate allows the cutting apparatus (not shown in the drawings) time to cut off a piece of wire long enough to form a tooth, and which piece of wire is held by its centre between the end of the crowner-bar R and the point of the doubler P, (the ends of the wire projecting at equal distances on each side of the doubler P,) until a part of the enlarged part 19 of cam V, acting upon the cam-block 17, forces the wing-plate T with its wings or benders forward, the wings striking the wire on each side of the point of the doubler P, and bending the ends of the wire around the latter in the form of a loop or staple. As soon as the wire is bent into the form of a loop or staple, as above described, cam M strikes the cam-block 20 connected with the doubler-plate K, when both the plates K and T are moved forward together by their cams V and M, carrying with them the doubler-bar, doubler, crowner-bar, and the loop or staple of wire, which is forced into the leather to receive the second bend. As soon as the ends of the staples of wire have been properly forced into the leather the crowner-bar is drawn back and the doubler is

raised by suitable and well-known mechanism, (not shown in the drawings,) and the parts move back to their first positions, and the operation is repeated.

It is often desirable to vary the second bend or hook in the teeth. Heretofore this has generally been effected by adjusting the bearings which supported the arbor or pivot of the doubler-bar. In lieu of this expensive and complicated arrangement, I make the doubler and doubler-bar separately, and hinge the doubler-bar to the standard *w*, and provide the front end with a slot, so that the doubler can be set forward or back by simply loosening screw 12. When the doubler is moved forward the second bend is nearer the back of the tooth, while if it is moved back the bend is nearer the points of the teeth. As the doubler-box O′ is made with a slot or recess just wide enough to receive the end of the doubler-bar, the connection is very secure and firm, while the adjustment can be easily made. From the rear of the machine projects a stand, U, to which is hinged the upright piece U′, to the top of which is hinged the bent or upright arm W′ of the perforating lever W, the front end of which is provided with the needles 21 by which the holes in the leather are made. The front end of the perforating lever W rests upon a cam, X, which is pivoted to arm X′ fastened to the under side of the main frame. From the side of cam X projects a pin, 22, which enters the slot 23 in the lever Y fulcrumed to a projection on the under side of the main frame, as fully shown in dotted lines, fig. 3. The rear end of lever Y extends back under cam 25 on shaft C, and is connected to one of the shafts bearing posts, by a spiral spring, 24, which keeps the rear end of the lever Y up close against the cam 25. To the right-hand side of the stand U is rigidly fastened the piece 26, which extends under shaft C, and is provided with an upright cam-block, 27, which is acted upon by cam A′ on shaft C. The perforating-bar or "pricker," as it is sometimes called, requires two motions, that is, it must be raised and lowered, and also have a back and forth motion. It must be raised to bring the points 21 into the proper position or elevation, and then forced forward in a horizontal position to perforate the leather, or make the holes into which the prongs of the loop are to be forced by the mechanism above described, before the second bend is given. The perforating-bar must also be withdrawn and lowered, however, before the blank tooth or staple is carried forward. This compound motion of bar W has heretofore been generally obtained by means of inclined surfaces, that is, the under side of the bar has been made with an inclined plane or in wedge form, which came in contact with a similar stationary piece, the inclines being sufficiently long to elevate the end of the bar to the proper height before it commences to perforate the leather. There are many serious objections to this mode of operating the perforating-bar. In the first place the rapid motion of the bar causes the latter to strike the stationary incline with a sudden force, which occasions much friction and imparts a tremulous motion, not only to the bar itself, but to some of the other working parts of the machine, and thus tends greatly to render the working of the machine irregular and imperfect, all of which objections are obviated by my improvements. The bar is raised in my machine by the partial revolution of the cam X, which is produced at the proper time by cam 25 depressing the rear end of lever Y, which causes the front end of said lever to rise, carrying with it pin 22 which plays in its slotted end, and consequently causes cam X to revolve and elevate the perforating-bar to the proper height, when cam A′ strikes against the cam projection 27 on the front of arm 26, and forces that forward together with arm U′ and the perforating-bar W, as indicated in red lines, fig. 7, in which figure the cam X and lever Y are represented on the front side of bar W in order to show the operation more fully, and they can be arranged to work on the front side, as shown in fig. 7, as well as upon the back side, as shown in fig. 3.

It will thus be seen that I obtain the up-and-down and back-and-forth motions of bar W in a very simple and yet effective manner. The perforating-bar W may be held down to cam X by a spiral or other spring. When the ends of the loop or staple are inserted in the leather they pass over a rest and into metal eyes 30, by which they receive the second bend. These eyes are formed in fingers 31 which are attached to lever-arms B′ fastened to the cross-piece or rocker B″, which is journalled to turn in the stands B‴ B‴. Only one lever-arm B′, finger, and eye are shown in the drawings. At the proper time and by well-known mechanism the rocker or piece B″ is caused to turn so as to depress the lever-arms B′, and their fingers 31 sufficiently to give the second bend to the teeth, after which the teeth slip from the eyes. The leather is fed forward, and the parts return again to the proper position and the operation is repeated. For the purpose of stopping the machine when a tooth has been missed, or when one has been improperly bent or inserted, stop-lever D″ is pivoted to a projection on lever-arm B′, and is provided with an arm, D‴, which carries on its extreme front end a bent feeler, 32, which strikes against the under side of the teeth, if they have been properly inserted when the lever arm B′ is depressed, but if a tooth has been missed the feeler rises so high that the lower end of stop-lever D″ strikes upon the hinged arm E′ and depresses it, thereby throwing off a spring-shipper which stops the machine. The springs that regulate the throw of the feelers and their arms have to be very delicate to prevent the feelers from bending the ends of the teeth. When, however, the machine is in operation, it is found that the feeler is liable to tremble so much that in some cases it stops the machine when a tooth has not been missed, and in other cases fails to stop it when a tooth has been missed. To obviate these objections I arrange a stop-guard, F′, against which the curved end of stop-lever D″ strikes, when the feeler rises to the proper elevation to indicate whether a tooth has been properly inserted or not, the effect upon the feeler and its arm being to stop their vibrations and thus render their action more certain, while at the same time allowing of the use of a very delicate spring to govern the action of the feeler upon the teeth. Arm B′ is drawn back by a coiled spring, H′, and is forced down to give the second bend at the proper time by the well-known and ordinary mechanism, but which is not shown in the drawings. After each row of teeth has been set the leather-carriage must be moved sufficiently to bring the leather into proper position to receive the next row of teeth. This is accomplished by means of shaft 40, ratchet-wheel 41, dogs 42 and 43, and the double inclined grooved cam 44. At the completion of each row of teeth the double inclined cam 44 is moved to the right or left, as the case may be, sufficiently far to raise each dog alternately, so that its lower point will slip into the groove *c′* in the top of the cam 44.

By allowing the points of the dogs to slip into the notch or groove *e'* the ratchet-wheel is allowed to rest upon the stationary dog 45. The arrangement insures an easy and perfect feed, and that, too, with a short throw of the cam 44, which is very desirable, since it is not convenient to communicate the motion to the cam, as the machines are usually made, if the horizontal throw of the cam is required to be much over a quarter of an inch, and hence with a single dog the sides of the cam have to be inclined very much, thus making its action abrupt and hard; all of which difficulties are obviated by my improvements, since, by the use of two dogs, arranged to operate in combination with the double inclined cam 44, as described, the motions of the dogs are nearly if not quite forty per cent. slower than the motion of the single-feed dog heretofore used, while the inclination of the cam can be less by one-half than by the common plan. The dogs 42 and 43 are supported in a case or box 46, and are held down to the cam 44 by spiral springs 47.

In the drawings the point of the perforating-bar, the eye for making the second bend, and the doubler, are not shown in that proximity to each other which they occupy in the machine when arranged for use. They are shown separated somewhat in the drawings for the purpose of illustrating the particular parts of the machine to which my improvements relate more clearly, and only so much of the entire card-setting machine has been shown as was necessary to illustrate my improvements. As it regards the feed-bar D, much time and money have been devoted to devising and trying to produce the important results attained by my improvements in reference thereto. In the old machine the bar was hung on a swivel or universal joint, and was made to turn sufficient to clamp the wire. This arrangement is found very expensive in the first instance, and, besides, is constantly liable to get out of order. To remedy the defects in this a plan was devised of using a bent or right-angled lever, which was attached to an upright journal arranged to operate at the rear end of the main frame, but this, too, has proved quite as objectionable as the plan which it was designed to supersede. If preferred in any case the auxiliary spring 50, fig. 8, may be fastened to the top of stop-block J, so as to project in over the clamp *a* to bear down upon spring *a'*, to cause the latter to clasp and hold the wire while it is begin fed forward; lever E operating upon the top of spring 50 instead of directly upon spring *a'*, as before described.

Having described my improved card-setting machine, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination with the clamp which feeds the wire of the following mechanisms, viz, the lever D, whether adjustable or not, arranged to operate between the clamp and the operating cam, so as to give the clamp its lateral motion, and a separate and independent clamping-lever or device for actuating the clamp to hold and feed the wire, substantially as set forth.

2. The combination of the feed-lever D, spring clamping-lever E, and wire-holding lever F with the clamp *a*, substantially as set forth.

3. The combination, with lever D, of the fulcrum-pin or stud *b*, collar *m*, and adjusting-screw *p*, or equivalent means for making the collar adjustable, substantially as and for the purposes set forth.

4. In a machine, such as described, I claim the construction and arrangement of the lever for producing the feed, substantially as described.

5. The combination of the doubler-plate K and crowner-bar R with the doubler P and doubler-bar O, made adjustable as and for the purposes set forth.

6. The combination, with the wing-plate T, crowner-bar R, and cam-block 17, of the compound or three-functioned cam V, all constructed and operating in relation to one another and to the doubler-plate K, substantially as and for the purposes set forth.

7. The combination, with the clamp *a*, of the bow or plate-spring *g* and spiral spring *h*, arranged for joint operation, substantially as and for the purposes set forth.

8. The combination with the perforating bar of the mechanism for operating the same, arranged as herein described, so that the said bar may be elevated before its forward motion is imparted, for the purposes stated.

9. The combination, with the upright dogs 42 and 43, and double inclined and grooved cam 44, of the holding-box 46, substantially as and for the purposes set forth.

10. The combination, with the ratchet-wheel 41, of the retaining-dog 45, feeding-dogs 42 and 43, double inclined and grooved cam 44, and holding-box 46, arranged for joint operation substantially as and for the purposes set forth.

11. The combination, with the stop-lever D″, of the stop-guard F′, substantially as and for the purposes set forth.

DAVID McFARLAND.

Witnesses:
THOS. H. DODGE,
C. JILLSON.