(No Model.) 3 Sheets—Sheet 1.

J. B. FROST.

RIVETING MACHINE.

No. 384,199. Patented June 5, 1888.

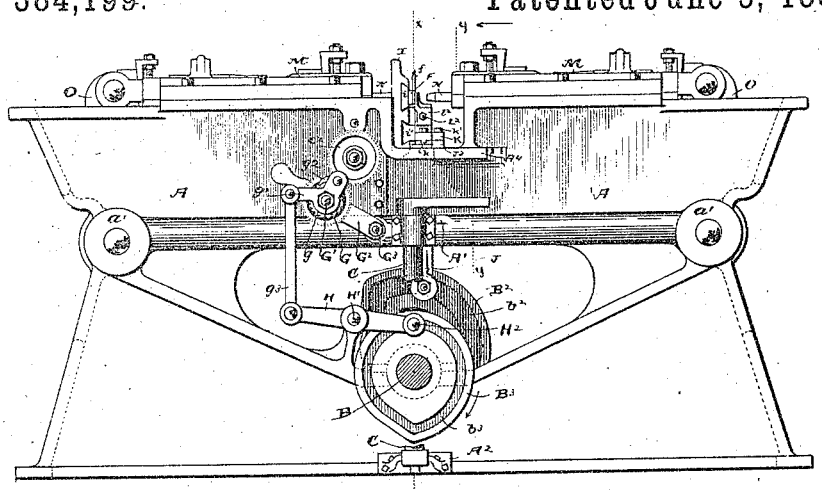


Fig. 1.

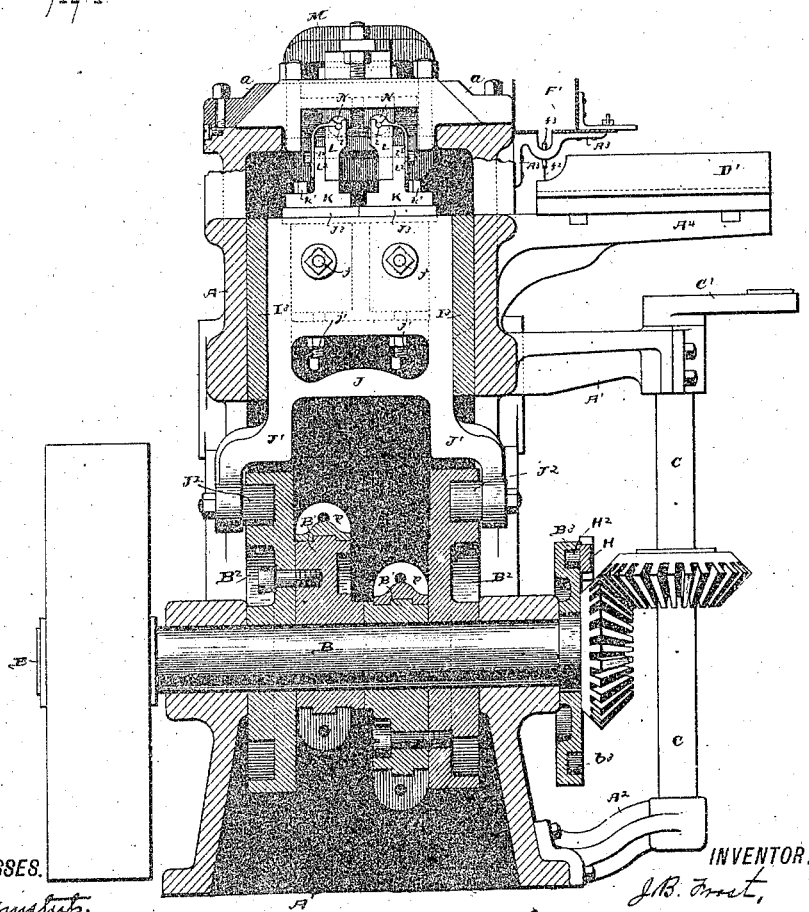


Fig. 4.

WITNESSES.

N. S. Amstutz.

Geo. W. Kinny.

INVENTOR.

J. B. Frost,

By Liggett & Liggett Attorney.

(No Model.) 3 Sheets—Sheet 2.

J. B. FROST.

RIVETING MACHINE.

No. 384,199. Patented June 5, 1888.

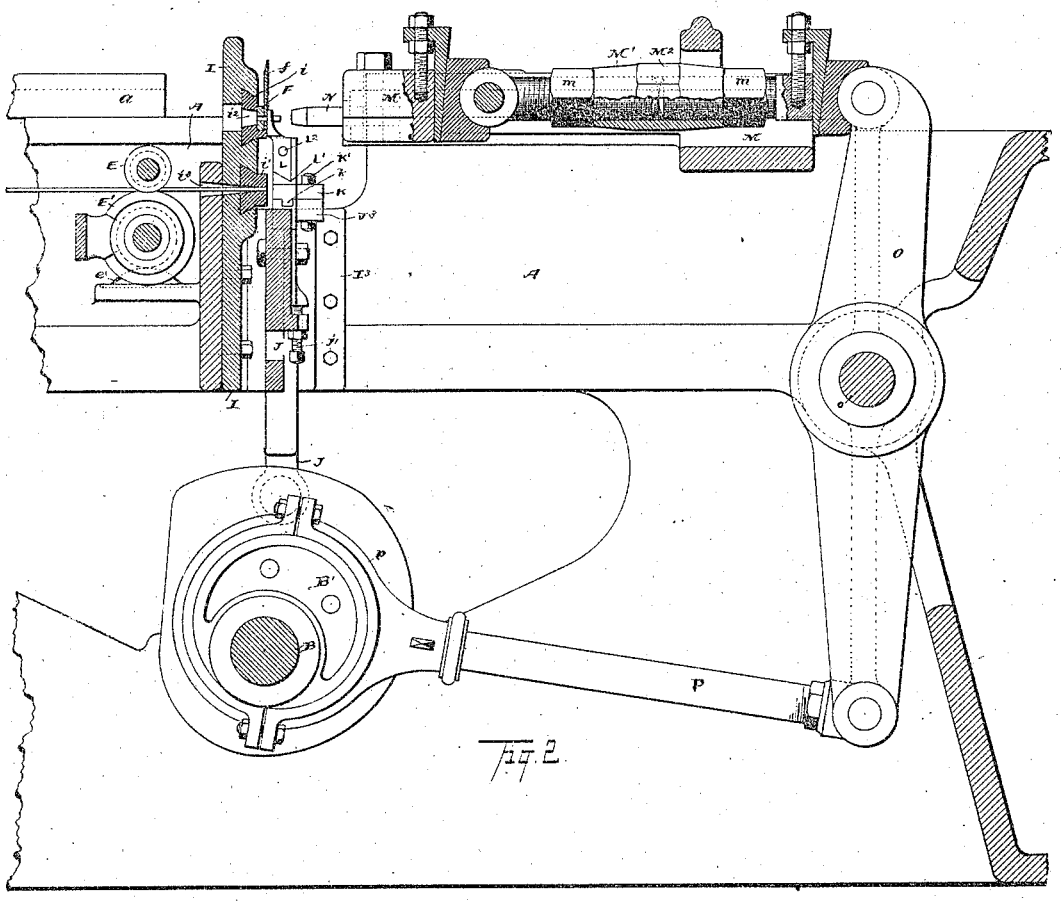


Fig. 2.

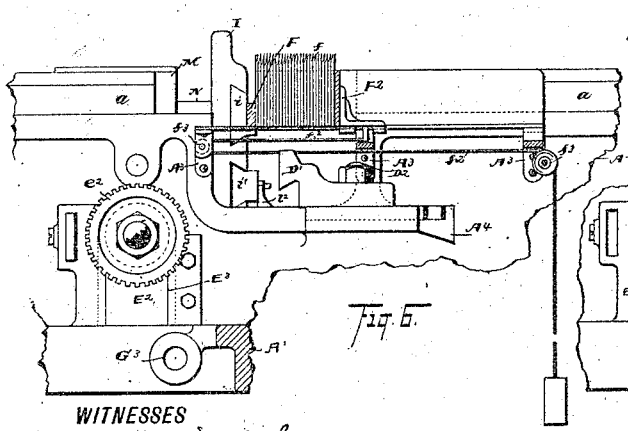
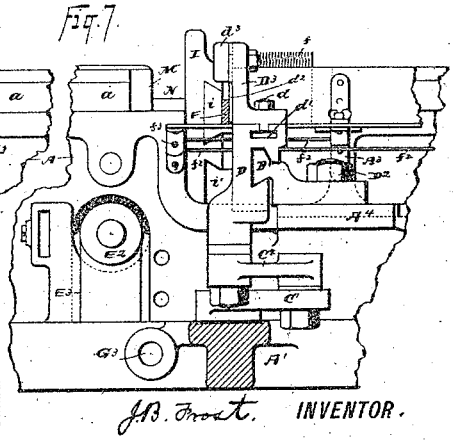


Fig. 6.

Fig. 7.



WITNESSES

N. S. Sinclair

Geo. W. King

J. B. Frost. INVENTOR.

By Liggett & Liggett Attorney.

(No Model.) 3 Sheets—Sheet 3.

J. B. FROST.

RIVETING MACHINE.

No. 384,199. Patented June 5, 1888.

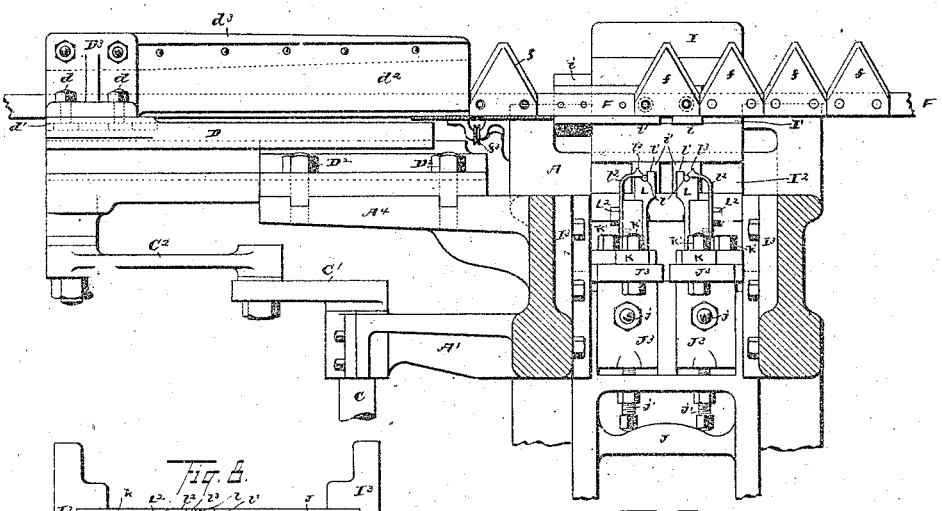


Fig. 5.

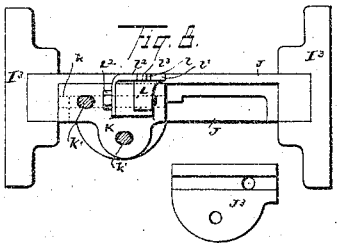


Fig. 6.

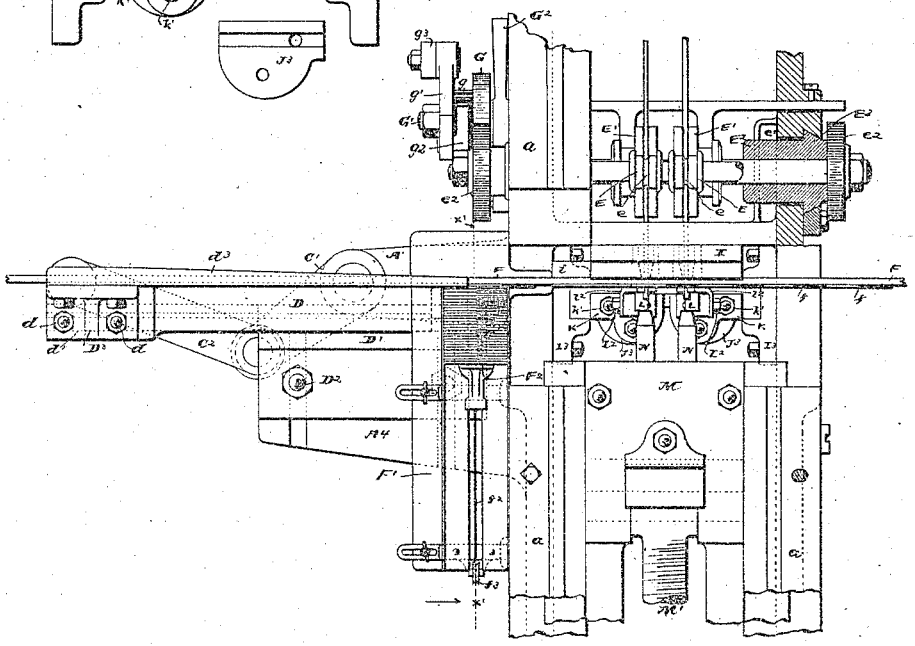


Fig. 3.

WITNESSES.
N. S. Amsbury
Geo. W. Kring

J. B. Frost INVENTOR.
By Liggett & Liggett
Attorney.

UNITED STATES PATENT OFFICE.

JOHN B. FROST, OF AKRON, OHIO, ASSIGNOR OF ONE-HALF TO C. E. SHELDON, OF SAME PLACE.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,199, dated June 5, 1888.

Application filed December 22, 1887. Serial No. 258,700. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. FROST, of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Riveting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in riveting-machines for attaching the cutter-blades or so-called "sections" to the section-bar to form what is known as the "knife" in reaping and mowing machines, in which wires are drawn into the machine and cut to lengths for rivets, the sections and section-bar are brought into position for riveting, and the rivets are inserted in their places and simultaneously riveted or upset at either end, the entire operation of the machine being automatic, to the end that the work is well, cheaply, and quickly done.

With these objects in view my invention consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is an enlarged elevation, in longitudinal section, of the one-half of the machine. Fig. 3 is a plan, partly in section, of the central portion of the machine. Fig. 4 is an elevation in cross-section on the line $x\,x$, Fig. 1. Fig. 5 is an elevation in section on the line $y\,y$, Fig. 1. Fig. 6 is an elevation in section on the line $x'\,x'$, Fig. 3. Fig. 7 is a side elevation of the central portion of the machine, illustrating more especially the section-feeding device. Fig. 8 is a plan of cross-head J and the ways between which the cross-head operates.

A represents a supporting-frame having suitable boxes, in which is journaled the driving-shaft B. On the one side of the machine (see Fig. 4) and connected with frame A project brackets A^2 and A^3, for supporting the upright shaft C, the two shafts being intergeared, as shown, with miter-gear. On the upper end of shaft C is mounted crank C', the wrist of which latter is connected by a pitman, C^2, with cross-head D, for reciprocating the latter on way D'. (See Figs. 5 and 6.) This way is supported by bracket A^4, the latter being connected with frame A and having elongated holes or slots, through which the bolts D^2 pass, that secure the way to the brackets to render the way adjustable sidewise, to bring it in line with other parts of the machine. (See Fig. 3.) To cross-head D is adjustably secured the angle plate D^3, the heads of the securing-bolt d operating in undercut slots d' of the cross-head, to render the angle-plate adjustable lengthwise of the cross-head. A push-bar, d^2, is attached to the face of the angle-plate. The plate is of considerable length and width, but corresponds in thickness with sections f, and being thus thin it is supported by a stiffening-bar, d^3, secured along the upper edge of the plate. The section-bar F and the section, f, that is to be riveted to the bar at one end thereof are placed by hand into the machine in position for riveting.

A quantity of sections are placed in the holder F', the latter consisting of a bottom and sides supported from brackets A^5. A movable head, F^2, operates in this box-like structure, and has a cord, f^2, attached, that leads over sheaves f^3, and has a weight, f^4, secured to the end of the cord for pressing the sections against the section-bar. The push-bar draws back past the section-holder, whereupon weight f^4 moves the section toward the section-bar, bringing the forward section in line with the push-bar. The next forward movement of the push-bar slides a section along by the side of the section-bar until the moving section strikes the section last riveted, and from thence on moves the section-bar, leaving at the end of the stroke the section-bar and loose section in position to be riveted together.

On driving-shaft B are mounted two eccentrics, B', for operating the riveting mechanism, and by the side of these eccentrics are mounted two cam-disks, B^2, for operating the dies that cut the wire into lengths for rivets, an eccentric and the adjacent disk being usually connected together, as shown, by a stud; also, there is mounted on shaft B a cam-disk, B^3, for operating the feed-rolls that draw the wire into the machine. Disk B^3 has a cam-groove, b^3, on the face thereof, and disks B^2 have cam-grooves b^2 on their respective faces.

The wire for the rivets is in two coils mount-

ed on reels, (not shown,) and is drawn from thence into the machine by means of feed-rolls E and E'. These rolls are intergeared, and are provided with two sets of grooves, e^2, for grasping the two wires, the grooves being located the exact distance apart to correspond with the holes in the sections and section-bar. The trunnions of the upper roll, E, are journaled in stationary boxes, while the trunnions of the lower roll are journaled in boxes E^2, that slide vertically in housings E^3, with flat springs e' located below the boxes, upon which the latter rest, and by the tension of these springs the necessary upward pressure is had on the lower roll for feeding the wire. The lower roller is provided with gear e^2, that engages a driving-gear, G. The latter gear is mounted on a stud, G', the stud being secured to a lever, G^2. This lever is fulcrumed at G^3, the bolt or stud at the fulcrum being tightened sufficiently to hold the gear in mesh, while the opposite end of lever G^2 serves as a handle by means of which the gears may be disconnected or thrown into mesh. Connected or integral with gear G is a ratchet-wheel, g. A lever, g', of the bell-crank variety, is mounted on stud G', the short arm of the lever being provided with a pawl, g^2, for engaging the ratchet-wheel. The long arm of this lever is connected by rod g^3 with lever H. Lever H is fulcrumed at H', and is provided with a laterally-projecting wrist, H^2, that operates in cam-groove b^3 of disk B^3. By means of the cam-groove and the connecting mechanism just described the feed-rolls are intermittently rotated the necessary distance to draw the wire into the machine with each stroke of the latter the distance required for the length of the rivets.

The mechanism for severing the wire into rivets is as follows: To a part of frame A is bolted plate I, the latter having transverse slots I' and I^2, said slots having undercut walls, forming dovetails with dies i and i', these dies being adjustable crosswise of plate I, and are preferably held in place by means of a driving fit. To frame A are secured ways I^3, between which ways reciprocate the cross-heads J. The cross-head is provided with depending arms J', these arms having laterally-projecting wrists, on which, respectively, are journaled rollers J^2, these rollers operating in cam-grooves b^2 of the respective disks B^2, by means of which the cross-head J and attachments are given the necessary vertically-reciprocating movement. In suitable vertical recesses in cross-head J are seated the two blocks J^3, the securing-bolts j passing through vertically-elongated holes and the blocks resting on set-screws j', by means of which the blocks may be adjusted vertically. On top of blocks J^3 are secured the die-holders K, these holders having depending ribs k, that fit in corresponding grooves made in the upper faces of blocks J^3, and the securing-bolts k' passing through elongated holes, by means of which the die-holders may be adjusted in the direction toward or from each other. To die-holders K are respectively secured the dies L, for cutting the wires and for elevating the severed pieces or rivets in position for entering the holes in the section and section-bar. The dies have beveled lower ends, L', that fit in corresponding seats in the die-holder, (see Fig. 2,) these dies being secured by bolts L^2. The upper end of each die has a semicircular cutting-edge, l, and an upwardly-projecting lip, l', on one side of the cutting-surface. On the other side of the cutting-surface, opposite lip l', is a spring, l^2, the same being secured to the die and having an incline, l^3, as shown in Figs. 4 and 5. Tapering holes i^3 extend through plate I and the contiguous part of frame A, and extend, respectively, through dies i', leaving a cutting-edge on these dies on the face thereof next to line of dies L, the latter in their reciprocations passing close to if not absolutely colliding with dies i', the co-operation of these two sets of dies forming shearing cuts that sever the wires into lengths for rivets. As the dies L on their upstroke come up under and against the wires protruding from dies i', the springs l^2 are pressed back a trifle by means of inclines l^3, and the recoil of the springs as the wires engage the cutting-edges presses downward and toward lips l', and hold the rivets after they are severed firmly in place on dies L during the balance of the upstroke of the latter, and at the end of the upstroke these rivets are in position to enter the holes of the section and section-bar, the latter lying flatwise against dies i. The latter dies are merely for steadying the section-bar, and have tapering holes i^2, through which the riveting-plungers enter from this side.

The riveting mechanism is as follows: Cross-heads M reciprocate in ways a of frame A. As these two cross-heads and the connected parts are alike, a description of one will answer for both, it being understood that the cross-heads are set in line and operate from opposite sides of the machine. At the inner end of each cross-head M are set two riveting-plungers, N, the opposing plungers of the respective cross-heads being in line and set at suitable distance apart to engage the two rivets that secure a section. Cross-head M is connected by link M' with the upper end of lever O. The link is made in two pieces that are screwed into the respective ends of sleeve M^2 with right and left handed threads, by means of which the length of the link can be accurately adjusted by turning the sleeve. Jam-nuts m are located on either side of the sleeve for securing the latter and holding the joint rigid. Lever O, near the center thereof, has trunnions o, that are journaled in boxes a', connected with frame A, and the lower end of the lever is connected by eccentric-rod P and eccentric-strap p with eccentric B' aforesaid. The two eccentrics are set to throw simultaneously in opposite directions, by means of which and of the connecting mechanism just described the plungers N of the respect-

ive cross-heads M are caused simultaneously to approach or recede from each other. Just as the two rivets for securing a section are brought up by dies L in front of the holes of the section the opposing plungers N approach each other. The two plungers on the right hand (see Figs. 1 and 2) first strike the rivets, driving them into the holes of a section in section-bar, and just as this occurs the plungers from the left hand engage the rivets and both of the rivets are simultaneously upset. Meanwhile, as the rivets are entering the holes, the downstroke of cross-head J carries dies L down out of the way of the plungers. As the plungers recede, the next section is moved forward, carrying with it the section-bar, as aforesaid. The next upstroke of die L brings two more rivets in position, and so on until the cutter-bar is completed, the different parts of the machine operating automatically and being timed to co operate to produce the general result.

What I claim is—

1. The combination, with cross-heads set in line and mechanism, substantially as indicated, for reciprocating the cross heads simultaneously toward and from each other, of riveting-plungers connected with the respective cross-heads and arranged to form opposing pairs for upsetting the ends of each of the rivets at one operation, substantially as set forth.

2. The combination, with cross-heads having riveting-plungers attached, substantially as indicated, of a push-bar operating at right angles to the movement of the riveting-plungers, and mechanism, substantially as indicated, for reciprocating the push-bar to feed successive sections and move the section-bar between the plungers in position for riveting, substantially as set forth.

3. The combination, with cross-heads and riveting-plungers attached, a push-bar, and mechanism for operating the same, substantially as indicated, of a holder for the sections, said holder having a movable head adapted to move the sections toward the section-bar, substantially as set forth.

4. The combination, with feed-roll having groove for feeding two wires and reciprocating cross-head, the latter having dies attached for severing the wires as they are fed by the rollers, of riveting-plunger for upsetting the rivets formed by the severing-dies, substantially as set forth.

5. The combination, with feed-roller and reciprocating cutting-dies, substantially as indicated, of projecting lip and opposing springs connected with each die adjacent the cutting-surface thereof, and arranged, substantially as indicated, for holding the rivets in place on the cutting dies, substantially as set forth.

6. The combination of riveting device, mechanism for feeding the sections and section-bar, feed-rolls for feeding the wires, and cutting-dies for cutting the wire into rivets and carrying the rivets into position for riveting, the parts being timed to co-operate with each other, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 10th day of October, 1887.

JOHN B. FROST.

Witnesses:
ALBERT E. LYNCH,
CHAS. H. DORER.