

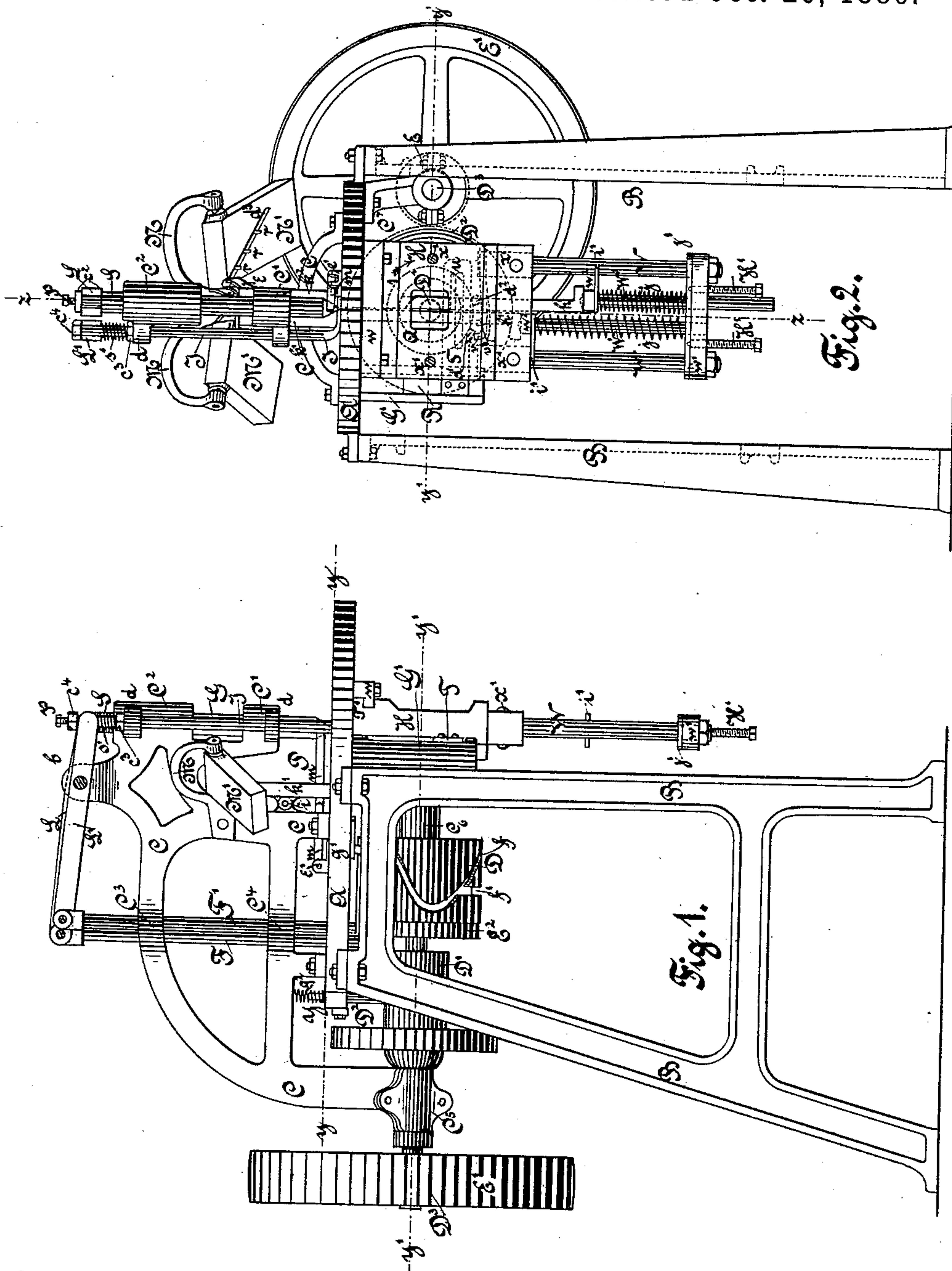
(No Model.)

3 Sheets—Sheet 1.

O. J. BROWN.
RIVETING MACHINE.

No. 351,356.

Patented Oct. 26, 1886.



WITNESSES:

Wm. B. Burt
R. B. Isaac.

INVENTOR

Oscar J. Brown.

BY

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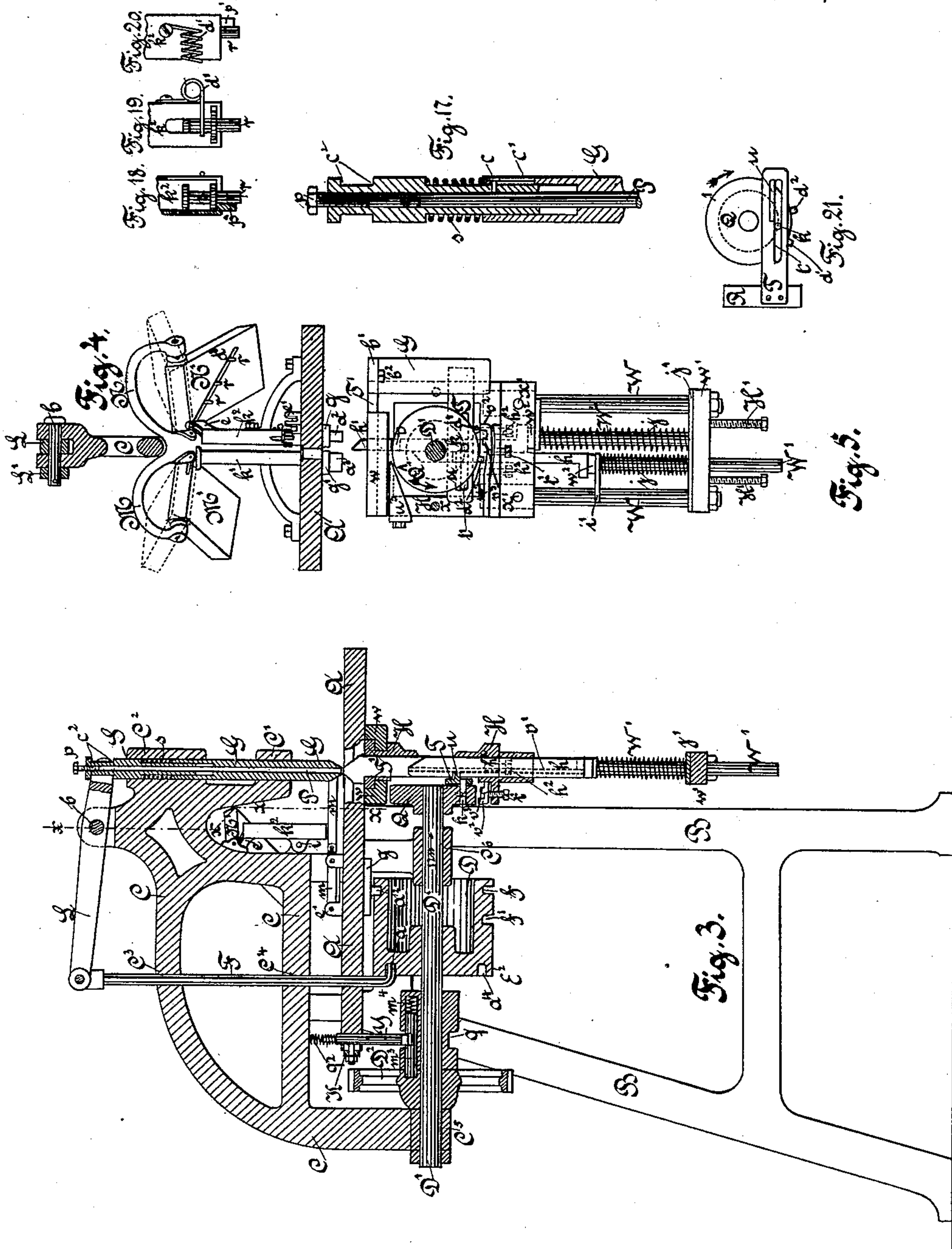
(No Model.)

3 Sheets—Sheet 2.

O. J. BROWN.
RIVETING MACHINE.

No. 351,356.

Patented Oct. 26, 1886.



WITNESSES:

Henry Bull

R. B. Soane.

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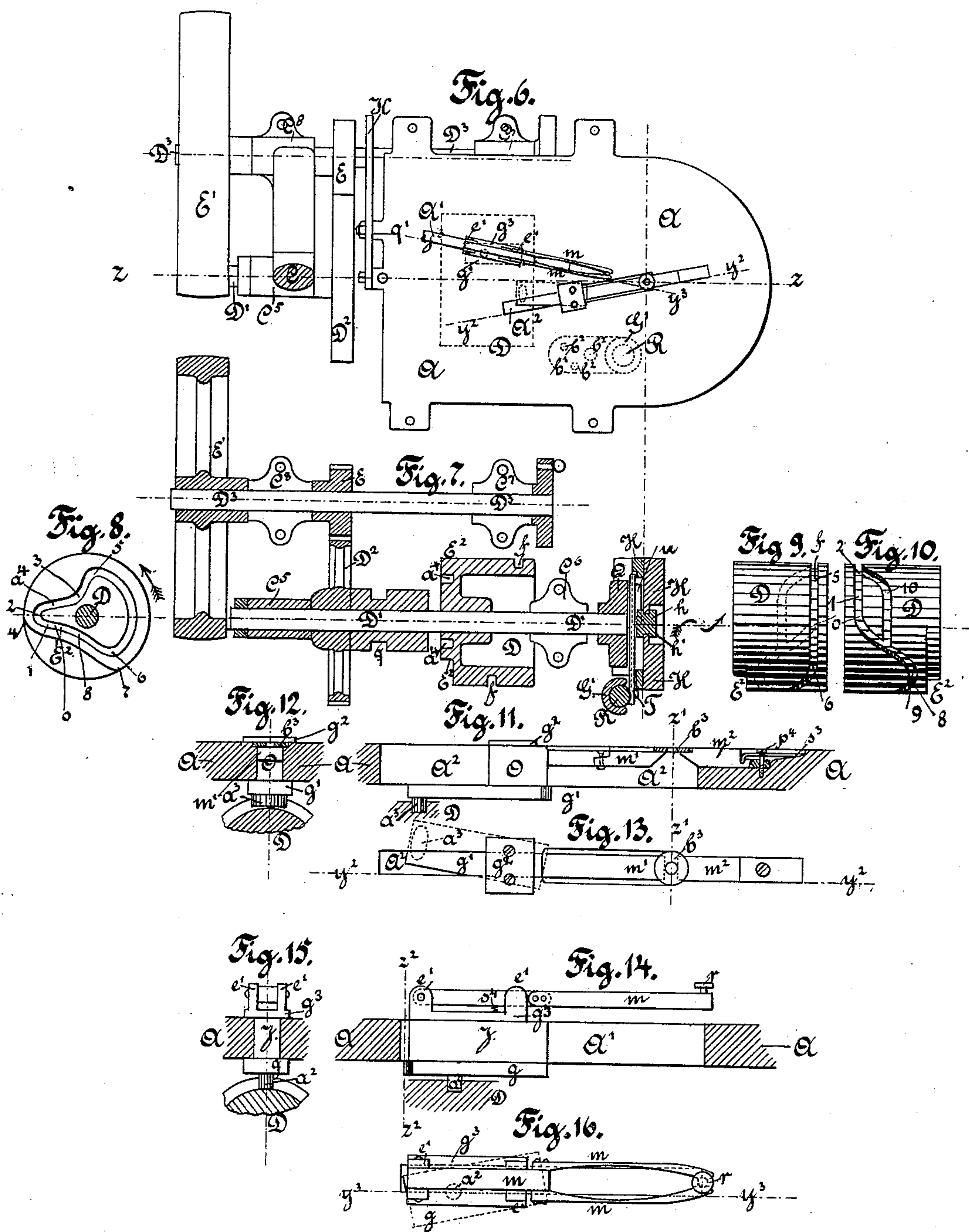
(No Model.)

3 Sheets—Sheet 3.

O. J. BROWN.
RIVETING MACHINE.

No. 351,356.

Patented Oct. 26, 1886.



WITNESSES:

Wm. Bull.

R. B. Doane

INVENTOR

Oscar J. Brown.

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UNITED STATES PATENT OFFICE.

OSCAR J. BROWN, OF MADISON, WISCONSIN.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 351,356, dated October 26, 1886.

Application filed January 21, 1886. Serial No. 189,342. (No model.)

To all whom it may concern:

Be it known that I, OSCAR J. BROWN, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, 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 a machine for riveting pieces of leather, paper, cloth, or other thin sheet material by automatically punching the material, inserting therein an ordinary solid rivet, placing a burr or washer over the end of said rivet, and heading it down upon the burr by two separate hammer-blows.

It consists in the combination and arrangement of certain devices, whereby the several operations of holding the material in position, punching it, separating from the supply-tubes, and feeding to the work in regular order the rivets and burrs, and riveting the work with the latter, and afterward throwing the machine out of gear, preparatory to heading the next rivet, are all automatically accomplished with rapidity and accuracy, either by foot or power.

In the drawings, Figure 1 is a side elevation of my machine. Fig. 2 is a front elevation. Fig. 3 is a longitudinal section through the line $z z$ of Fig. 2. Fig. 4 is a section through the line $x x x$ of Fig. 3, looking toward the rear of the machine. Fig. 5 is a vertical section taken at right angles to the shaft D' , Fig. 3, at the forward point of the arrow 12, looking in the direction indicated, and shows a rear view of the hammer-case with its attachments independent of the table or bed of the machine. Fig. 6 is a top or plan view of a horizontal section through the line $y y$ in Fig. 1. Fig. 7 is a horizontal section through the line $y' y'$ of the same figure. Fig. 8 is an end view of the cam-cylinder D , looking toward the front of the machine. Fig. 9 is a top view of the cam-cylinder in position corresponding to that shown in Fig. 7, and Fig. 10 is a top view showing the corresponding under side of Fig. 9. Fig. 11 is a section through the line $y^2 y^2$ of Fig. 6, showing in detail side elevation the burr-carrier and the slot in which it op-

erates. This and all the subsequent figures on Sheet 3 are, for the sake of greater clearness in the drawings, enlarged to double the size of the same parts shown elsewhere in the drawings. Fig. 12 is a vertical section through the line $z z$ and perpendicular to the line $y^2 y^2$ of Fig. 6, showing the burr-carrier and a portion of the cam-cylinder in end view. Fig. 13 is a top view of Fig. 11. Fig. 14 is a section through the line $y^3 y^3$ of Fig. 6, showing in detail side elevation the rivet-carrier and the slot in which it operates. Fig. 15 is a vertical section through the line $z^2 z^2$ of Fig. 14 perpendicular to said line $y^3 y^3$, showing in end view the burr-carrier and a portion of the cam-cylinder. Fig. 16 is a top view of Fig. 14. Fig. 17 is a detail of the anvil and punch with their connections as shown in Fig. 3. Figs. 18, 19, and 20 are detail views of the foot of the rivet-receiver and its attachments. Fig. 21 is a detail view, independent of the hammer-case, of the guide-rod with its cross-head and lug in attachment with the operating-disk and its crank-pin.

In the drawings similar letters and figures, where they occur, refer to like parts throughout the several views.

A is the table or bed of the machine, supported on the legs B , which may be of suitable height to bring the upper surface of the table at a convenient elevation for the operator.

C is a frame rising from the upper surface of the table A , and provided with bearings at C' , C^2 , C^3 , C^4 , and C^5 .

D is a cam-cylinder fixed to the shaft D' , at the rear end of which is hung the spur-gear D^2 , adapted to engage the clutch m^3 , as will be more particularly described hereinafter. The shaft D' is hung in suitable bearings, C^5 and C^6 , the latter being fastened to the under surface of the table A .

D^3 is a counter-shaft, supported by brackets, attached in the ordinary manner to the under side of the table A and to the upright C , as shown at C^7 and C^8 . Fixed to the counter-shaft D^3 is the pulley or fly-wheel E' and pinion E , which engages with the spur-gear D^2 . The plunger F , terminating at its lower end in a foot or crank pin, a , has a reciprocating vertical motion, through the bearings C^3 C^4 , im-

parted to it by the cam-slot a^4 in the rear end of the cylinder D, operating on the pin a . The upward stroke of the plunger F is converted into a downward stroke for the anvil G by means of the lever L, pivoted at b to the frame C, and connected with the plunger F by pivot, and to the sleeve or thimble S by open jaws, adapted to operate in a slot in the ordinary manner of such appliances. The anvil G is a heavy cylindrical bar adapted to reciprocate in the bearings C' C^2 , the top being recessed to admit the sleeve or thimble S and the spiral spring s . The anvil G is lifted by means of the screw c in the lower part of the sleeve S, operating against the top of the slot c' in the anvil. This slot c' also allows the punch P to be pressed down and through the work after the anvil G has reached its lowest limit, the sleeve S continuing to move downward in the recess above described. The punch P is a steel rod, adapted to punch holes of suitable size in the work, and has a reciprocating vertical motion through the center of the anvil G. It may be adapted to various thicknesses of work by means of the adjusting-screw p in the top of the sleeve S. For lifting purposes it is intended to fit so closely into the sleeve as to be held by friction in any adjustment at which it may be set; but, if further security is required, an ordinary set-screw may be inserted through the sleeve S and against the punch in the ordinary manner. The sleeve S is provided with the circular slot c^2 , to admit the jaws or fork in the front end of the lever L, by which means the reciprocating motion is communicated from the plunger F to the anvil and punch.

The plunger F' is operated by the eccentric E^2 on the rear end of the cam-cylinder D, and works parallel with the plunger F. It is pivoted to the rear end of the lever L', which in turn is pivoted to the bolt b . The front end of the lever L' is forked similar to that of L, already described, and in a similar manner engages the setting-tool I immediately beneath the adjusting-nut c^4 , threaded to the setting-tool, and rests upon the spring s' , the tension of which may be regulated by the adjusting-nut c^3 , also threaded to the setting-tool. The setting-tool I works in the guides d , and terminates at its lower end in a presser-foot adapted to press down upon the work and hold it firmly while it is being punched and riveted.

Attached to the upright C at a point about midway in height between the bearings C' and C^2 are the arms m and n , to which are connected by screw-pivots the hoppers M' and N', respectively, the former containing burrs and the latter rivets. Both hoppers, so far as concerns the construction, attachment, and operation of delivering the rivets from the hopper N', are practically on the same general plan as those described in Mellen Bray's patents—rivet-setting machine, No. 161,659, patented April 6, 1875, and same inventor's riveting-machine, No. 161,660, of same date. For this

reason I make no claim on my arrangement for holding and delivering the rivets to the chute e . These hoppers may be operated by a forked arm rigidly fastened to the plunger F', extending forward beneath the hoppers and at the proper moment raising them to the position shown in dotted lines, Fig. 4, in a similar manner and to the same effect as that described in the patents above referred to; but, for the reason above given, and for the sake of clearness in the drawings, I have omitted to show the operating-arm.

The receivers k' and k^2 are fastened to a lug extending forward from the upright portion C by means of a pin, i , through said lug and ears extending from the rear face of each of said receivers. The rivets pass from the chute e into the receiver k^2 , filling the receiver and standing one above the other, the tube being of sufficient size to allow the rivets to pass down conveniently. The bottom of the receiver k^2 is slotted to allow the rivet to pass down and depend from its head through the slot and at the proper moment to be carried forward and out of such receiver.

Directly to the rear of the rivet as it depends from the bottom of the receiver, and rigidly secured to the latter, is a pin, p' , extending downward the length of the rivet-shank, for the purpose of holding the rivet upright and firm when the jaws m of the rivet-carrier, coming back against it, close over and seize it preparatory to carrying it forward, as will be more fully described. The slot in the bottom of the receiver k^2 extends forward and up the front face, as shown in Fig. 19, in order that rivets, when they accidentally come down wrong side up, may be easily withdrawn by the operator.

The jarring from the hammer-blows may occasionally tend to throw the second rivet down on its side, the rivet vibrating upward and forward through the face-slot. To prevent this, I attach the spring d' to the outer side of the receiver k^2 , with the end extending around in front of the face slot and adapted to be turned downward and outward from the same when a rivet is to be withdrawn.

The burr-hopper M' has at its inner lower corner a rectangular slit or opening just large enough to allow one burr to pass through easily. When the hopper is suddenly raised to the position shown by the dotted lines, Fig. 4, a burr escapes into the cup-shaped opening at the top of the receiver k' , and thence onto the burr-column, which stands in a vertical tubular chamber sufficiently large in diameter to allow the burrs to pass downward freely.

The receiver should always be kept full of burrs, so that the weight of the column will aid in discharging them. It rests on the surface of the table A, and the burrs are directly over a channel cut in said table to receive them.

The rivet-carrier J has a reciprocating motion in the slot A' of the table A imparted to it by the pin a^2 operating in the cam-slot f , and is riveted to the guide-plates g g^3 , the lower

one, g , bearing the pin a^2 and extending diagonally across the slot A' in a direction parallel to the central axis, $z z$. (See Fig. 6.)

Extending from the upper guide-plate, g^3 , are four uprights or ears, e' , between the rear two of which is pivoted the bar m , which rests in a horizontal position on the spring s^t , and extends forward between the front pair of ears or guides e' . The bar m is continued forward in the fingers m , riveted to it at its front end. They are made of spring-steel and bear firmly against each other at the forward ends, which are jaw-shaped with a flaring opening on the top side, and are adapted to open and admit the rivet r , closing around it and holding it firmly in an upright position. The top of the opening in the jaws is made flaring, so that when the conical point of the anvil G descends upon the rivet-head it will easily open the jaws, forcing the rivet down between them and through the work beneath.

The burr-carrier O reciprocates in the slot A^2 , actuated by the pin a^3 , which is oblong in cross-section, and is riveted to the guide-plates $g' g^2$, the lower one, g' , bearing the pin a^3 and extending diagonally across the slot A^2 in a direction parallel to the central axis, $z z$. The arm m' is dovetailed or fastened in any other suitable manner into the carrier O , immediately beneath the upper guide-plate, g^2 , being of the same width as the slot A^2 , with its upper face flush with that of the table A . The burr b^3 being somewhat wider than the slot A^2 , the latter is recessed on either side to a sufficient width and depth to admit the burr flush with the face of the table, while the forward end of the arm m' is recessed to the same depth in a semicircular shape for the purpose of forming a seat, in which the burr may be pushed forward. By this device the burr is supported by the table as well as by the arm m' , and is for this reason less liable to be jarred from its seat. The bar m' is made of two parts, riveted at about its center in order not to offer too rigid a resistance to the upward strokes of the hammers. Forward of the slot A^2 a corresponding shorter fixed arm, m^2 , extends rearward to meet the arm m' , and is provided with a corresponding semicircular seat at the end, so that when the two arms meet, the burr will be held firmly between them, and the distance between them will be equivalent to the diameter of the burr-opening through which the rivet-shank passes. This arm is secured in the table by the spring-dog s^3 , and is suitably adjusted to the upward strokes of the hammers by the adjusting-screw p^1 . The foot of the receiver k' is immediately over the arm m' , so that when the semicircular burr-seat in the arm m' is directly under the burr-column in the receiver k' a burr will drop into it, and as the burr-carrier moves forward again will be cut off from the burr-column and carried forward. To correspond with the other positions of the parts, as shown in the drawings, the rivet-carrier, as shown in Fig. 6, should be farther forward, so that the rivet would be represented immediately

over the burr; but to avoid confusion of lines in the drawings I have shown it to the rear of the position it would actually occupy in this stage of the machine's operation.

The shaft D' terminates at its forward end in the circular disk Q , provided with the crank-pin k , extending from its front face, and the spurs $d' d^2$ in its periphery. The vertical guide G' is bolted to the under side of the table A by the bracket b' , secured by the bolts b^2 . The guide-rod R is adapted to reciprocate freely in the guide G' , and is bolted to the cross-head T at right angles to the same, said cross-head being provided with the slot t , through which the crank-pin k extends. The horizontal lug u projects from the front face of the cross-head T directly above the slot t , extending from the outer end of said slot inward to about the middle point of the same, and is adapted to engage and play freely in and through the notches v of the hammers $h h'$.

The hammer-case H , consisting of a rear and a front portion, secured by the bolts x' , depends by the cross-head T' from the sliding ways w , fastened to the under side of the table A , and in which it is adapted to reciprocate from right to left. The vertical stay-rods W extend downward from the hammer-case, and are bolted to the cross-piece w' , thereby forming a frame for the hammers to act in. The inside faces of the hammers $h h'$ slide over each other in the operation of the machine, while the opposite or outer faces are provided with grooves v' , into which fit corresponding tongues or guides extending from the front casting of the hammer-case. The lower end of each hammer terminates in a foot, which rests on the headed ends w^2 of the rods W' , which in turn are surrounded by the hammer-springs $j j$.

The guide-plates i' , fitted to the rods $W' W'$ between the hammer springs $j j$ and the rod-heads w^2 , are each recessed at the outer end, so as to close partially over the guide-rods W , and are adapted to reciprocate over the same. The hammer springs $j j$ rest at the lower end on the plate j' , which may be raised or lowered by means of the adjusting-screws $H' H'$, thereby regulating the compressive force of the hammer-springs, as desired. The upward motion of the hammers is limited by the foot of the same striking against the head of the stop-screws h^2 .

The steel plate u^2 , bolted at its outer end to the hammer-case H , is provided with the lugs $v^2 v^3$ in different vertical planes, which are adapted to engage successively with the spurs $d' d^2$ in the periphery of the disk Q . Vertical adjustment for the inner end of the plate u^2 is effected by the adjusting-screw t' . The dog u^3 , bolted at its outer end to the hammer-case H , is adapted to engage the spur d' , by which the hammer-case is moved to one side, engaging the notches v in the hammers over the lug u on the cross-head T . The spring-clutch m^3 is pressed back into engagement with a corresponding notch in the loose spur-

gear D^2 by the spring m^4 , both being recessed into an enlargement of the shaft D' , which is provided with the circular slot q , in which the wedge-shaped foot of the plunger Y travels. The clutch m^3 is slotted to correspond, and is adapted to engage the wedge-shaped foot of the plunger Y , the latter acting on the forward face of the slot in the clutch m^3 , pressing it forward out of engagement with the spur-gear D^2 . The machine is thrown into gear by raising the plunger-foot out of the slot in the clutch m^3 , in which position it is held by the spring q^2 . The plunger Y is pivoted to the lever K , which is pivoted to the upright q' , and is connected at the outer end to a foot-lever not shown in the drawings.

To avoid complicating the drawings, I have not indicated the work or material to be punched and riveted beneath the anvil G , but for the purposes of this description we will now suppose it to be thus placed.

The operation of my improved machine is as follows: Supposing the cam-cylinder D to be revolving continuously in the direction indicated by the arrows, the position of the parts, as shown, is that just after the first blow has been struck by the hammer h' , the other hammer, h , being about to be released for the second blow, the rivet being properly placed in the work and partially headed over the burr, while the anvil G rests on the rivet-head, and the presser-foot of the setting-tool I presses onto the work, holding it firmly in position. If the weight of the anvil G , as shown, is not sufficient to counteract the force of the hammer-blows, an additional weight may be fastened to it between the bearings C' C^2 . Immediately succeeding the blow of the first hammer, h' , the spur d^2 , engaging the dog v^3 , moves the hammer-case to the right, (see Fig. 5,) disengaging the hammer h from the lug u , and the second blow is struck. Then the burr-carrier and the rivet-carrier, immediately following, are retracted as their operating-pins a^3 and a^2 are passed, respectively, by the point 6 of the slot f . At the same time the corresponding point, 6, of the end slot, a^4 , passing the pin a of the plunger F , the anvil G is raised from the work, and the point 7 of the eccentric E^2 passing under the end of the plunger F' , the presser-foot of the setting-tool I is removed, when the work can be changed in position for the next rivet, the weight of the plunger F' and of the rear lever-arm of L' being sufficient to raise the setting-tool I . The spring s' provides a yielding resistance of the work against the presser-foot of the setting-tool I when the blows are struck. As the point 8 in the slots a^4 and f passes the operating-pins a^3 , a^2 , and a of the burr-carrier, rivet-carrier, and plunger F , respectively, these parts are in the following positions: The anvil G is raised to its highest limit. The semicircular seat in the arm m' is directly beneath the column of burrs in the receiver k' , the lowest burr falling into position in the seat. The jaws in the front end of the arms m have been

drawn back against the shank of the rivet depending through the slot in the bottom of the receiver k^2 , have sprung over it and hold it firmly in an upright position against the pin p' , both burr-carrier and rivet-carrier being at the extreme rear limit of their motion. The revolution of the cam-cylinder continuing, the burr-carrier comes rapidly forward with its burr to the position shown in Fig. 11. The operating-pin a^3 being oblong in cross-section, with its major diameter larger than the mouth of the branch slot f' , it cannot be switched off, but continues in the main slot f . The rivet-carrier following with the rivet, the pin a^2 , being round, passes, in an obvious manner, into the branch slot f' at the same instant that the point o reaches the burr-carrier pin a^3 . The rivet-carrier is now half-way forward, being approximately in the position shown in Fig. 6. At this point the machine is automatically thrown out of gear by the foot of the plunger Y engaging against the front face of the notch in the spring-clutch m^3 , and drawing it out of engagement with the spur-gear D^2 , for the purpose of enabling the operator to be sure that everything is in readiness for the operation of punching and riveting. The plunger Y being raised, the spring-clutch re-engages with the spur-gear, and the cylinder D revolving, the anvil G descends and rests upon the work as the pin a is reached by the point 1 of the end slot, a^4 . From the point 1 to the point 2 the punch P , actuated by the pin a in the end slot, plunger F , and lever L on the sleeve S , is pressed down through the work and the burr. At the same time the presser-foot of the setting-tool I , actuated in a similar manner as the point 4 of the eccentric E^2 , passes beneath the end of the plunger F' , and is pressed down onto the work, in which position it remains until the point 7 is reached again. As the punch and anvil are withdrawn, reaching their highest limit for a second time when the point 3 passes the pin a , the point 10 of the branch slot f' passing the rivet-carrier pin a^2 , the latter is brought rapidly forward into the main slot at the point 2, and immediately behind the burr-carrier, the rivet now being in position over the burr. From this point the anvil G descends a second time, this time upon the rivet-head, forcing the jaws m open and the rivet r down through the work and the burr as the point 5 of the end slot passes the pin a , in which position the anvil remains until the point 6 is reached. Meanwhile, after the second hammer-blow is struck, as hereinbefore described, the hammer h falls back beside the hammer h' , so that the notches v come together. The crank-pin k now carries the cross-head T upward until the lug u is opposite the notches v , when the spur d' strikes the dog w^3 , moving the hammer-case sidewise, so that the notches v of the hammers engage over the lug u . At this instant, when the crank-pin k is about to descend, the machine is thrown out of gear, as already described. The machine being thrown into gear; the crank-pin,

acting in the cross-head T, begins at the points 1 to bear the hammers down against the springs $j j$ at about the time the hole is punched in the work. Just before the crank-pin k reaches its lowest point, while the anvil G is resting on the rivet-head and the presser-foot is holding the work, as shown in the drawings, the spur d' engages the dog v^2 , moving the hammer-case to the right, releasing the hammer h' from the lug u just as it comes beneath the rivet r , so that it strikes the rivet squarely on the end. The upward motion of the springs j is limited by the guide-plates i striking against the lower part of the hammer-case; but the hammer continues upward by its inertia until the foot of the hammer strikes against the head of the adjusting-screw h^2 , after which the hammer falls back to the position shown in the drawings, so that it can move to one side under the table A, and make room for the second hammer, the operation of which has already been described, after which the anvil, the presser-foot, burr-carrier, and rivet-carrier are retracted, as described at the beginning, and the operation continues as before. I prefer to make the head of the hammer which strikes the first blow pointed, so as to spread the rivet-head. The other hammer I finish with either a cup-head or flat head, so as to bind and finish the upset. Both hammers may, however, have cup or flat heads, if desired. This is a matter which will be determined largely by the nature of the work to be done and of the material employed.

It is not my intention to claim anything that has been covered by the patents granted to Mellen Bray, and hereinbefore referred to.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a riveting-machine, the cam-cylinder D, provided with the slot f , in combination with the pin a^2 , extending from the lower guide-plate g' , riveted to the burr-carrier O, and adapted to communicate to the latter a reciprocating motion when actuated by said cam-cylinder, substantially as set forth, and for the uses and purposes mentioned.

2. In a riveting-machine, the cam cylinder D, provided with the slot f and branch slot f' , in combination with the pin a^2 , extending from the lower guide-plate g , riveted to the rivet-carrier J, and adapted to communicate to the latter a reciprocating motion when actuated by said cam-cylinder, substantially as described, and for the uses and purposes set forth.

3. In a riveting-machine, the cam-cylinder D, provided with the eccentric-cam E^2 , in combination with the plunger F', lever L', setting-tool I, and its presser-foot, all arranged to operate substantially as described.

4. In a riveting-machine, the cam-cylinder D, provided with the end slot, a^4 , adapted to operate on the pin a , in combination with the plunger F, lever L, sleeve S, punch P, and anvil G, substantially as described, and for the purposes set forth.

5. In a riveting-machine, the disk Q, provided with the crank-pin k , in combination with the guide G' and cross-head T, adapted to engage and compress the hammers $h h'$ against the hammer-springs $j j$, all arranged to operate substantially as described, and for the uses and purposes mentioned.

6. In a riveting-machine, the combination of the disk Q, crank-pin k , cross-head T, provided with the slot t , lug u , and spurs $d' d^2$ with the dogs v^2 , v^3 , and u^3 , by which means are provided for releasing successively the hammers h' and h from their engagement with the lug u , and afterward re-engaging the same on said lug u preparatory to compressing them for another blow, all arranged to operate substantially as described, and for the purposes set forth.

7. In a riveting-machine, the combination of the disk Q, crank-pin k , cross-head T, lug u , and spurs $d' d^2$ with the cam-cylinder D, provided with the slots $f f'$ a^4 and the eccentric E^2 , so that when the hammer-blows are struck the work is held in position by the presser-foot of the setting-tool I and the rivet by the anvil G, substantially as described.

8. In a riveting-machine, the combination of the burr-carrier O, adapted to reciprocate in the slot A^2 , with the guide-plates $g' g^2$ and arm m' , substantially as described, and for the purposes set forth.

9. In a riveting-machine, the combination of the rivet-carrier J, adapted to reciprocate in the slot A' , with the guide-plates $g g^2$, and spring-fingers $m m$, pivoted to the two rear uprights or ears $e' e'$, and extending forward freely between the front guides $e' e'$, substantially as described, and for the purposes set forth.

10. In a riveting-machine, the rivet-receiver h^2 , provided with the pin p' , and the slot in its bottom adapted to hold the rivet in position to be seized and carried forward to the work by the jaws in the forward end of the spring-fingers m , substantially as described.

11. In a riveting-machine, the rivet receiver h^2 , provided with spring d' and central slot in lower front face, all arranged to operate substantially as described, and for the uses and purposes mentioned.

12. In a riveting-machine, a device consisting of two upright rectangular rods or hammers, their inner adjacent faces being adapted to slide freely over each other and their outer faces having flanges that engage in corresponding grooves or guides in the body of the hammer-case casting, the lower end of each hammer terminating in a foot that rests upon an upright coil-spring, secured, as described, between uprights in the lower part of the hammer-case frame, the rear face of each of said hammers having a transverse horizontal slot or notch, all as set forth, whereby a lug extending from a cross-head adapted to reciprocate in a vertical guide attached to the under side of the table, and operated by a crank-pin extending from the front face of a crank-disk

at the forward end of the drive-shaft of said cam-cylinder, is adapted to engage in the said transverse hammer-slots, press the hammers down upon the respective spring-coils afore-
5 said, on which the foot of said hammers rests, preparatory to releasing each of said hammers in succession suddenly, and striking two successive blows, all as set forth, in combination with a device consisting of two radial spurs in
10 different vertical planes on the periphery of said crank-disk, adapted to engage successively as said crank-disk revolves, with two corresponding spurs or dogs in different vertical planes, extending from an arm fastened to said
15 hammer-case, whereby the latter is moved

transversely so as to release successively the hammers engaged on said lug, as aforesaid, thus releasing the hammers and throwing them upward with sufficient force and accuracy to strike the rivet squarely on end and upset the 20 same over the work and the burr, all as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

OSCAR J. BROWN.

Witnesses:

FRANK E. PARKINSON,
RUFUS B. SMITH.