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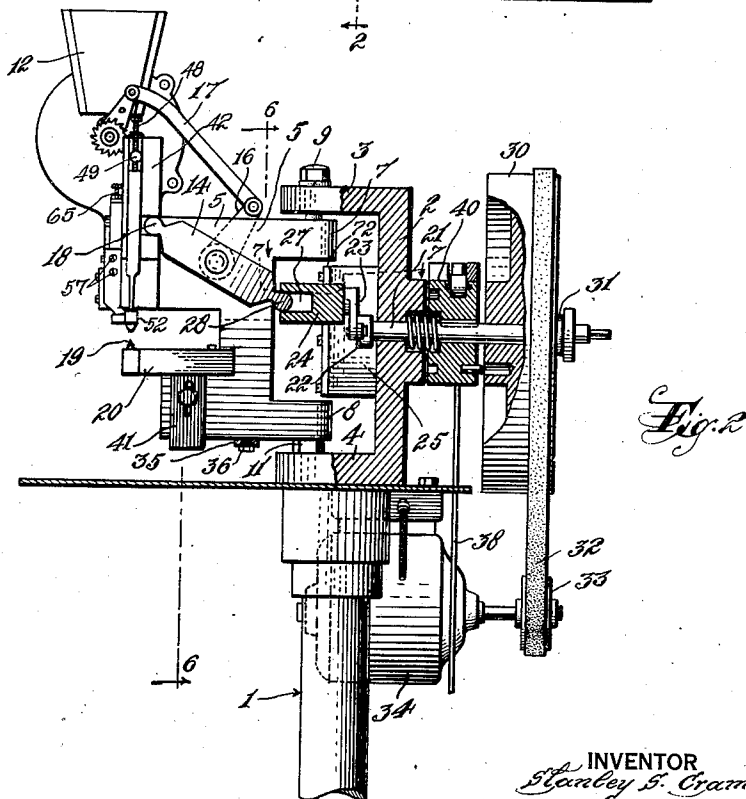
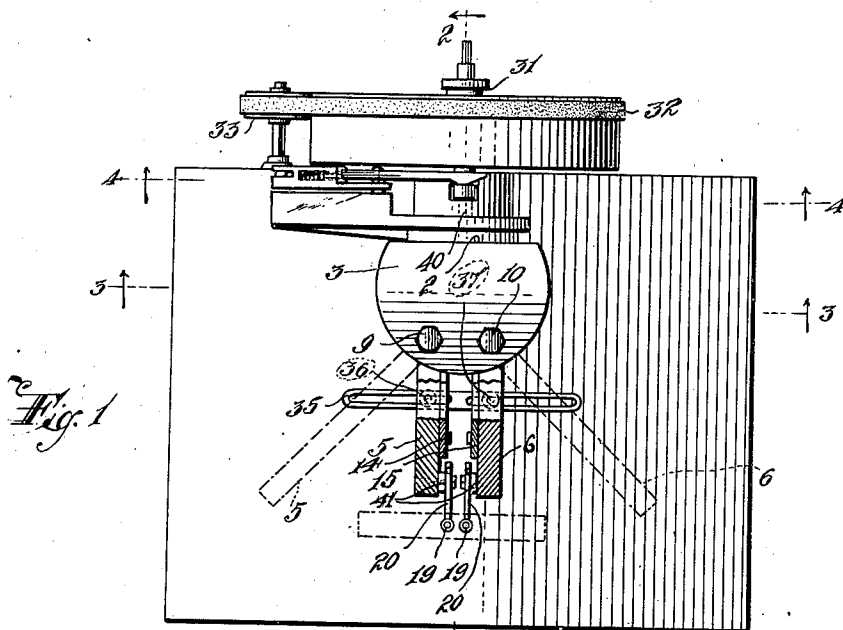
S. S. CRAMER

2,259,296

RIVET-SETTING MACHINE

Filed July 20, 1940

4 Sheets-Sheet 1



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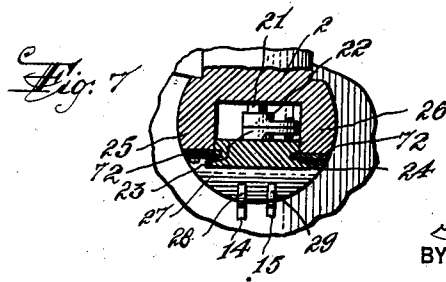
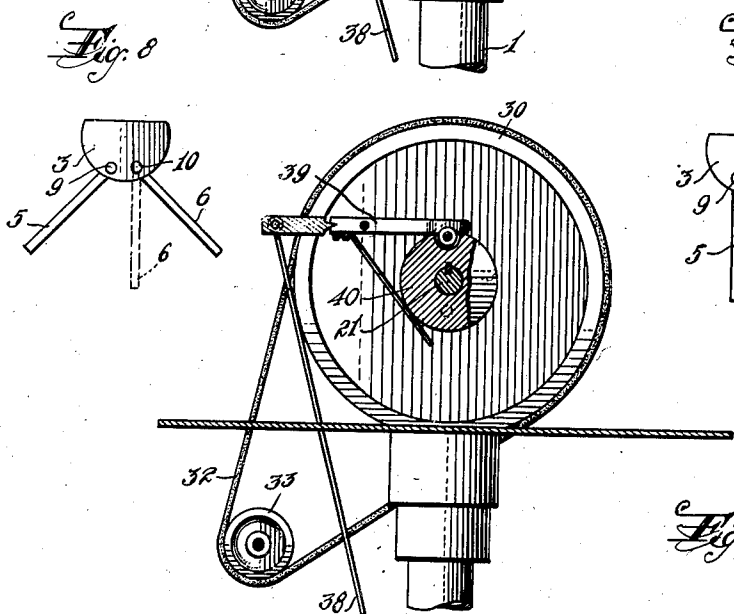
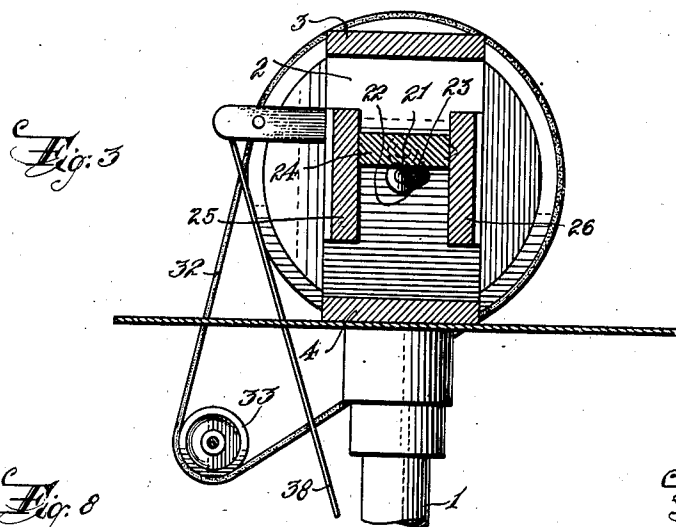
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4 Sheets-Sheet 2



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Fig. 5

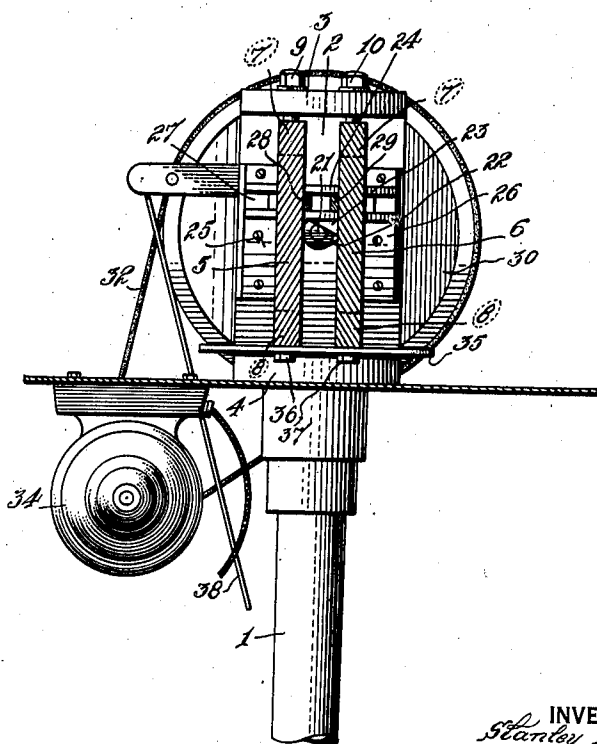
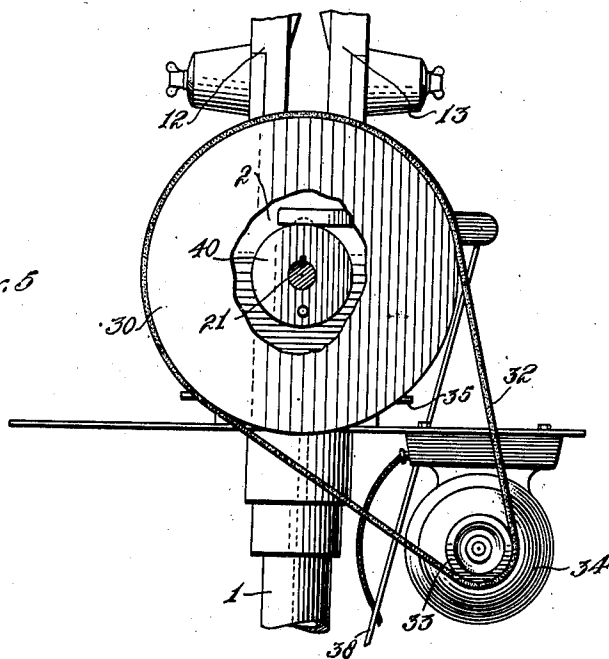


Fig. 6

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4 Sheets-Sheet 4

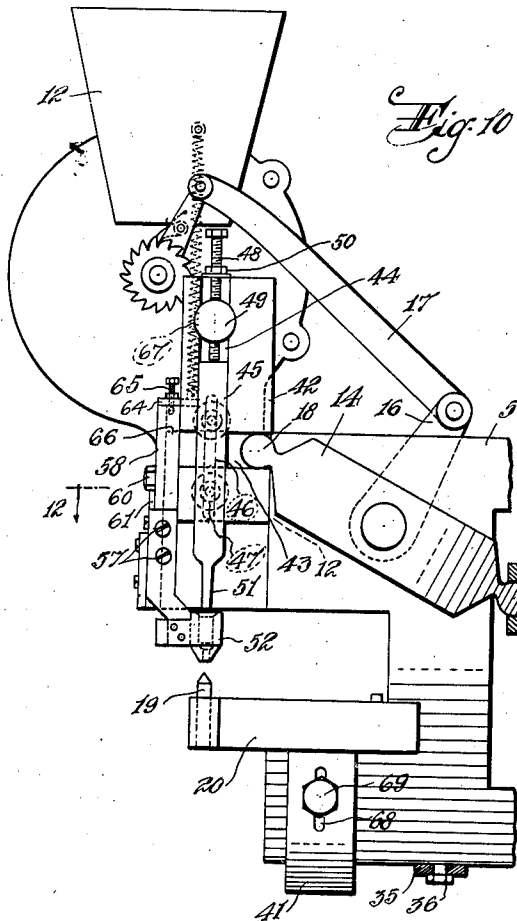


Fig. 10

Fig. 11

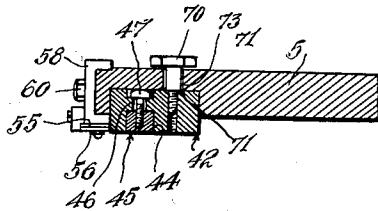
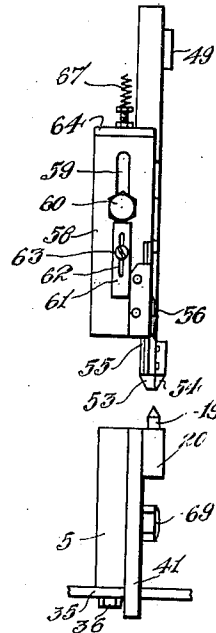


Fig. 12

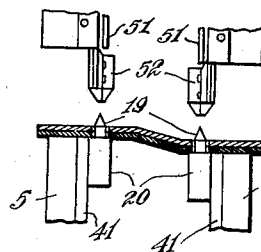


Fig. 13

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UNITED STATES PATENT OFFICE

2,259,296

RIVET-SETTING MACHINE

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17 Claims. (Cl. 218—0.5)

This invention relates to a new and improved rivet-setting machine.

Where a plurality of rivets, either of the solid or hollow type, is desired to be simultaneously set in one operation—as is many times required in attaching one piece to another—much time and expense can be saved by utilizing a rivet-setting machine which will set a plurality of rivets simultaneously. In the majority of rivet-setting machines now on the market and in those with which I am familiar, separate machines are used for each spacing of rivets desired, because the anvil pins and driving mechanism are in a fixed center distance which cannot be changed.

It is, therefore, necessary for users of this type of equipment to have a separate machine for each spacing of the rivets, thus requiring a relatively large investment in rivet-setting equipment. It happens many times that these special machines are often used for only a few hours in a week, or at certain seasons of the year, hence to substitute a very few adjustable center distance machines for a large number of fixed center distance machines will materially reduce the investment in setting equipment.

It is the principal object of my present invention to provide a riveting machine which may be very quickly adjusted to rivet articles together, where different spacings of the rivets are required, and/or different thicknesses of material requiring a difference in the length of stroke for the two rivets, without the trouble and expense of making any additional parts, by merely adjusting the position of certain elements of the machine.

Another object of my invention is to provide a relatively small and compact riveting machine which will attain the principal object at low initial cost of the entire machine.

A further object of my invention is to provide an apparatus to attain the principal object by utilizing a standard rivet-hopper mechanism per se, if desired.

Other objects will be apparent to one skilled in the use of such structures to be hereinafter described.

In the drawings forming a part of this specification:

Figure 1 is a plan view looking down on the machine, with the rivet-feeding and setting mechanism removed.

Figure 2 is a view on the line 2—2 of Figure 1.

Figure 3 is a view on the line 3—3 of Figure 1.

Figure 4 is a view on the line 4—4 of Figure 1.

Figure 5 is a view of Figure 2 looking from

right to left, with the central part of the flywheel broken away.

Figure 6 is a view on the line 6—6 of Figure 2, certain parts being omitted.

Figure 7 is a view on the line 7—7 of Figure 2.

Figures 8 and 9 are diagrammatic views showing how certain parts of the machine may be adjusted to accommodate the machine to different rivet spacings.

Figure 10 is a view of the left-hand portion of Figure 2, on an enlarged scale.

Figure 11 is a view of the rivet-setting parts only, looking from left to right of Figure 10.

Figure 12 is a view on the line 12—12 of Figure 10.

Figure 13 is a diagrammatic view illustrating how two riveting operations may be performed simultaneously at different heights or on different horizontal planes.

In the different views, wherein like numbers refer to corresponding parts, 1 is a standard which supports a main frame member 2 having projections 3 and 4 which, as shown in Figure 1, are preferably arcuate in shape. Pivotaly supported between the projections 3 and 4 are two plate-like members 5 and 6, each of which has arms 7 and 8. The arm 7 of the plate 5 is pivoted to the projection 3 by a stud 9, and the plate 6 is likewise pivoted to the projection 3 by the stud 10. The arms 7 and 8 of the plates 5 and 6 are connected to the projection 4 by somewhat similar studs or pins 11.

Carried on the outer end of the member 5 is a rivet-feeding and setting mechanism having a rivet hopper 12, and on the member 6, a similar mechanism having a rivet hopper 13. Each of the members or plates 5 and 6 also has levers 14 and 15 respectively. Each lever is operatively connected by its link 16 and rod 17 with a rivet-hopper mechanism, but since this rivet-hopper mechanism per se is no part of my present invention, further description does not seem to be necessary.

Each rivet-hopper mechanism, for example 12, with its feed slide, which is back of the portion shown in Figures 2 and 10, is carried by suitable fastening devices to the outer end of the plate 5, which has a vertically disposed groove near its extremity to receive a rivet driver carrier 42. The carrier 42 has a cross-slot 43 to receive the end 18 of the lever 14. The carrier 42 also has a vertical slot 44 in which is positioned a rivet-drive pin 45. The carrier 42 has a slot 46 positioned in the bottom of the groove or channel 44 to receive set screws 47 that screw into the rivet-

drive pin 45 to assist in locking it in position after it has been adjusted by a set screw 48 carried by a stud 49 that is fastened to the carrier 42 after the slot or channel 44 has been milled or completed therein. Also, the set screw 48 is held in position by a lock nut and washer collectively referred to as 50. The plate or member 5 has a slot 73 on the back side to receive one or more guide and holding studs 70, which, for clarity, are not shown in Figure 10. The stud 70 has a large head and is threaded into 42 against a shoulder 71 so that the member 42 is held in slidable position on the plate 5.

The lower end of the drive pin 45 terminates in a plunger point 51 adapted to engage a rivet which is fed to the rivet holder 52, the rivet slide from the hopper 12 being on the back-side of the part shown in Figure 10, but not shown in this view. However, it is to be understood that the rivets are automatically fed down from the hopper 12 through a suitable slide into the holder 52 formed to receive them.

The holder 52 is made up of two parts or split portions 53 and 54. The part 53 is carried by a strip 55 of spring material such as spring-steel, and, likewise, the half 54 of the holder is carried by a spring member 56, the two springs being held as by screws 57 to a holding member 58 which is slidably mounted on the extremity of the plate 5, as is clearly shown in Figure 12. The holding member 58 has a slot 59 therein to receive a guide and holding stud 60 which is screwed into the end of the plate 5 to hold the member 58 in position thereon. The member 58 carries a strip 61 having a slot 62 therein, in which is positioned a set screw 63 which is screwed into the member 58 to lock the strip 61 in any adjusted position. Fastened to the upper part of the member 58 is a flat member 64 carrying an adjusting screw 65 which is adapted to contact with the upper face of the plate 5 at the point 66 to thereby limit the downward movement of the member 58 which is moved downwardly by the plunger 51 when it engages a rivet in the receiver 52. The upward movement of the member 58 is limited by the upper end of the adjustable strip 61 engaging the head of the set screw or holding stud 60. The member 58 is moved to return, that is, elevated, position, after a riveting stroke, by means of a spring 67 which is attached to some part of the hopper or hopper support.

Positioned below the rivet holder 52 is an anvil 20 carrying a pin 19 used for locating the workpiece. The anvil 20 is adjustably supported by an arm 41 on the lower portion of the plate member 5, the adjustment being accomplished in any satisfactory manner as by a slot 68 in the arm 41, and a set screw 69 threaded into the plate 5, whereby the anvil 20 may be raised and lowered to allow for various thicknesses of the parts to be riveted.

Also, the drive pin 45, together with the member 58 may be adjusted as heretofore described so that the plunger point 51 and rivet holder 52 will cooperate with the anvil for setting riveting parts, and so that the parts associated with plate 5 may be set to apply a rivet at a different height or into material of a different thickness than the corresponding parts carried by the plate 6, as illustrated in Figure 13 which shows what may be referred to as a step arrangement of riveting.

On reference to Figures 1, 8 and 9, it will be seen that the plate-type members 5 and 6, with

the mechanism which they carry, may be swung through a large arc, the ends 28 and 29 of the levers 14 and 15 operating in the arcuate recess 27 as will be more clearly seen from Figures 2 and 7. To hold the members 5 and 6 in this adjusted arcuate position, I use a slotted yoke 35 which is locked to members 5 and 6 by set screws 36 and 37 and this anchors the members 5 and 6 in their adjusted position, so that the anvils 20 may be quickly set to any desired arcuate position and distance apart. Because of the adjustment of the members 5 and 6, it will be readily understood that a pair of rivets may be simultaneously set at a great number of positions over a considerable range.

Extending from and supported by the main frame member 2, is a shaft 21 which carries a crank arm 22 which, in turn, is connected to a link 23. The link 23 is connected to a member 24 which is slidably mounted between the guide members 25 and 26, and constructed to move in a single vertical path by the gibs 72. The slide 24 has an arcuately formed recess 27 therein, and positioned within the recess 27 are the ends 28 and 29 of the levers 14 and 15. The outer end of the shaft 21 carries a flywheel 30 which is held thereon by some fastening means 31, it being understood that the flywheel 30 rotates freely on the shaft 21 and only turns it through the medium of a clutch to be later referred to.

The flywheel carries a belt or suitable drive member 32 connected to a pulley 33 of a motor 34 which is carried on the frame structure of the machine.

It may be mentioned in passing that the machine is equipped with what I consider to be a new type of clutch mechanism controlled by a foot lever 38 acting on a control lever 39 and a clutch member 40 which is keyed to the shaft 21 and is adapted to engage the flywheel 30 at the will of the operator, the flywheel being automatically disengaged at the end of a rivet-setting cycle. Since this clutch mechanism is the subject matter of a separate application, further description of the details does not appear to be necessary.

While I have shown the machine mounted on a standard or pedestal 1, it is obvious that the frame member 2 may be arranged for bench mounting. Other changes in the details may be made without departing from the spirit of my invention or the scope of the appended claims.

What I claim is:

1. A rivet-setting machine including a main frame member, a pair of members pivotally mounted in spaced relation on said frame member, means engaging said pair of members for holding said pair of members in adjusted relative position with respect to each other, and each carrying rivet-feeding and setting mechanisms, each of said pair of members having a lever rotatably carried thereon and means cooperative with said lever for operating the rivet-feeding and setting mechanisms, a power drive shaft carried by the frame member, and common means for drivingly connecting the shaft with both the levers, and power means for driving the shaft.

2. A rivet-setting machine including a main frame member having projecting portions extending in the same direction from opposite ends of the frame member, a pair of plate-type members pivotally mounted in spaced relation on said projecting portions, a yoke extending across the plate members at one end thereof and having means cooperating with the plate mem-

bers for holding the plates in adjusted position, each plate having rivet-feeding and setting mechanisms carried thereon and a lever rotatably mounted on the plate and interconnected with the rivet-feeding and setting mechanisms; a power drive shaft carried by the frame member, and common means for drivingly connecting the shaft with both the plate levers and power means for driving the shaft.

3. A rivet-setting machine including a main frame member having projecting portions extending in the same direction from opposite ends of the frame member, a pair of plate-type members pivotally mounted on their opposite edges in spaced relation on said projecting portions, a slotted yoke across the plate members at their lower ends and locking positioning studs located in the slot of the yoke and engaging the plate ends, each plate having a rivet-feeding mechanism carried thereon and a lever rotatably mounted on the plate and interconnected with the rivet-feeding mechanism, a power drive shaft carried by the frame member, and common means for drivingly connecting the shaft with both the plate levers and power means for driving the shaft.

4. A rivet-setting machine including a main frame member, a pair of plate-type members pivotally mounted in spaced relation on said frame member, a yoke engaging said plates and having therewith cooperative means for holding the plates in adjusted relative position with respect to each other, each plate having a lever rotatably carried thereon, a rivet feed mechanism carried by each plate and means cooperative with said lever for operating the rivet feed mechanism, a pair of spaced guide members carried by said frame member, a member having an arcuately formed recess therein and located between said guide members, the ends of said levers being positioned in said recess; a power-driven shaft carried by the frame member and having a crank arm connection with the recessed member to raise and lower it as the shaft is turned, and power means for driving the shaft.

5. A rivet-setting machine including a main frame member, a work table, a pair of spaced members pivotally mounted on the frame member and extending over the work table and each carrying a rivet-feeding and setting mechanism, a drive shaft extending through the frame member, a lever for each of said spaced members and pivoted thereon, and each having operative connection with the rivet-feeding and setting mechanism, and means interconnected between the shaft and one end of the levers for causing them to operate the feeding and setting mechanism.

6. A rivet-setting machine including a main frame member, a work table, a pair of spaced members pivotally mounted on the frame member and extending over the work table and each carrying a rivet-feeding and setting mechanism, a drive shaft extending through the frame member, a lever for each of said spaced members and pivoted thereon, and each having operative connection with the rivet-feeding and setting mechanism, a pair of spaced guide members, a member having an arcuately formed recess positioned between the guide members and eccentrically connected with the shaft, the ends of said levers being located in said recess, and means for holding the said members carrying the rivet-setting mechanism at any desired angular position within a considerable range.

7. A rivet-setting machine including a main

frame member, a work table, a pair of spaced members pivotally mounted on the frame member and extending over the work table and each carrying a rivet-feeding and setting mechanism, and an anvil for the workpiece below said rivet-feeding and setting mechanism, a drive shaft extending through the frame member, a lever for each of said spaced members and pivoted thereon, and each having operative connection with the rivet-feeding and setting mechanism, and means interconnected between the shaft and one end of the levers for causing them to operate the feeding and setting mechanism.

8. In a rivet-setting machine utilizing a rivet-feeding and setting mechanism, a frame member, a pair of members pivoted to the frame member so as to swing through a considerable angle, means for anchoring the pivoted members in any arcuately adjusted position within said angular range, each pivoted member carrying a rivet-feeding and setting mechanism and a lever for operating it, a slidable member supported on the frame member and positioned to simultaneously operate both said levers, and means for moving said slidable member up and down to actuate the rivet-feeding and setting mechanism.

9. In a rivet-setting machine utilizing a rivet-feeding and setting mechanism, a frame member, a pair of members pivoted to the frame member so as to swing through a considerable angle, means for anchoring the pivoted members in any arcuately adjusted position within said angular range, each pivoted member carrying a rivet-feeding and setting mechanism and means for operating it, a pair of spaced guides, a member positioned between said guides and adapted to slide up and down therebetween and having an arcuate recess on one edge, the recess receiving the ends of said levers, a drive shaft eccentrically connected to the member which slides, and an anvil carried by each of said pivoted members in cooperative relation to the rivet-feeding and setting mechanism.

10. In a rivet-setting machine utilizing a rivet-feeding and setting mechanism, a frame member, a pair of members pivoted to the frame member so as to swing through a considerable angle, means for anchoring the pivoted members in any arcuately adjusted position within said angular range, each pivoted member carrying a rivet-feeding and setting mechanism and means for operating it, and an anvil positioned below its rivet-feeding mechanism, a pair of spaced guides having inner guiding surfaces, a member having parts engaging said guiding surfaces and adapted to slide up and down thereon with means for holding said sliding member in position on said guides, said sliding member having a formation receiving the ends of both of said levers, and a drive shaft eccentrically connected to this member as and for the purpose described.

11. A rivet-setting machine as set forth in claim 8, further defined in that each rivet-setting mechanism includes a driver carrier slidably supported on the pivoted member carrying it and having a cross-slot for the end of said operating lever, a driver pin adjustably carried by the driver carrier and terminating in a plunger point for engaging a rivet.

12. A rivet-setting machine as set forth in claim 8, further defined in that each rivet-feeding and setting mechanism includes a driver carrier slidably supported on the pivoted member carrying it and having a cross-slot for the end of said operating lever, a driver pin adjustably carried

by the driver carrier and terminating in a plunger point for engaging a rivet, and a rivet receiver slidably carried adjacent the driver carrier at the end of the pivoted member carrying it, said receiver including a pair of relatively stiff but resilient members, each carrying at its free end a complementary part forming a receptacle for a rivet in alignment with said plunger point.

13. A rivet-setting machine as set forth in claim 8, further defined in that each rivet-feeding and setting mechanism includes a driver carrier slidably supported on the pivoted member carrying it and having a cross-slot for the end of said operating lever, a driver pin adjustably carried by the driver carrier and terminating in a plunger point for engaging a rivet, and a rivet receiver having a rivet receptacle in alignment with said plunger point, said receptacle being in two complementary parts, with means for resiliently holding them together but allowing them to be separated so the plunger point may force the rivet out of the receptacle into the workpiece positioned below the receptacle.

14. A rivet-setting machine as set forth in claim 8, further defined in that each rivet-feeding and setting mechanism includes a driver carrier slidably supported on the pivoted member carrying it and having a cross-slot for the end of said operating lever, a driver pin adjustably carried by the driver carrier and terminating in a plunger point for engaging a rivet, and a rivet receiver having a rivet receptacle in alignment with said plunger point, said receptacle being in two complementary parts, with means for resiliently holding them together but allowing them to be separated so the plunger point may force the rivet out of the receptacle into the workpiece positioned below the receptacle, the rivet receiver being slidable along with the driver pin, with means for automatically returning it to starting position on withdrawal of the plunger point from the receptacle.

15. A rivet-setting machine including a frame member, members pivoted to the frame member so as to be arcuately movable, means for anchoring the pivoted members in any arcuately adjusted position within a suitable range, each pivoted member supporting a rivet hopper with means for feeding rivets therefrom, a rivet driver carrier and a driver pin adjustably on the carrier, a slidable rivet receiver having a receptacle for a rivet in alignment with the pin, with means for successively feeding rivets to the receptacle, the receptacle being expansible to allow the pin to force a rivet therethrough, levers for operating the slidable carrier and rivet-feeding means; and means for operating all of said levers on all of said pivoted members simultaneously, and an anvil positioned in alignment with each of the driver pins to receive the workpiece to be riveted together.

16. A rivet-setting machine including a frame member, members pivoted to the frame member so as to be arcuately movable to different vertical planes, means for holding the pivoted members in any stationary adjusted position within a suitable range, a rivet-feeding and setting mechanism carried on each of said pivoted members, and means for simultaneously operating all of said mechanisms.

17. A rivet-setting machine including a frame member, members pivoted to the frame member so as to be arcuately movable to different vertical planes, means for holding the pivoted members in any stationary adjusted position within a suitable range, a rivet-feeding and setting mechanism carried on each of said pivoted members, a single movable part carried by the frame and having levers operatively connected thereto for actuating the rivet-feeding and setting mechanisms, and power means for moving said single movable part.

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