

June 27, 1939.

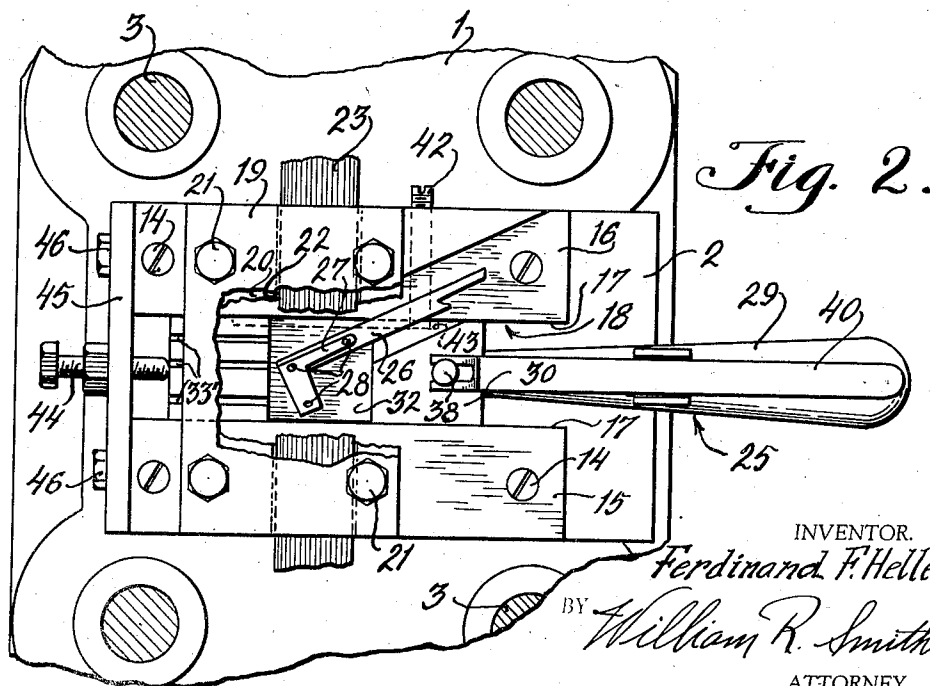
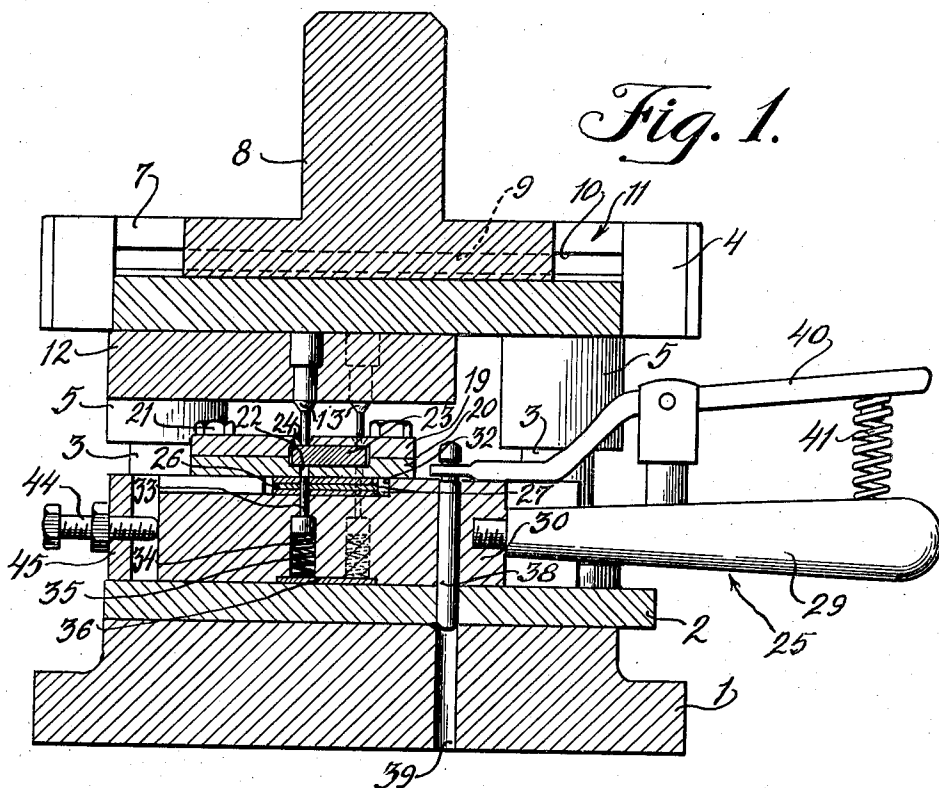
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2,163,683

MEANS FOR CUTTING AND SETTING RIVETS

Filed April 9, 1937

3 Sheets-Sheet 1



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MEANS FOR CUTTING AND SETTING RIVETS

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3 Sheets-Sheet 2

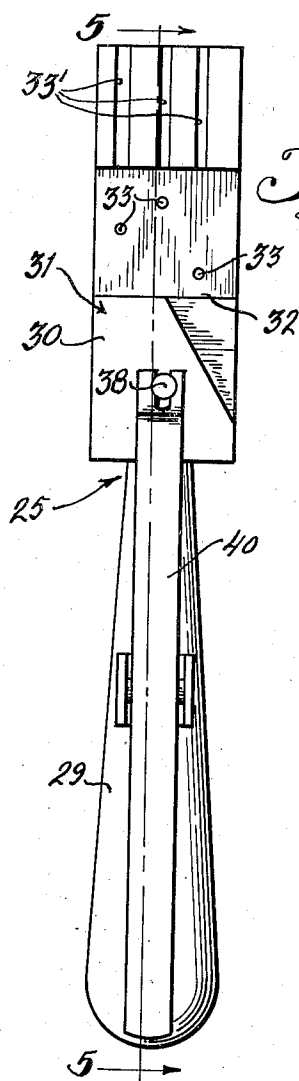


Fig. 3.

Fig. 4.

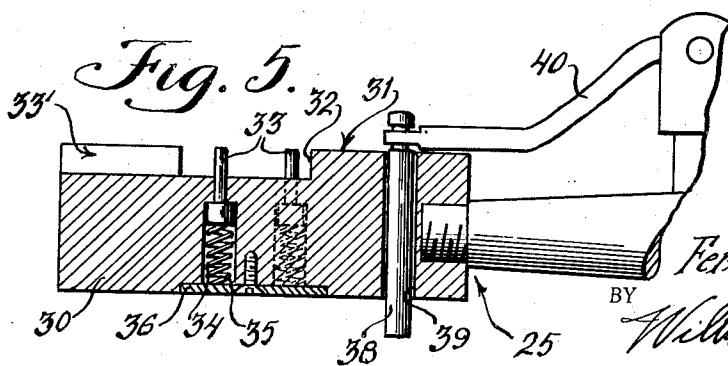
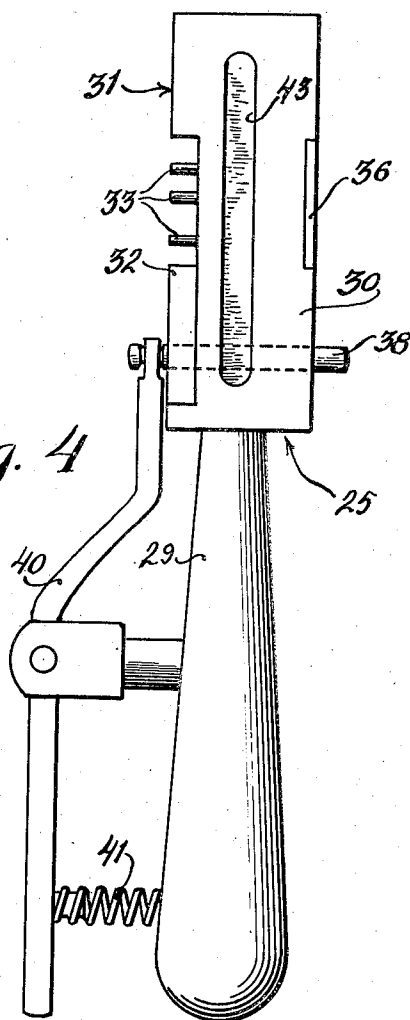


Fig. 5.

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MEANS FOR CUTTING AND SETTING RIVETS

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3 Sheets-Sheet 3

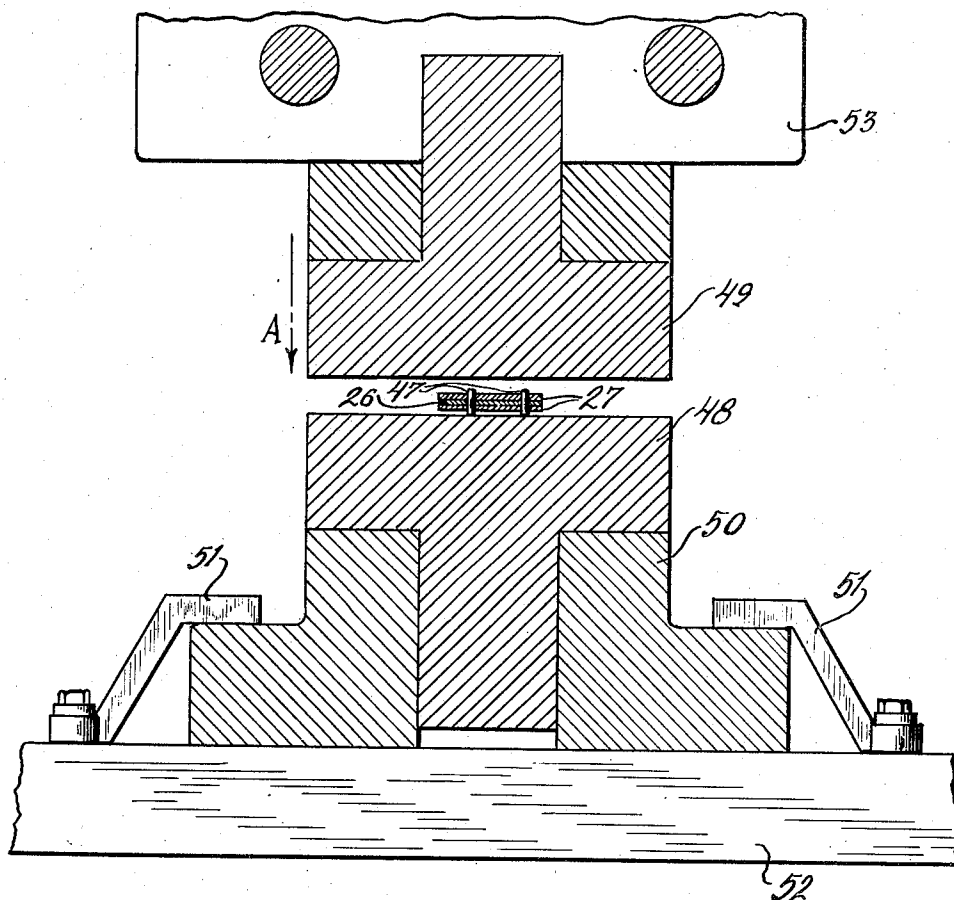


Fig. 6.

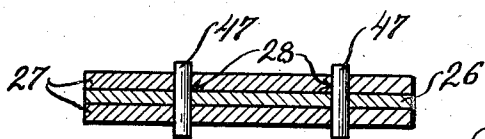


Fig. 7.

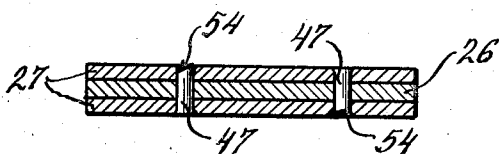


Fig. 8.

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UNITED STATES PATENT OFFICE

2,163,683

MEANS FOR CUTTING AND SETTING
RIVETS

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Application April 9, 1937, Serial No. 135,887

7 Claims. (Cl. 78—49)

The present invention relates to a method and means for cutting and setting rivets and has for its primary object the provision of a method and machinery by means of which rivets may be cut out of a metal strip and the cut rivets readily introduced into registering openings of a plurality of superposed members of relatively thin construction for frictional engagement therewith, whereby said rivets may be subsequently pressed into binding engagement with said members for rigidly uniting the same.

The invention also aims to provide mechanism for cutting and frictionally setting rivets wherein is embodied means constructed and operable to facilitate the positioning of relatively small parts in accurate registration for placement into the rivet cutting machine to receive the cut rivets and for removal of said parts with the rivets frictionally set therein from said machine, whereby said rivets may thereafter be upset to rigidly secure the parts together for forming a unitary structure.

Another important object of the invention resides in the provision of a machine of the character mentioned having a support for the parts to be riveted together, said support consisting of a handle movable into and out of the machine and having means for assuring the proper aligned positioning of the parts during the rivet cutting and setting operation.

Other important objects and advantages of the invention will be in part obvious and in part pointed out hereinafter.

As hereinbefore stated, my invention contemplates a method and means devised to facilitate the riveting together of parts of relatively thin construction, the invention being primarily directed to the art of manufacturing so-called "sinkers", generally used in full fashioned knitting machines, and comprising a very thin blank reinforced by likewise thin members riveted to a portion of said blank.

When it is considered that the usual sinker approximately ranges between .0055" to .0075", and that the reinforced members thereof are not much thicker than the sinker itself, the difficulty encountered in placing and setting the rivets to unite the composite parts is readily appreciated.

By practicing my improved method, the riveting of such parts as those above mentioned becomes a simple and easy matter. In practicing the method in accordance with this invention, the parts to be riveted, which parts have rivet holes therein, are first arranged in superposed relation with the rivet holes in registration. The parts so

arranged are then placed in a rivet punching machine in juxtaposition with a metal strip disposed to travel in said machine. Rivets are then punched or cut out of said strip and the punched or cut out rivets positively guided into the rivet holes of the parts for engagement with said parts, which thereby become frictionally assembled. The parts so assembled are then removed from the rivet punching machine and subsequently placed into a pressing or stamping machine where the rivets are upset to rigidly fasten the composite parts into a unitary structure.

In order that the invention and its mode of operation may be more readily understood by persons skilled in the art, I have in the accompanying drawings and in the detailed description based thereupon, set out a possible embodiment of the invention. In these drawings:

Figure 1 is a vertical cross section through the rivet cutting and placing mechanism constructed in accordance with the invention.

Figure 2 is a top plan of the rivet cutting and setting machine with certain parts removed and other parts broken away.

Figure 3 is a top plan of the movable support in the form of a handle incorporated in my improved mechanism.

Figure 4 is a side elevation of the same.

Figure 5 is a longitudinal cross section taken on line 5—5 of Figure 3, and viewed in the direction indicated by the arrow.

Figure 6 is a vertical cross section of the rivet pressing and upsetting machine.

Figure 7 is an enlarged cross section of the parts to be united having the cut rivets in frictional engagement therewith.

Figure 8 is an enlarged cross section of the parts having the cut rivets upset to rigidly unite said parts.

Having more particular reference to the drawings, wherein like characters of reference will designate corresponding parts throughout the rivet cutting and setting machine may be stated to comprise a base 1 preferably formed from cast iron and having a hardened metal plate 2 suitably affixed thereon. The base 1 with its plate 2 are adapted to be fixedly clamped upon the frame table of any suitable type of commonly well known power operated cutting and forming presses.

Arranged to extend upwardly from the base 1 are a plurality of posts 3 upon which is reciprocally mounted a metal frame 4 having sleeves 5 engaged about said posts. The upper side 6 of the frame is formed with a well 7 receiving a

chuck 8 adapted to be engaged with the usual ram of the cutting and forming press. In order that the reciprocating movement of the frame 4 may adjust itself to the working of the press ram, the chuck 8 is preferably secured to, but movable in relation with, the frame 4. For this purpose, each of the two opposed sides of the chuck is provided with a flange, as indicated by the dotted lines 9 in Figure 1, said flange being slidably engaged in a slot 10 cut in the wall 11 of the well 7. Thus the chuck is free to slide in relation to the frame 4 so that no jamming of parts will occur during the operating function of the press.

Secured to the underside of the frame 1 is a block 12 in which is rigidly secured a set of punches 13 moving up and down in a limited path of travel with the reciprocation of the frame 4.

Arranged longitudinally of the plate 2 to project upwardly therefrom and rigidly secured thereon by means of screws 14, or the like, is a pair of diametrically opposite blocks 15 and 16 respectively, the opposed faces 17 of which define a guideway 18 for the purpose to be hereinafter specified.

Mounted transversely of the blocks 15 and 16 over the guideway 18 are superposed plates 19 and 20 fixed in position by means of bolts 21 or like fastening elements. The contacting faces of said plates 19 and 20 are provided with complementary recesses forming a slot 22 adapted to receive a stock metal strip 23 from which rivets are to be punched or cut out in the manner to be later specified.

The plates 19 and 20 are also provided with transversely aligned apertures 24 positioned to open into the slot formed by the complementary recesses 22, the apertures in the uppermost plate 19 engaging and serving as guides for the rivet punches 13, and the aperture in the lower plate 20 serving as guides for the cut rivets when forced downwardly by said punches.

Adapted to be slidably received in the guideway 18 and beneath the plates 19 and 20 is a support 25 for the parts 26 and 27 having the rivet holes 28 cut therein. As more clearly shown in Figures 3, 4, and 5 of the drawings, the support 25 has the form of a handle consisting of a hand piece 29 connected to a block 30. In the upper face 31 of the block 30 is cut a recess 32 for the purpose of accommodating the sinker parts 26 and 27 (Figures 1 and 2). The block 30 is adapted to enclose a set of pins 33 disposed to project outwardly in the recess 32. For this purpose the block 30 is formed with bores 34 receiving said pins 33.

A spring 35 is likewise retained in each bore 34 and acts on the associated pin 33 to normally urge the same out of the block 30. The pins 33 and spring 35 are maintained in the block by means of a plate 36 detachably secured to the lower face 37 of said block 30. The pins 33 are provided for the purpose of entering the rivet holes in the sinker parts and thus hold the same in proper position to frictionally receive the rivets punched from the metal plate 23 by the punches 13. The pins 33 are so disposed in the block 30 that they will be aligned with the punches 30 and rivet guiding apertures 22 in the plate 20 and in order that the proper and accurate alignment may be assured, the block 30 is provided with a rod 38 traversing the block for engagement with a bore 39 in the plate 2 and base 1 in the man-

ner represented in full lines in Figure 1 of the drawings.

To permit the block 30 to be withdrawn from its operative position, and thereby facilitate the arranging of the parts 26 and 27 thereon, the rod 38 is retractable from its engagement with the plate 2 and base 1 by means of a lever 40 suitably pivoted on the hand piece 29. The rod 38 is normally urged into locking position by means of a spring 41 disposed between the hand piece 29 and the lever 40.

The sliding movement of the block 30 is limited by a stop pin 42 adjustably mounted in the block 16 and disposed to enter a recess 43 cut in the adjacent side of the support block 30 as more clearly illustrated by the dotted lines in Figure 2 of the drawings.

As shown in Figures 1 and 2, the inward positioning of the block 30 may be advantageously controlled by an abutment 44 adjustably supported in a bar 45 rigidly connected to the ends of the blocks 15 and 16 by means of bolts 46, or like securing means.

In order to prevent injury to the punches 13 should the same become accidentally positioned in the path of the moving block 30 of the support 25, said block is provided with a plurality of slots 33' extending longitudinally of the forward end of the block and arranged in alignment with said punches.

In using the rivet cutting and setting machine, the support 25 is first partially withdrawn from the machine, which is possible because of the construction above described. In this partially withdrawn position of the support, the pins 33 are exposed so that the parts 26 and 27 may be easily arranged thereon in superposed relation with the rivet holes 28 in registration. The support is then moved into the machine and when the rod 38 falls into the bore 39 in the base, the proper positioning of the support 25 for the functioning of the machine is assured.

Through the normal operation of the machine, the frame 4 moves downwardly carrying the punches 13 therewith, thus punching rivets out of the metal strip 23. The cut rivets are then guided through the apertures 22 in the lower plate 20 into the rivet receiving holes 28 of the parts 26 and 27.

As shown in Figure 7, the cut rivets 47 are merely placed snugly into the rivet receiving holes 28 of the parts 26 and 27 to frictionally engage the same and thus frictionally retain the parts in assembled relation. At this point, I wish to call attention to the fact that the punches 13 may be so shaped as to cut rivets of a diameter slightly greater than the diameter of the rivet receiving holes 28 in the parts 26 and 27. Thus the rivets upon being forced, through the continued movement of the punches, into the rivet holes of the parts 26 and 27, have a snug fit and assure a positive frictional connection with said parts. Subsequent to this operation, the support 25 is again withdrawn from the machine and the assembled parts removed to be subsequently placed in a pressing or stamping machine for upsetting the rivets to rigidly unite the parts.

In Figure 6 of the drawings, I have shown a preferred construction of the pressing or stamping machine, which comprises a pair of opposed pressing plates 48 and 49 respectively. The plate 48 is mounted in a base 50 rigidly secured by means of clamps 51 to the stationary frame table 52 of any suitable type of well known pressing or stamping press. The remaining plate 49 is

rigidly mounted in the ram 53 of the pressing or stamping press.

As previously stated, the parts 26 and 27 frictionally assembled by the rivets 47 are placed between the pressing plates 48 and 49.

Through the usual function of the stamping press, the plate 49 is caused to move towards the companion plate 48, as indicated by the arrow A in Figure 6. This movement of the plate 49 presses the rivets 47 between said plate 49 and the plate 48, thus flattening the rivets and upsetting the same, as indicated at 54 in Figure 8, thus rigidly clamping the parts 26 and 27.

Whereas I have described the rivet cutting and the rivet upsetting features of the invention, as being performed preferably in different machines, it is of course to be understood that these two features may be incorporated in a unitary mechanism.

From the foregoing, it will be understood that I have provided a simple yet efficient method and means of riveting together relatively thin parts. It is also to be understood that whereas I have herein shown and described a possible embodiment of the invention, certain modifications may be incorporated in the disclosed construction. Therefore, any modifications which come within the scope of the following claims are to be considered within the spirit of the invention.

What I claim is:

1. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; and a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts.

2. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, and apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the

rivet holes of said parts; and means between said support and base for releasably locking said support in place when bringing the parts in rivet receiving position.

3. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts; and means associated with the support and engageable with the base for releasably locking said support in place when bringing the parts in rivet receiving position.

4. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts; and a stop carried by the base and adjustable thereon for engagement with the support to adjust the positioning of the latter when placing said parts in rivet receiving position.

5. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the

ing position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts; a stop carried by the base and adjustable thereon for engagement with the support to adjust the positioning of the latter when placing said parts in rivet receiving position; and means between said support and base for releasably locking the support in said position.

6. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; and a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts; and a spring actuated pin associated with the support and engageable with the base for releasably locking said support in rivet receiving position.

ated pin associated with the support and engageable with the base for releasably locking said support in rivet receiving position.

7. A machine for cutting and placing rivets in frictional engagement with a plurality of parts having rivet holes therein, comprising: a base provided with a guideway; a pair of superposed plates mounted on said base to extend transversely of the guideway thereof, and having complementary recesses forming a slot adapted to receive a stock metal strip, each plate having a set of apertures opening in said slot, the apertures in one plate being aligned with the apertures in the other plate; a mechanism including rivet punches supported on said base over the plates, said punches being disposed for engagement with the apertures in the opposed plate and guided thereby into contact with said strip for punching rivets therefrom; a support for engaging and retaining said parts in rivet receiving position and slidable on said base in and out of the guideway thereof beneath the plates for bringing the rivet holes of said parts in alignment with the apertures of the opposed plate, whereby the punched rivets are guided into the rivet holes of said parts; a stop carried by the base and adjustable thereon for engagement with the support to adjust the positioning of the latter when placing said parts in rivet receiving position; and a spring actuated pin associated with the support and engageable with the base for releasably locking the support in said position.

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