

Feb. 24, 1931.

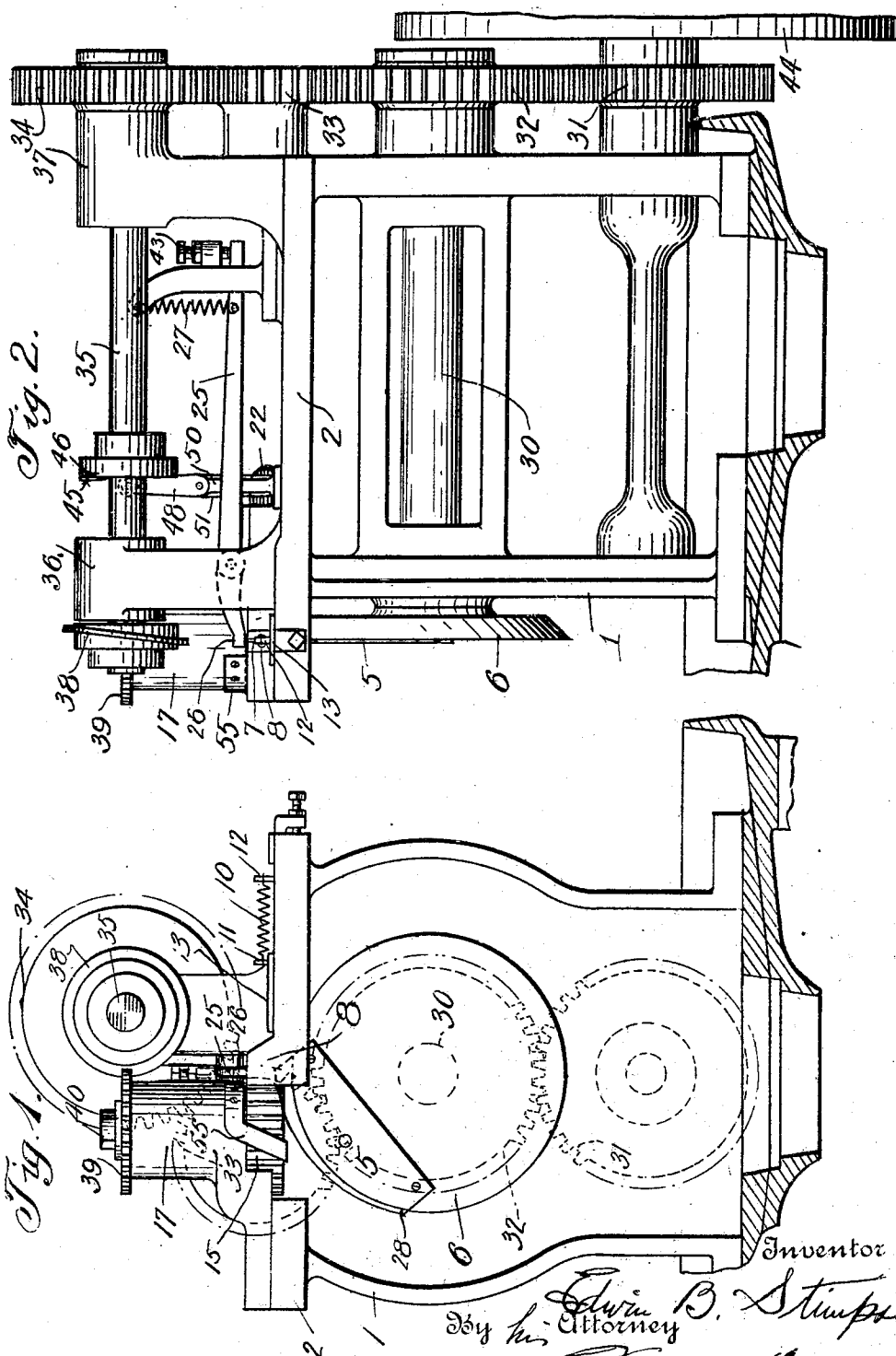
E. B. STIMPSON

1,793,646

SLITTING MACHINE

Original Filed Oct. 25, 1921

4 Sheets-Sheet 1



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Fig. 3.

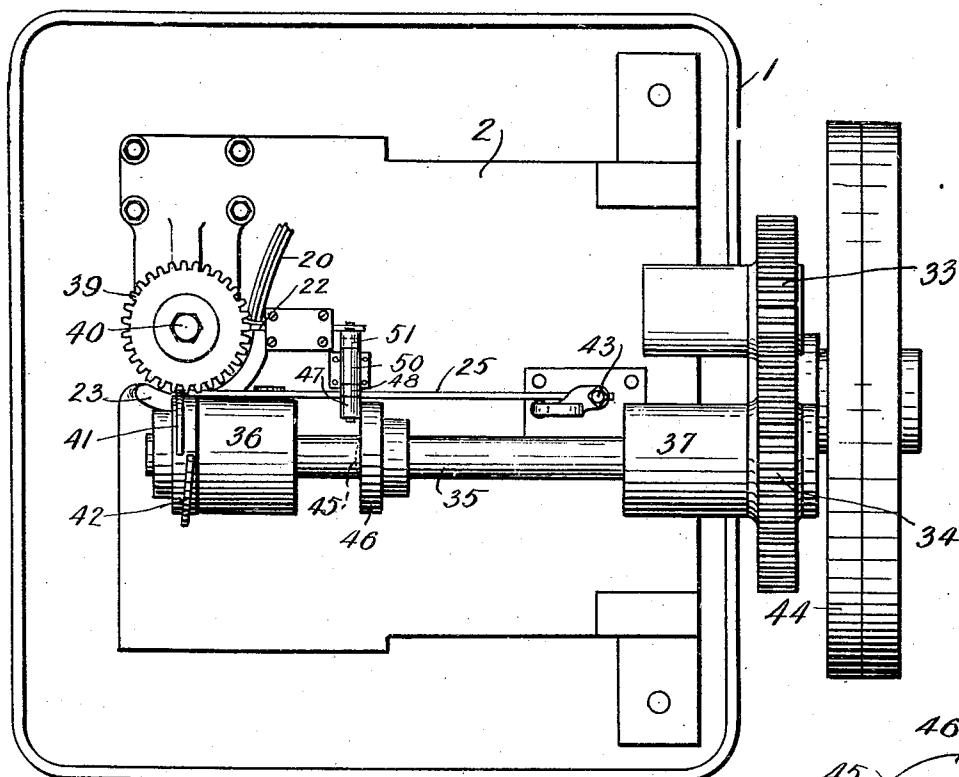


Fig. 4.

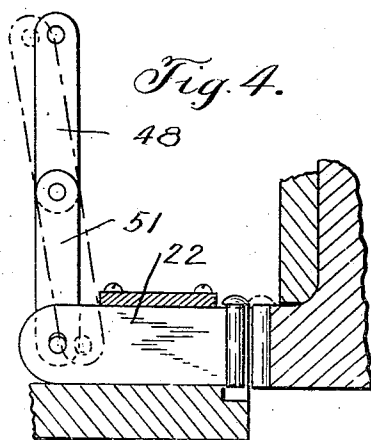
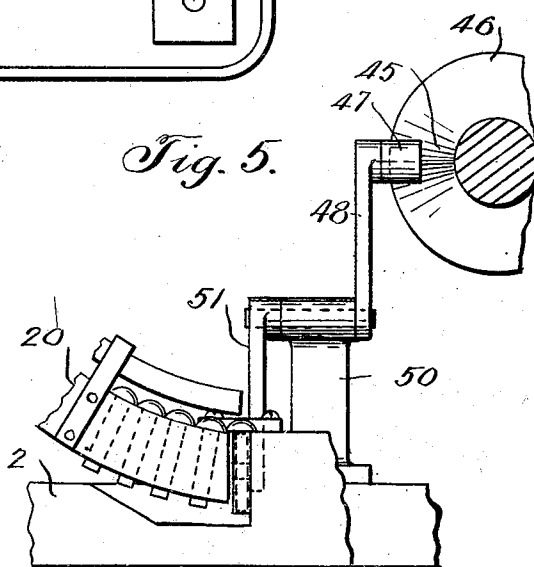


Fig. 5.



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Fig. 6.

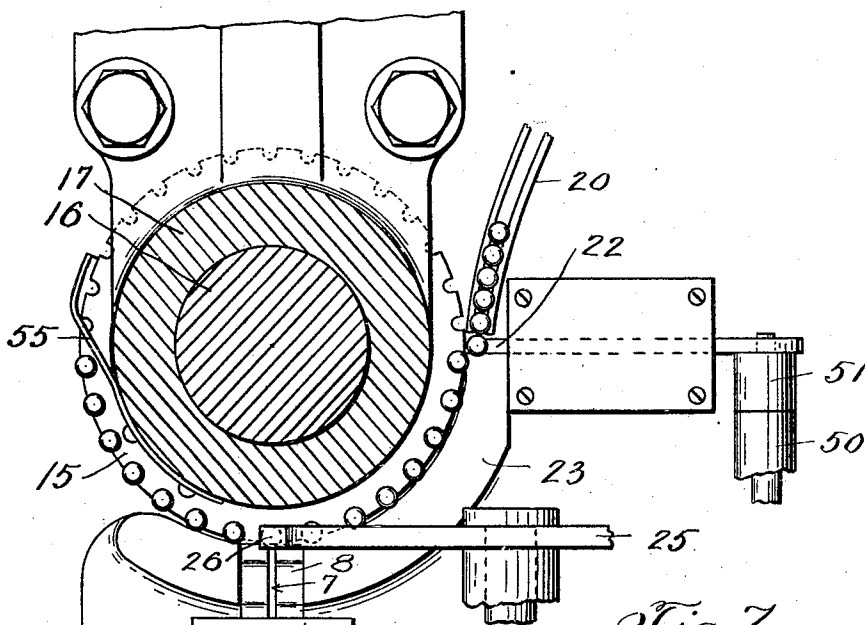


Fig. 7.

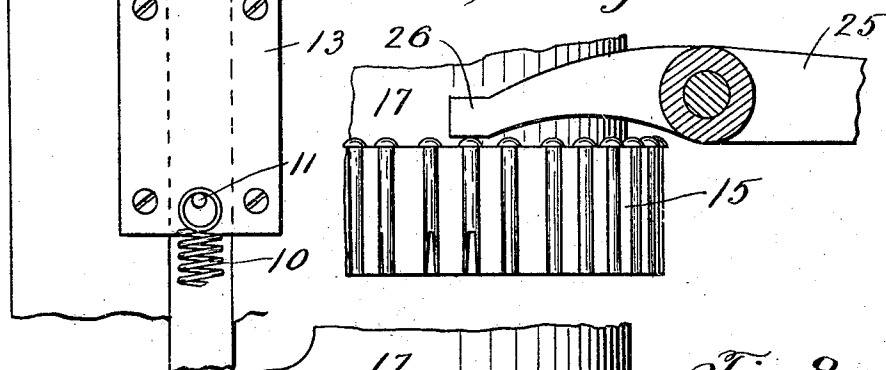
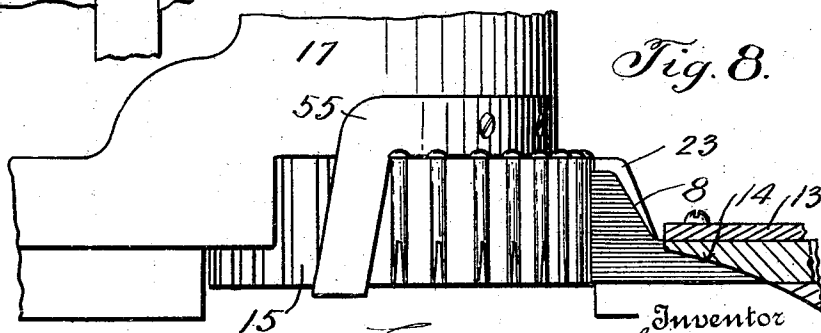


Fig. 8.



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Fig. 9.

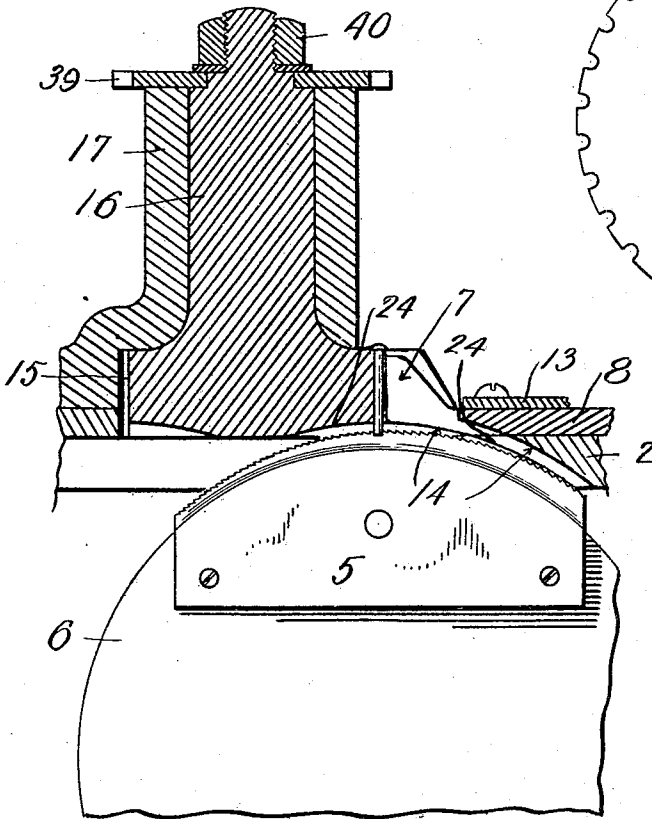


Fig. 11.

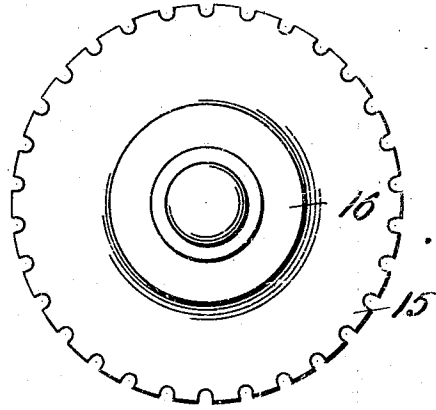


Fig. 12.

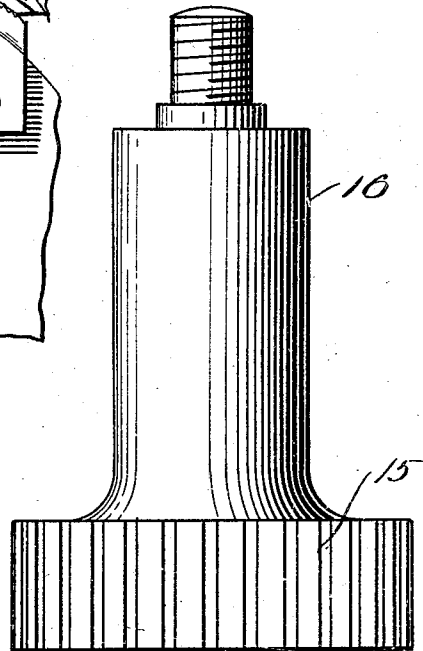
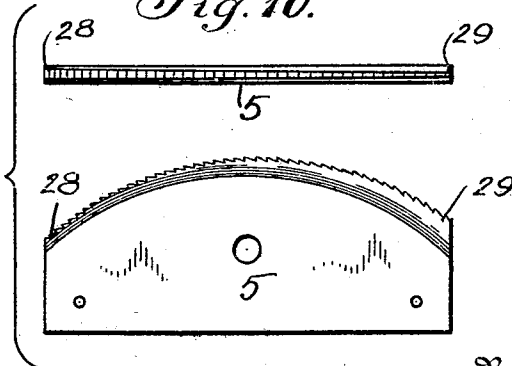


Fig. 10.



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UNITED STATES PATENT OFFICE

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SLITTING MACHINE

Application filed October 25, 1921, Serial No. 510,195. Renewed March 18, 1927.

This invention relates to cutting or slitting machines, and is adapted to cut slits in the lower ends of the shanks of rivets. Such slitted rivets find their chief use as fastening members, but the uses to which they may be applied are numerous and varied. It is highly desirable that they be manufactured rapidly and at the smallest possible cost. The present invention comprises a machine for effectively carrying out these objects.

Another object of this invention is the provision of means whereby the entire operations of feeding the rivets, positioning them properly for cutting, slitting the rivets, and discharging them from the machine are performed automatically.

Other objects and advantages will hereinafter appear.

In the accompanying drawings:

Fig. 1 is a side view of the machine forming the subject of this invention.

Fig. 2 is a front view of the machine as shown in Fig. 1.

Fig. 3 is a plan view.

Fig. 4 is a front view showing an enlarged detail of the means for inserting the rivets in position in the rivet-holder.

Fig. 5 is a side view of the device shown in Fig. 4.

Fig. 6 is a plan view of the machine, horizontally sectioned, and showing the operation of the rivet-feeding and positioning means.

Fig. 7 is an enlarged detail of one of the means for holding the rivets in position while being cut.

Fig. 8 is an enlarged detail showing the means for discharging the cut rivets.

Fig. 9 is a vertical section through the rivet-holder.

Fig. 10 shows a front and a plan view of the cutting means.

Fig. 11 is an enlarged plan view of the rivet-holder.

Fig. 12 is an enlarged front view of the rivet-holder.

Referring to the drawings, the machine comprises a supporting framework 1 having a bed-plate 2, the entire operating mechanism being supported upon said framework and bed-plate. The operating mechanism in-

cludes the cutting means, the rivet-feeding means, the rivet-positioning and holding means, the rivet-discharging means, and the driving mechanisms for the foregoing means.

The means for cutting or slitting the rivets comprises a cutting member 5, fixed to rotating disk 6, and operating in a slot 7 formed in a guide-block 8. Said guide-block is slidably mounted upon the bed-plate and is normally pressed inwardly by a spring 10 fixed at one end to the supporting frame at 11 and at the other end to the block as at 12. Said block is embedded in the bed-plate and is held against upward movement by a cover plate 13 fixed to the bed-plate. Both the guide-block and the bed-plate are cut out as at 14 (see Fig. 9) to permit the rotary cutting member to operate therein.

The guide-block, being pressed inwardly, abuts against a rivet in a rivet-holder 15 to hold said rivet in position while the cutting member operating in the guide slot cuts its way into the rivet. Said rivet-holder is preferably in the form of a wheel having a plurality of rivet-holding grooves in its periphery, and has formed integral therewith a shank 16 operating in a vertical bearing member 17 fixed to the bed-plate, so that said rivet-holder may be rotated to bring the rivet-holding grooves successively into cutting position.

For feeding the rivets into the rivet-holding grooves, there may be provided an inclined chute 20 into which the rivets are fed so that they are suspended by the heads of the rivets which are supported and slide upon the chute. As each rivet leaves the chute it is supported in vertical position upon the bed-plate 2 between the rivet-holder 15, an operating plunger 22, and the end of a guide-block 23 fixed upon the bed-plate concentric with rivet-holder 15 to prevent outward movement of the rivets from said grooves. The rivet may be supported by its head resting upon the end of block 23 in front of the plunger. As the rivet-holder is rotated to bring a new rivet into cutting position, the plunger 22 is operated inwardly to force the rivet in front of it into that rivet-holding groove which passes said plunger as the holder rotates. The rivet having been forced into the rivet-hold-

ing groove, it is supported by means of its head resting upon the upper surface of the holder 15. The plunger is withdrawn, and the newly-inserted rivet passes in front of the member 23 which holds it against outward movement until the rivet reaches the cutting position. In this manner, as the cutting of each rivet is completed, the holder is rotated to bring the next rivet into cutting position, and another rivet is inserted into the holder as the latter rotates to the new position.

As the rivet comes into cutting position it is no longer held by block 23, but is pressed firmly into its groove by the guide-block 8. The cutting member operating in the slit 7 cuts its way into the lower end of the rivet-shank, the rivet-holder 15 being provided with a segmental slit 24 at the rear of each groove to permit the rotary cutting member to operate therein. To hold the rivet against upward movement as the cutting member works its way upwardly into the rivet shank, there may be provided a lever 25 pivoted on the supporting frame and having one end 26 pressed downwardly upon the head of the rivet in cutting position by a spring 27 fixed at one end to the lever and at the other end to the supporting frame. The pressure of lever-end 26 upon the rivet heads may be limited by a stop 43 fixed to the supporting frame. It is desirable for most purposes that the slit formed in the rivet shank be wedge-shaped,—wider at the bottom and narrower at the top. For this purpose the cutting member 5 is preferably in the form of a blade having saw-teeth on its periphery, said periphery being in the form of a cam of increasing radius, and the width of the teeth decreasing as the radius increases. In this manner the thick end 28 of the blade, having the shorter radius, will cut a relatively wide slit at the bottom of the rivet shank, but as the cam works its way up into the shank due to the increasing radius thereof, the slit will be extended upwardly into the shank but will decrease in thickness corresponding to the decrease in thickness of the blade toward the end 29. The slit will thus be wedge-shaped as shown in the rivets in Figs. 7 and 8.

It is necessary to provide driving mechanism to operate the machine automatically, and to so synchronize the driving mechanism that the rivet-holder will begin moving to a new position to bring the next rivet into cutting position after the end 29 of the cutting member has passed through a rivet, that the movement of the rivet-holder shall be completed before the end 28 of the cutting member comes to effective cutting position, and that plunger 22 shall be operated while the rivet-holder is moving to its new position and when a groove is opposite the plunger. For this purpose there is provided driving means which may comprise a pulley 44 driven in the ordinary manner by a belt from any suitable

source, said motion being transmitted to the cutting means through a suitable driving connection such as gears 31 and 32, the latter being connected to a shaft 30 upon which the cutting means is mounted. The motion of the pulley may be further transmitted to operate the rivet-holder through a connection which may comprise gearing 33 and 34, driven from gears 31 and 32, and a shaft 35 fixed to one of the gears such as 34 and supported upon the supporting frame preferably in brackets 36, 37. Said shaft 35 carries a worm 38 which meshes with a gear 39 fixed to the upper end of the rivet-holding shank 16 preferably by a nut 40 screw-threaded thereon. The worm 38 has a straight portion 41 (see Fig. 3), and therefore transmits no motion to the rivet-holder while this portion is in mesh with gear 39. The worm comprises also a twisted portion 42 which operates, when in mesh with gear 39, to rotate the rivet-holder through a distance sufficient to bring the next rivet into cutting position. The twisted portion 42 is so positioned that it meshes with gear 39 after the end 29 of the cutting member has passed through the rivet in cutting position, and is so formed that it completes the rotation of said holder before the end 28 of the cutting member comes into effective cutting position. The straight portion 41 of the worm is, of course, in mesh with gear 39 while the cutting member is passing through the rivet in cutting position.

To operate the plunger 22 there is provided upon shaft 35 a cam 45 preferably on the face of a disc 46 fixed to the shaft, said cam engaging one arm 47 of a lever 48 mounted upon the supporting frame, preferably in a bracket 50, the other arm 51 of said lever being connected to said plunger 22. Said cam is so positioned that plunger 22 is operated inwardly while the twisted portion 42 is in mesh with gear 39 and is rotating the rivet-holder, and the relative positioning is accurately adjusted so that the plunger will operate inwardly exactly when a rivet-holding groove is in front of it. Suitable means may be provided for returning the lever and the plunger to their original outward positions when the end 47 is out of engagement with the cam 45.

Thus the movements of the rivet-holder and the means for positioning rivets in the holder are synchronized with the movements of the cutting member. When the rivets move out of cutting position they are again held between member 23 and the rivet-holder, but they soon pass beyond the end of said member and are swept out of the rivet-holding grooves by a guard 55 fixed preferably upon the bearing 17 and closely adjacent the top of the rivet-holder 15 so that the heads of the rivets abut thereagainst. The guard is so positioned as to force the rivets outwardly upon movement of the rivet-holder. The slit

rivets may be collected by any suitable means disposed below guard 55.

The above description represents the preferred embodiment of my invention, but it will be understood that changes may be made within the scope of the appended claims.

What I claim is:

1. A rivet-cutting machine comprising periodically-operating cutting means for slitting a rivet at the free end of its shank, a rotary rivet-holder for feeding the rivets successively to cutting position, means for intermittently rotating said rivet-holder between periods of operation of said cutting means to bring successive rivet-shanks into cutting position, said rivet-holder including means for suspending the rivet at said position by underlying the head of the rivet, and a device movable relative to the suspending means and operating to bear down on the head of the rivet when the rivet-shank reaches cutting position to prevent movement of the rivet axially of its shank away from the cutting means during the cutting operation.

2. A rivet-cutting machine comprising periodically-operating cutting means for slitting a rivet at the free end of the shank, a rotary rivet-holder for feeding the rivets successively to cutting position, means for intermittently rotating said rivet-holder between periods of operation of said cutting means to bring successive rivet-shanks into cutting position, said holder being adapted to have a plurality of rivets mounted at its periphery, means adjacent said periphery for holding said rivets against outward movement in said holder, and means including a pivoted member for bearing down on the head of the rivet when the rivet reaches cutting position to hold said rivet against upward movement in said holder.

3. A rivet-cutting machine comprising cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, said holder being adapted to have a plurality of rivets mounted in its periphery, means adjacent said periphery for holding said rivets against outward movement in said holder before said rivets reach the cutting position and after said rivets leave said position, and a plunger for pressing against said rivets when in cutting position to hold said rivets against outward movement in said holder, and a lever having end pressure against the head of the rivet to hold the same against upward movement when in cutting position.

4. A rivet-cutting machine comprising periodically operated cutting means, a periodically operated rivet-holder for feeding the rivets successively to cutting position, between the cutting periods of the cutting means said cutting means operating upwardly from the bottom of the rivet, means for holding said rivets against outward movement when in cutting position, and means

for holding said rivets against upward movement when in cutting position.

5. A rivet-cutting machine comprising cutting means, a rivet-holder for feeding the rivets successively to cutting position, said cutting means operating upwardly from the bottom of the rivet, a spring-pressed plunger for holding said rivets against outward movement when in cutting position, and a spring-pressed lever for holding said rivets against upward movement when in cutting position.

6. A rivet-cutting machine comprising periodically operated cutting means, an intermittently operated rotary rivet-holder having grooves in its periphery in which the rivets are carried, the heads of said rivets projecting above the rivet-holder, said rivet-holder being rotated to bring the rivets successively into cutting position, means for supplying rivets to the portion of the rivet-holder which is being fed to the cutting position, and means for disengaging the rivets from said holder after the rivets have passed the cutting position, said last-named means comprising a relatively fixed guard positioned above and adjacent to said holder and engaging the heads of said rivets as the holder rotates to disengage the rivets from the holder.

7. A rivet-cutting machine comprising rotary cutting means adapted to cut periodically, a rotary rivet-holder having an intermittent movement for feeding the rivets successively to the cutting position, a guide for holding the rivet while in cutting position from outward movement in said holder, said guide having a slit therein in which said rotary cutting member operates.

8. A rivet-cutting machine comprising rotary, periodically-operating cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, means for rotating said cutting means, a driving-connection between said rotating means and said rivet-holder whereby said rotating means rotates also said holder, said connection comprising means whereby said holder is rotated only between periods of operation of said cutting means.

9. A rivet-cutting machine comprising rotary, periodically-operating cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, means for rotating said cutting means, a driving-connection between said rotating means and said rivet-holder whereby said rotating means rotates also said holder, said connection comprising a gear wheel movable integrally with said holder, and a driving-worm having a straight portion which has no driving effect on the gear and a twisted portion which drives the gear to the next cutting position of the holder, said worm being so synchronized with the means for rotating the cutting means that the twisted

portion of the worm is effective to rotate said gear and holder between periods of operation of said cutting means.

10. A rivet-cutting machine comprising periodically operated cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, rivet-supply means, means for positioning the rivets from said supply means in said holder, means for periodically rotating said holder to bring successive rivets to cutting position, and means synchronized with said rotating means for operating said rivet-positioning means in the periods of rotation of said holder.

11. A rivet-cutting machine comprising cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, rivet-supply means, means for positioning the rivets from said supply means in said holder, said positioning means comprising a plunger, means for periodically rotating said holder to bring successive rivets to cutting position, said rotating means comprising a shaft, and means for operating said plunger, said last-named means comprising a cam on said shaft, a lever having one end in engagement with said plunger and the other end engageable by said cam, said cam engaging said lever to operate said plunger, said cam being so synchronized with said rotating means as to engage said lever and operate said plunger in the periods of rotation of said holder.

12. A rivet-cutting machine comprising rotary, periodically-operating cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, rivet-supply means, means for positioning the rivets from said supply means in said holder, means for rotating said cutting means, means for operating said rivet-positioning means, and means for rotating said holder, the means for operating said rivet-positioning means and the means for rotating said holder being synchronized with the means for rotating said cutting means so that the holder is rotated between periods of operation of said cutting means, and so that said rivet-positioning means is operated when said holder is rotated.

13. A rivet-cutting machine comprising rotary, periodically-operating cutting means, a rotary rivet-holder for feeding the rivets successively to cutting position, rivet-supply means, means for positioning the rivets from said supply means in said holder, said last-named means comprising a plunger, means for rotating said cutting means, a driving-connection between said rotating means and said holder whereby said rotating means rotates also said holder, said connection comprising a driving shaft, a gear-wheel movable integrally with said holder, and a driving worm having a straight portion which has no driving effect on the gear and a twisted portion which drives the gear to

the next cutting position of the holder, said worm being so synchronized with the means for rotating the cutting means that the twisted portion of the worm is effective to rotate said gear and holder between periods of operation of said cutting means, while the straight portion of the worm meshes with said gear during the operation of said cutting means, and means for operating said plunger, said last-named means comprising a cam carried by said shaft, a lever having one end in engagement with said plunger and the other end engageable by said cam to operate said plunger, said cam being so synchronized with said holder-rotating means as to engage said lever and operate said plunger when said holder is rotated to successive cutting positions.

14. A rivet-cutting machine comprising periodically-operating cutting means for slitting a rivet at the free end of its shank, a rivet-holder intermittently operated to feed the rivets successively to cutting position while suspending a rivet at its head with its shank depending, means for holding the rivet against lateral movement when it reaches cutting position, and means for holding said rivet against upward movement when it reaches said position.

15. A rivet-cutting machine comprising periodically-operating cutting means for slitting a rivet at the free end of its shank, a rivet-holder intermittently operated to feed the rivets successively to cutting position, while suspending a rivet at its head with its shank depending, means for holding the rivet against lateral movement when it reaches cutting position, a device for engaging the head of a rivet to hold the rivet against upward movement relative to the cutting means during the cutting operation, and means for intermittently operating said device to raise and lower the same in timed relation to the movement of said rivet-holder.

16. A rotary cutting-machine comprising means for holding a rivet at the cutting position, a rotary rivet-slitting means, means for guiding a line of rivets toward said slitting means, means for transferring said rivets one by one from said line, means for guiding the transferred rivets in a line further toward said slitting means, means continuously rotating said slitting means, and means synchronized with said rotating means for periodically operating said transferring means.

17. A rotary cutting-machine comprising means for holding a rivet at the cutting position, a rotary rivet-slitting means, said slitting means carrying a cutting blade forming only a part of its periphery so that on each revolution of the slitting means there is alternately a period of effectiveness and ineffectiveness of said slitting means at said position, means for guiding a line of rivets toward said position, means for transfer-

ring said rivets one by one from said line, means for further transporting said rivets toward the cutting position, means for continuously rotating said slitting means, and means synchronized with said rotating means for actuating said transferring means when said blade is in a predetermined position relative to the cutting position.

18. A rotary cutting-machine comprising means for holding a rivet at the cutting position, a rotary rivet slitting means, said slitting means carrying a cutting blade forming only a part of its periphery so that on each revolution of the slitting means there is alternately a period of effectiveness and ineffectiveness of said slitting means at said position, means for guiding a line of rivets toward said position, intermittently operating means for transferring said rivets from said line, means for further advancing said rivets toward the cutting position, means for continuously rotating said slitting means, and means synchronized with said rotating means for operating the transferring means intermittently.

19. A rotary cutting-machine comprising means for holding a rivet at the cutting position, a rotary rivet slitting means, said slitting means carrying a cutting blade forming only a part of its periphery so that on each revolution of the slitting means there is alternately a period of effectiveness and ineffectiveness of said slitting means at said position, means for guiding a line of rivets toward said position, intermittently operating means for transferring said rivets from said line, intermittently operating means for transporting said rivets toward the cutting position, means for continuously operating said slitting means, means for actuating said transferring means when said blade is in a predetermined position relative to the cutting position, and means for actuating said transporting means when the blade is in a predetermined position relative to the cutting position.

In testimony whereof I affix my signature
EDWIN B. STIMPSON.

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