Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 1

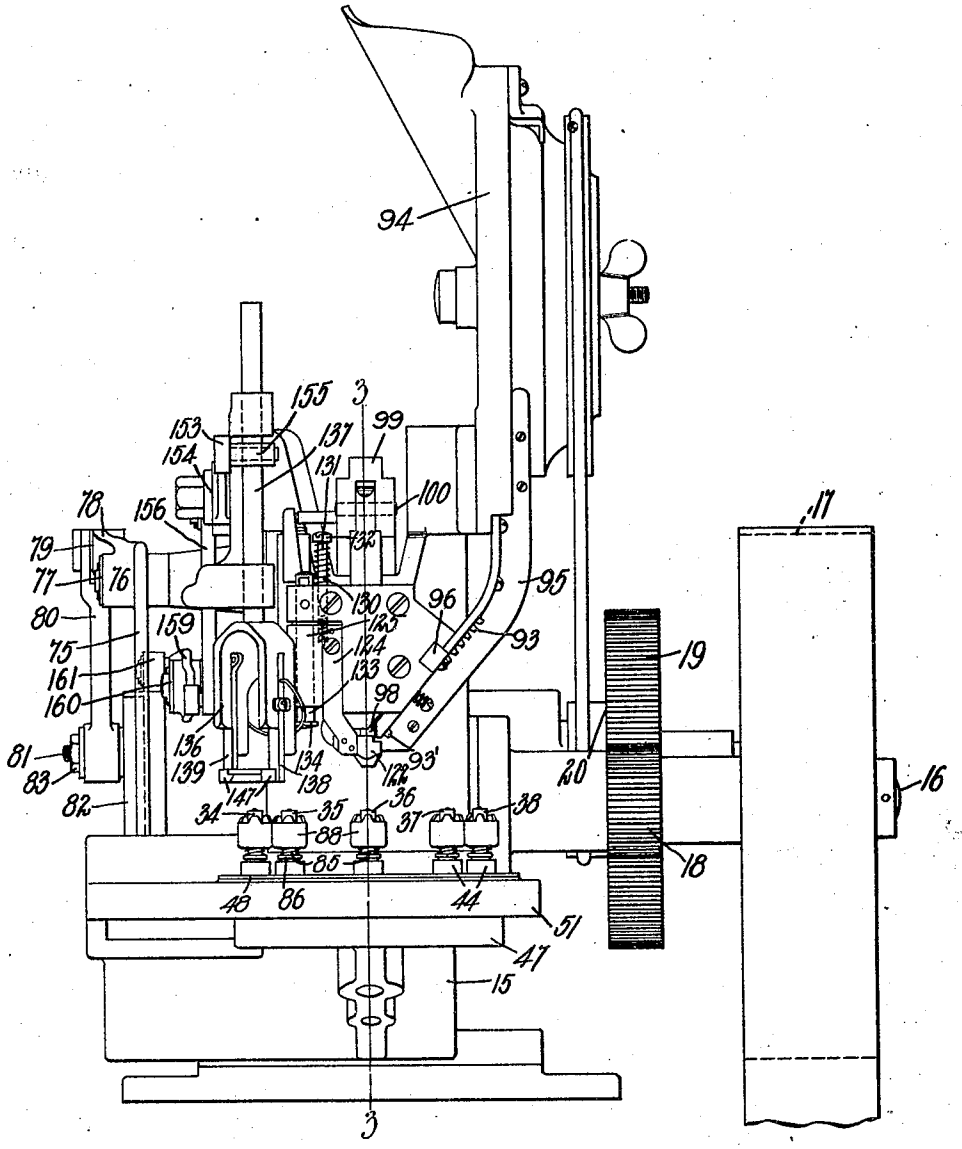


Fig. 1.

Inventor:
Arthur R. Havener.
By Parker S. Goodwin, Atty.

Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 2

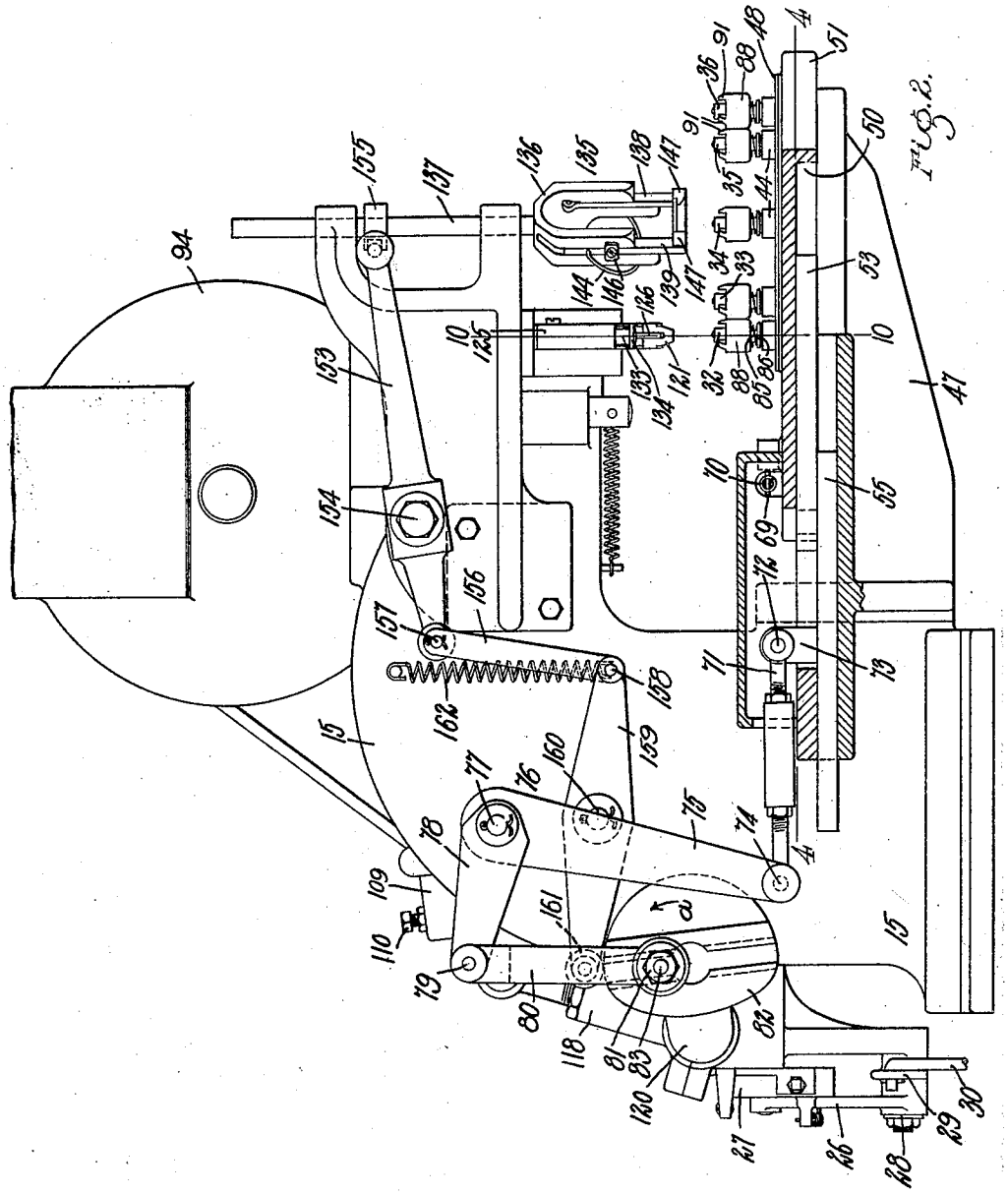


Fig. 2.

Inventor:
Arthur R. Havener,
By Charles N. Gooding Atty.

Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 3

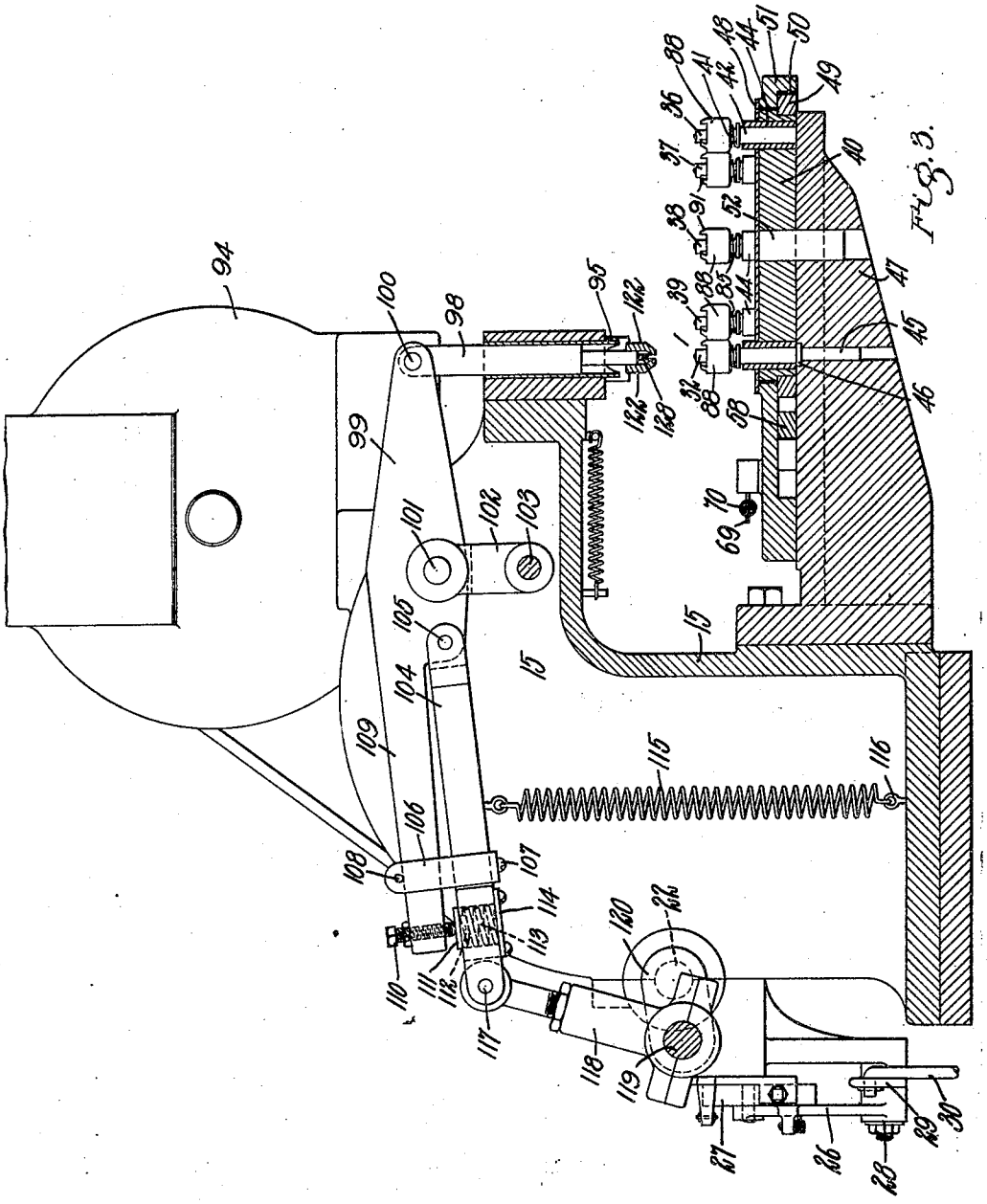


Fig. 3.

Inventor:
Arthur R. Havener.
By Charles S. Gooding,
Atty.

Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 4

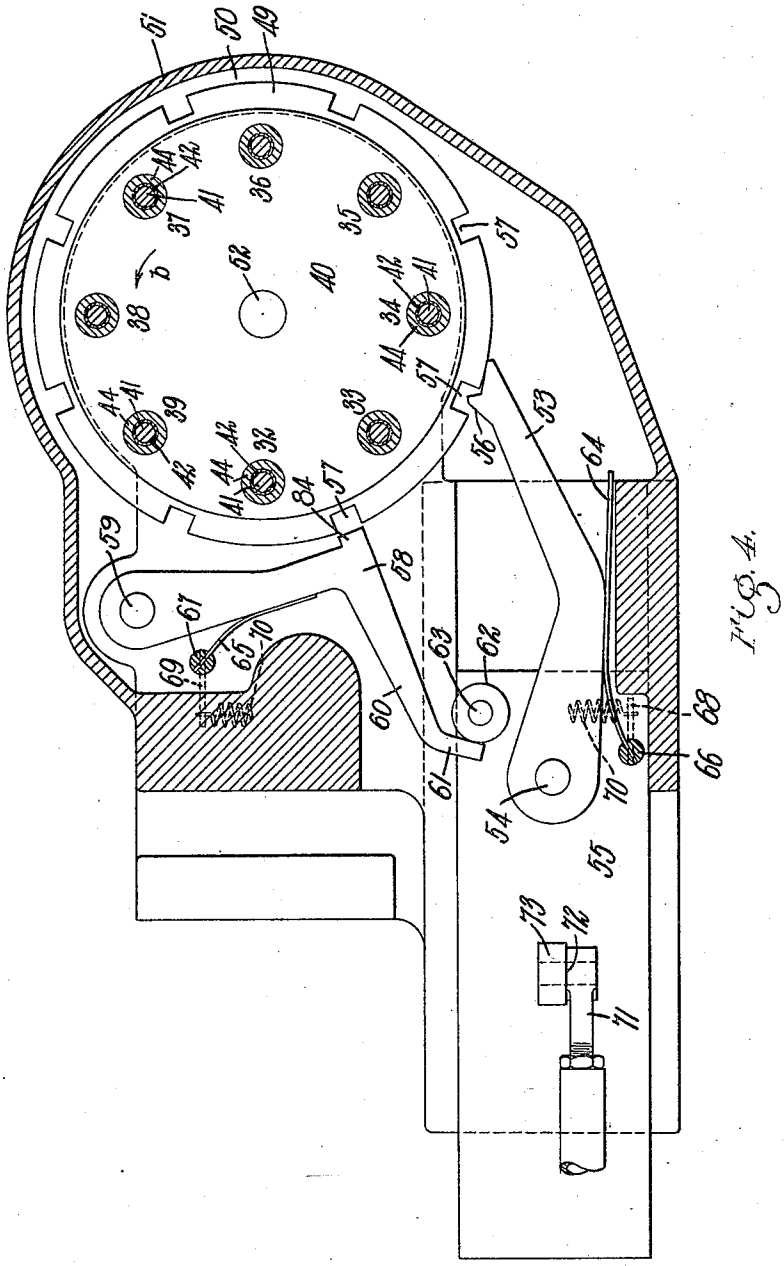


Fig. 4.

Inventor:
Arthur R. Havener.
By Parker N. Gooding, Atty.

Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 5

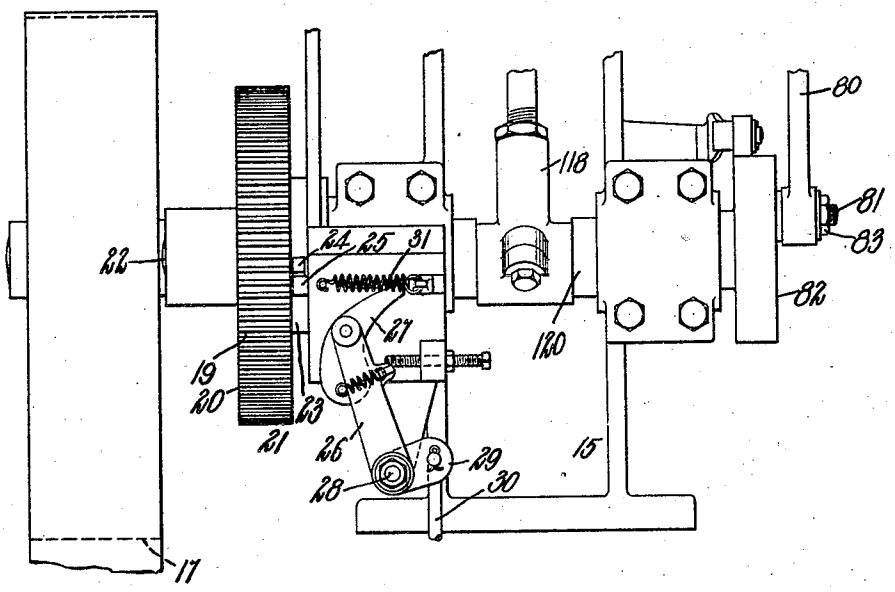


Fig. 5.

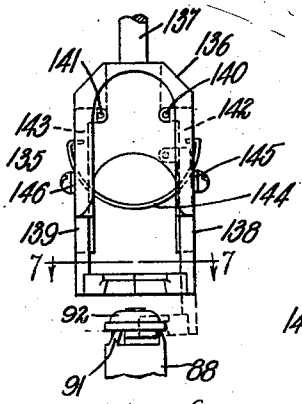


Fig. 6.

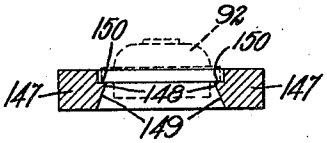


Fig. 8.

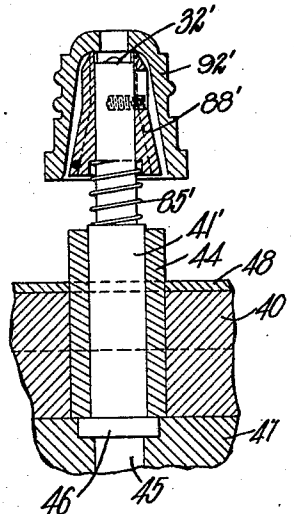


Fig. 9.

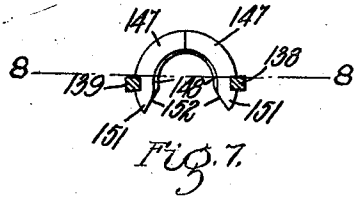


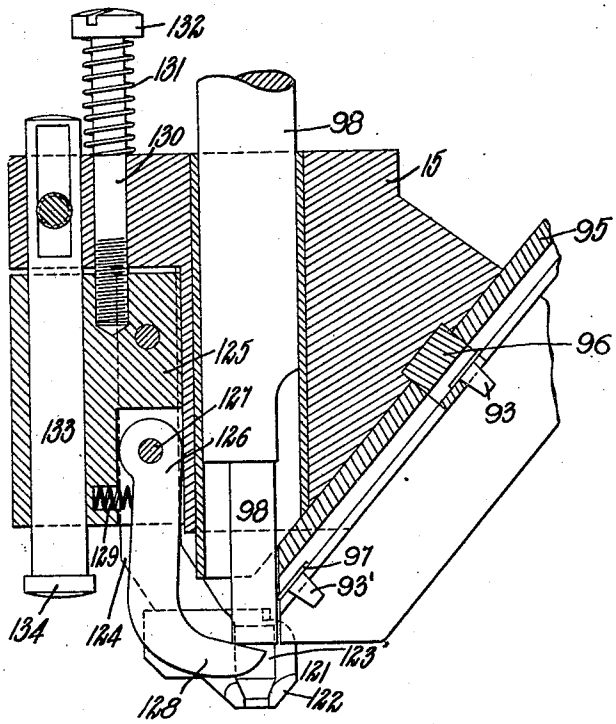
Fig. 7.

Inventor:
Arthur R. Havener.
by Charles L. Gooding, Atty.

Oct. 1, 1929. A. R. HAVENER 1,730,140

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Filed April 25, 1928 6 Sheets-Sheet 6



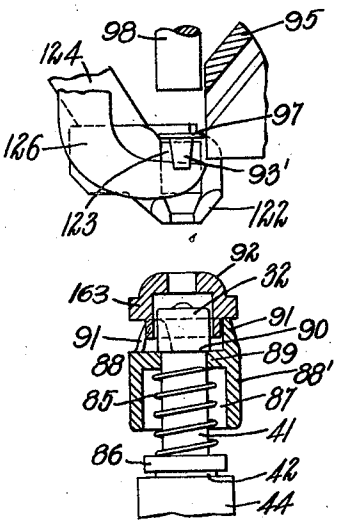


Fig. 11.

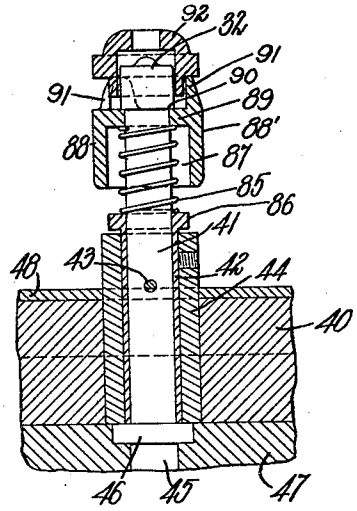


Fig. 10.

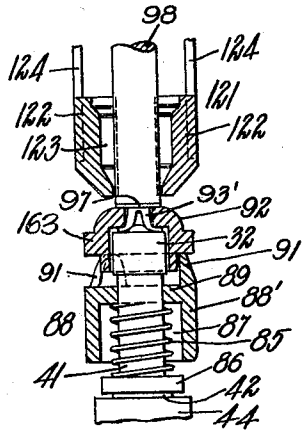


Fig. 12.

Inventor:
Arthur R. Havener.
By Charles S. Gooding, Jr.
Atty.

Patented Oct. 1, 1929 1,730,140

UNITED STATES PATENT OFFICE

ARTHUR R. HAVENER, OF WAYLAND, MASSACHUSETTS, ASSIGNOR TO JUDSON L. THOMSON MANUFACTURING CO., OF WALTHAM, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

MACHINE FOR ATTACHING RIVETS TO ARTICLES

Application filed April 25, 1928. Serial No. 272,823.

This invention relates to a machine for attaching rivets to articles and is particularly adapted to attach rivets, constituting contacts, to the porcelain member of a fuse plug.

The object of the invention is to provide a machine of the character set forth which will attach the rivets or contact members to the porcelain member of a fuse plug rapidly and efficiently and also, without the danger of injury to the operator of the machine while placing the porcelain members therein.

A further object of the invention is to provide a machine in which the porcelain member, which is very easily broken, shall not be injured in any way by the attachment thereto of the contact member.

Further objects of the invention will appear in the following specification.

The invention consists in a machine for attaching rivets to articles as set forth in the following specification and particularly as pointed out in the claims.

Referring to the drawings:—

Figure 1 is a front elevation of my improved machine for attaching rivets to articles.

Fig. 2 is a side elevation partly in section viewed from the left of Fig. 1.

Fig. 3 is a vertical sectional elevation taken on line 3—3 and viewed from the left of Fig. 1.

Fig. 4 is a sectional plan taken on line 4—4, Fig. 2, and broken away.

Fig. 5 is a rear elevation of the machine broken away.

Fig. 6 is a detail front elevation of the article remover and a portion of the anvil, one of the article remover jaws being shown in dotted lines in a second position.

Fig. 7 is a sectional plan taken on line 7—7, Fig. 6.

Fig. 8 is an enlarged detail section taken on line 8—8, Fig. 7, and illustrating a porcelain member positioned in relation to the flanges 147 in dotted lines and when about to be removed from the anvil.

Fig. 9 is a sectional elevation of a modified form of an anvil and article support.

Fig. 10 is an enlarged sectional elevation taken on line 10—10, Fig. 2, illustrating the mechanism for feeding a bifurcated rivet and positioning the same.

Fig. 11 is a sectional elevation similar to Fig. 10 illustrating the parts in different relative positions therefrom.

Fig. 12 is a sectional elevation taken on a plane at right angles to the plane in which the sections 10 and 11 are taken and illustrating the rivet clenched within the porcelain member.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 15 is the frame of the machine upon which is journalled a driving shaft 16 driven by a pulley 17 and having a pinion 18 fastened thereto, which meshes into a gear 19 formed on the periphery of one member 20 of a clutch 21. The member 20 is rotatably mounted upon a shaft 22, while another member 23 of the clutch 21 is keyed to the shaft 22. Normally the clutch member 20 rotates loosely upon the shaft 22, but when a locking member 24 of the clutch is released by moving a slide 25 toward the right, Fig. 5, the locking member 24 locks the two parts 20 and 23 of the clutch together and thus the shaft 22 is rotated in the usual well-known manner. The slide 25 is moved toward the right by a lever 26 and pawl 27 which are rocked upon a pivot 28 by an arm 29 which is connected by a rod 30 to a treadle not shown in the drawings. A spring 31 moves the slide 25 to the left, Fig. 5, when the treadle is released, whereupon the slide will be engaged by the locking member 24 of the clutch and the two members 23 and 20 thus disengaged from each other, the shaft 22 coming to a stop and the member 20 continuing its rotation thereon.

A plurality of anvils 32, 33, 34, 35, 36, 37, 38 and 39 are mounted upon a turntable 40. These anvils are duplicates of each other and each is provided with a shank 41 which projects downwardly through a sleeve 42, see Fig. 10, and is fastened to said sleeve by a pin 43. The sleeve 42 projects through a tubular support 44 which is fast to the turntable 40. The anvils, when they are brought to the position occupied by the turntable 40 in Fig. 3, that is, in position to have a rivet

clinched thereon, rest upon a stud 45 provided with a flange 46 at its top, this stud being positioned in a bracket 47 fast to the frame 15, see Fig. 3.

The turntable 40 is covered with a plate 48 which is fast thereto and has a ring 49 fastened to the lower portion thereof, and the turntable, together with the ring 49 which forms a portion thereof, rotates within a recess 50 provided in a cover 51. The cover 51 is supported upon and fast to the bracket 47. It is very necessary that the working parts, namely, the turntable and the mechanism by which it is intermittently rotated, should be provided with covers to keep the dust which comes from the porcelain member from coming into contact therewith. The turntable 40 is horizontally disposed and has a vertical shaft 52 projecting downwardly therefrom into the bracket 47 in which it is rotatably mounted.

An intermittent rotary movement is imparted to the turntable 40 by the mechanism specifically illustrated in Figs. 2 and 4 and consisting of a pawl 53 which is pivoted at 54 to a slide 55. The actuating pawl 53 has a tooth 56 thereon which, when the pawl is in operation, projects into one of a series of recesses 57 in the periphery of the turntable 40. The turntable after being rotated through one-eighth of a rotation is locked in position by a locking pawl 58 which is pivoted at 59 to the bracket 47 and is provided with an arm 60, the end 61 of which engages a roll 62 rotatably mounted on a pin 63 fast to the slide 55. The actuating pawl 53 and locking pawl 58 are pressed against the periphery of the turntable 40 by arms 64 and 65 respectively. These arms are fastened to rotatable studs 66 and 67 and these studs have pins 68 and 69 projecting therefrom which are connected together by a spring 70.

A reciprocatory movement is imparted to the slide 55 by the mechanism illustrated in Fig. 2 in which a link 71 is pivotally connected at 72 to an ear 73 on the slide 55, the other end of the link 71 being pivotally connected at 74 to an arm 75 of a lever 76 which is pivoted at 77 to the frame 15 of the machine. Another arm 78 of the lever 76 is connected by a pin 79 to a link 80 through the lower end of which a crank pin 81 projects, the said crank pin being adjustably fastened to a crank plate 82 by a nut 83. The crank plate 82 is fastened to the shaft 22. The crank plate 82 rotates in the direction of the arrow *a* thereon and thus imparts a rocking movement to the lever 76 through the link 80 which, in turn, imparts a reciprocatory movement to the slide 55 through the link 71.

Assuming the slide to be moved toward the right, Fig. 4, it will be seen that the actuating pawl 53 will move the turntable in the direction of the arrow *b* and during this rotation the locking pawl 58 will be released by the roll 62, so that it bears against the periphery of the turntable 40. When the turntable has been moved one-eighth of a rotation, a tooth 84 on the locking pawl 60 will drop into one of the recesses 57 in the periphery of the turntable and lock the turntable in position ready for a rivet to be set.

Each of the anvils has a spring 85 encircling the same, see Fig. 10, resting at its lower end on a flange 86 on the upper end of the sleeve 42. The spring 85 projects into a chamber 87 in an article support 88, the upper end of the spring bearing against an annular flange 89 provided in the tubular part 88′ and slidable upon the shank 41 of the anvil. The anvil is provided with a shoulder 90 which engages the upper face of the flange 89. The article support is provided with a plurality of prongs 91, preferably three, and upon these prongs the article 92, in this case the porcelain member of a fuse plug, rests as illustrated in Fig. 10.

The rivets 93 are fed from a hopper 94 to a raceway 95 and the lowermost one of a column of rivets on said raceway is separated from the rest of the rivets in the column and allowed to move by a reciprocatory slide 96, Figs. 1 and 10, to the position of the rivet 93′ in a manner well known to those skilled in this art, whereupon it will slide down the lower part of the raceway until the head 97 of the rivet rests against the side of a rivet driver 98 as illustrated in Fig. 10.

The rivet driver 98 has a reciprocatory motion imparted thereto, see Fig. 3, by a lever 99 to which it is connected by a pin 100. The lever 99 is pivoted at 101 to a rocker arm 102 which, in turn, is pivoted at 103 to the frame 15 of the machine. The lever 99 has an arm 104 pivoted thereto at 105. This arm projects through a bifurcated guide plate 106 and is fastened thereto by a screw 107. A pin 108 extends across the bifurcated guide plate 106 from one side to the other thereof and above the upper edge of the arm 109 of the lever 99. A stop screw 110 has screw-threaded engagement with the rear end of the arm 109, its lower end bearing against a disc 111 which has a projection 112 thereon projecting into a spiral spring 113. The spiral spring 113 is positioned in a hole extending through the arm 104 and rests at its lower end against a plate 114 fast to the lower edge of the arm 104. The upper end of the spring 113 bears against the disc 111, so that any upward pressure exerted by the arm 104 will be transmitted to the lever 99 with a yielding pressure, due to the spring 112.

A spring 115 connects the arm 104 to an eye 116 fast to the frame of the machine. The arm 104 is connected by a pin 117 to a link 118 which, in turn, is pivotally mounted at its lower end upon a crank pin 119 on a

crank 120 which is fastened to the shaft 22. It will be seen that as the shaft 22 rotates, the crank 120 and crank pin 119 through the link 118, will cause the arm 104 and the lever 99 to rock about the pivot 101 and thus impart a reciprocatory motion to the driver 98 which is in alignment with one of the anvils, as 32, when the parts are in the position illustrated in Fig. 4.

A rivet carrier 121, Fig. 10, consists of two blocks 122 with a chamber 123 therein. These blocks are each mounted upon a flat spring 124 and the upper ends of the flat springs are fastened to a slide 125. The slide 125 has mounted therein an arm 126 pivoted on a pin 127. The lower end 128 of said arm projects into the chamber 123 between the two blocks 122 in readiness to receive a bifurcated rivet, such as 93′, thus lining the rivet up in the particular location relatively to the article 92 into which it is to be inserted. A spring 129, positioned in the slide 125, bears against the rear edge of the arm 126 and holds it in the position illustrated in Fig. 10 until said arm is forced back, as hereinafter described. A screw 130 is fastened to the upper end of the slide 125 and projects through and above the frame, and a spring 131 encircles the screw 130 and bears at its upper end against the head 132 of said screw, whereby the slide 125 is moved upwardly. A stud 133 is fastened to the frame 15 and projects downwardly through the slide 125, being provided with a head 134 and thus constituting a stop to limit the distance to which the slide 125 can be moved downwardly.

Assuming the parts to be in the relative positions illustrated in Fig. 10, the driver 98 will first be moved upwardly until the lower end thereof clears the head 97 of the rivet 93′, whereupon said rivet will fall down into the chamber 123 in the rivet carrier 121 and the lower end 128 of the arm 126 will project into the slot in the rivet shank as illustrated in Fig. 11. It will be noted that the flange 97 of the rivet 93′ rests on the bevelled upper edge of the blocks 122. Now when the driver 98 descends, it will engage the head 97 of the rivet 93′ and push said rivet together with the blocks 122 and slide 125 downwardly, thus carrying the arm 126 downwardly until the slide 125 engages the head 134 of the stud 133. Further downward movement of the driver will then cause the arm 128 to be swung backwardly and the rivet 93′ will be pushed out from between the blocks 122 and inserted in the fuse member 92 with the prongs spread apart by the anvil 32, as illustrated in Fig. 12. The rivet driver 98, the carrier 121 and the arm 126 will then return to the relative positions illustrated in Fig. 10. The turntable will then be rotated by the mechanism hereinbefore set forth one-eighth of a rotation in the direction of the arrow *b*, bringing the anvil 32 into the position of the anvil 33, Fig. 4, and upon the next cycle of movements the anvil 32 will be moved one-eighth of a rotation to the position of the anvil 34, Fig. 4. When in this position the anvil will be in alignment with an article remover which will operate to remove the fuse plug member 92 with its contact rivet 93′ from the anvil 32.

The article remover 135 is illustrated in Figs. 2, 6, 7 and 8 and consists of a holder 136 and upwardly extending shank 137 upon which a pair of jaws 138 and 139 are pivotally mounted at 140 and 141. These jaws are positioned in slots 142 and 143 in the holder 136 and are pressed toward each other by a U-shaped spring 144, the ends of which project into holes provided therefor in the jaws 138 and 139. Stops 145 and 146 limit the distance to which these jaws may be moved toward each other, as illustrated in Fig. 6. The lower free ends of the jaws 138 and 139 each terminate in an arcuate flange 147 and each of these flanges have a ledge 148 projecting inwardly therefrom, as illustrated in Figs. 7 and 8. These ledges are bevelled downwardly and outwardly along their faces 149 from the upper edge 150 of said ledge. The front ends 151 of the flanges 147 are spaced apart and are bevelled on their inner faces at 152, particularly as shown in Fig. 7 so that after being removed from the anvil the article 92 may fall out of the jaws 138 and 139. It will be understood that the article remover 135 is in alignment with one of the anvils and as each anvil is moved by the turntable to the position of the anvil 34, it will be brought into alignment with the article remover 135.

In order to remove the article 92 from the anvil and holder upon which it is positioned, it is necessary to impart a reciprocatory motion to said article remover and this is accomplished by the mechanism illustrated in Fig. 2 by a lever 153 pivoted at 154 to the frame of the machine and engaging a collar 155 on the shank 137 of the holder 136. A rocking motion is imparted to the lever 153 by a link 156 pivotally connected to the rear end thereof by a pin 157, the lower end of the link 156 being connected by a pin 158 to a lever 159 pivoted to the frame at 160 and having a cam roll 161 rotatably mounted on its rear end and engaging the cam-shaped periphery of the crank plate 82. A spring 162 holds the cam roll 161 in engagement with the cam-shaped periphery of said crank plate 82.

When the article remover 135 is moved downwardly by the mechanism hereinbefore described the bevelled faces 149 of the flanges 147 on the jaws 138 and 139 will engage the flange 163 on the fuse plug member 92 and will slip over it. The jaws will then be brought together beneath the flange 163 and when the remover is moved upwardly the

upper edges 150 of the ledges 148 will engage the under face of the flange 163 and lift the fuse plug member 92 off of its support 88 and off of the anvil 32, whereupon the article will fall outwardly through the space between the ends 151 of the flanges 147.

The general operation of the mechanism hereinbefore specifically and to a considerable extent in general described is as follows: —The operator places an article such as a fuse plug member 92 upon any one of the anvils and the respective article supports positioned at 35, 36, 37 or 38. The turntable is then rotated in the direction of the arrow *b*, Fig. 4, until each of the anvils is brought successively into alignment with the rivet setting mechanism and with the article removing mechanism, and while the turntable is locked in position by the locking pawl 58 a rivet is inserted and clinched in one of the articles at the position of 32, Fig. 4, and an article is removed at the position of 34, Fig. 4.

Fig. 9 illustrates an anvil and article support for a porcelain fuse member of a different design from the porcelain fuse member 92 and in Fig. 9, 40 is the turntable, 44 the tubular support, 32′ the anvil, 41′ the shank of the anvil, 85′ the spring and 88′ the article support. The operation of setting the rivet in the article 92′ is the same as hereinbefore described with relation to the setting of the rivet in the porcelain fuse member 92.

I claim:

1. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil, and mechanism adapted to impart a reciprocatory movement to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

2. A riveting machine having, in combination, an anvil, a support for an article yieldingly mounted on said anvil, an article remover in alignment with said anvil, and mechanism adapted to impart a reciprocatory movement to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

3. A riveting machine having, in combination, an anvil, a spring on said anvil, an article support slidably mounted on said anvil and resting on said spring, an article remover in alignment with said anvil, and mechanism adapted to impart a reciprocatory movement to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

4. A riveting machine having, in combination, an anvil, a spring encircling said anvil, a support for an article comprising a tubular member with an inner annular flange slidably mounted on said anvil and resting on said spring, and a plurality of prongs projecting upwardly from said flange integral therewith and adapted to position and support said article.

5. A riveting machine having, in combination, an anvil, a spring encircling said anvil, a support for an article comprising a tubular member with an inner annular flange slidably mounted on said anvil and resting on said spring, a plurality of prongs projecting upwardly from said flange and adapted to position and support said article, an article remover in alignment with said anvil, and mechanism adapted to impart a reciprocatory movement to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

6. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

7. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

8. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

9. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom and bevelled outwardly and downwardly from its upper edge.

10. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a

holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom and bevelled outwardly and downwardly from its upper edge, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

11. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, the front ends of said flanges being spaced apart, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

12. A riveting machine having, in combination, an anvil, a support for an article mounted on said anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, the front ends of said flanges being spaced apart and bevelled on their inner faces, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

13. A riveting machine having, in combination, an anvil, a support for an article on said anvil, a rivet carrier and a driver in alignment with each other, an article remover, means to move said anvil alternately into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby a rivet may be attached to said article and said article subsequently removed from said anvil.

14. A riveting machine having, in combination, an anvil, a support for an article on said anvil, a rivet carrier and a driver in alignment with each other, an article remover, a turntable upon which said anvil is positioned, mechanism to impart an intermittent motion to said turntable, whereby said anvil may be moved into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby a rivet may be attached to said article and said article subsequently removed from said anvil.

15. A riveting machine having, in combination, a turntable, a plurality of anvils positioned on said turntable carried in a circle concentric therewith, a support for an article on each of said anvils respectively, a rivet carrier and a driver in alignment with each other, an article remover, mechanism to impart an intermittent motion to said turntable, whereby said anvils may be moved successively into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby the rivet may be attached to a plurality of said articles respectively and said articles subsequently removed from their respective anvils.

16. A riveting machine having, in combination, a rivet carrier, means to feed a rivet to said carrier, a driver in alignment with said carrier, a horizontal turntable, a plurality of anvils on said turntable carried in a circle concentric therewith, an article support resiliently mounted on each of said anvils, and mechanism adapted to intermittently rotate said turntable, whereby said anvils may be successively brought into alignment with said driver and carrier.

17. A riveting machine having, in combination, a rivet carrier, means to feed a rivet to said carrier, a driver in alignment with said carrier, a horizontal turntable, a plurality of anvils on said turntable carried in a circle concentric therewith, a spring encircling each of said anvils, an article support resting on each of said springs respectively and slidable on said anvils, and mechanism adapted to intermittently rotate said turntable, whereby said anvils may be successively brought into alignment with said driver and carrier.

18. A riveting machine having, in combination, a rivet carrier, means to feed a rivet to said carrier, a driver in alignment with said carrier, a horizontal turntable, a plurality of anvils on said turntable carried in a circle concentric therewith, a spring encircling each of said anvils, an article support comprising a tubular member with an inner annular flange slidably mounted on each of said anvils respectively and resting on said springs, and a plurality of prongs projecting upwardly from each of said flanges and adapted to position and support an article.

19. A riveting machine having, in combination, a rivet carrier, means to feed a rivet to said carrier, a driver in alignment with said carrier, a horizontal turntable, a plurality of anvils on said turntable carried in a circle concentric therewith, an article remover spaced apart from said driver and equidistant with said anvils from the center of said turntable, and mechanism adapted to intermittently rotate said turntable, whereby

said anvils may be successively brought into alignment with said driver and carrier and remover.

20. A riveting machine having, in combination, a rivet carrier, means to feed a rivet to said carrier, a driver in alignment with said carrier, a horizontal turntable, a plurality of anvils on said turntable carried in a circle concentric therewith, an article remover spaced apart from said driver and equidistant with said anvils from the center of said turntable, mechanism adapted to intermittently rotate said turntable, whereby said anvils may be successively brough into alignment with said driver and carrier and remover, and mechanism to impart a reciprocatory motion to said remover, whereby said articles may be consecutively removed from their respective anvils.

21. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

22. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

23. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

24. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom and bevelled outwardly and downwardly from its upper edge.

25. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, said arcuate flanges having a ledge projecting inwardly therefrom and bevelled outwardly and downwardly from its upper edge, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

26. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, the front ends of said flanges being spaced apart, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil, whereby said article may be removed from said anvil.

27. A riveting machine having, in combination, an anvil, an article remover in alignment with said anvil and comprising a holder, a pair of spring-actuated jaws pivoted to said holder and projecting downwardly therefrom, the free ends of said jaws each terminating in an arcuate flange, the front ends of said flanges being spaced apart and bevelled on their inner faces, and mechanism to impart a reciprocatory motion to said article remover toward and away from said anvil whereby said article may be removed from said anvil.

28. A riveting machine having, in combination, an anvil, a rivet carrier and a driver in alignment with each other, an article remover, means to move said anvil alternately into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby a rivet may be attached to said article and said article subsequently removed from said anvil.

29. A riveting machine having, in combination, an anvil, a rivet carrier and a driver in alignment with each other, an article remover, a turntable upon which said anvil is positioned, mechanism to impart an intermittent motion to said turntable, whereby said anvil may be moved into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby a rivet may be attached to said article and said article subsequently removed from said anvil.

30. A riveting machine having, in combination, a turntable, a plurality of anvils positioned on said turntable concentric therewith, a rivet carrier and a driver in alignment with each other, an article remover, mechanism to impart an intermittent motion to said turn-

table, whereby said anvils may be moved successively into and out of alignment with said carrier and driver and with said article remover, and mechanism adapted to impart a reciprocatory motion to said carrier and driver and to said article remover, whereby the rivet may be attached to a plurality of said articles respectively and said articles subsequently removed from their respective anvils.

In testimony whereof I have hereunto set my hand.

ARTHUR R. HAVENER.