

A. R. HAVENER.
 MULTIPLE RIVET SETTING MACHINE.
 APPLICATION FILED OCT. 20, 1910.

1,021,869.

Patented Apr. 2, 1912.

5 SHEETS—SHEET 1.

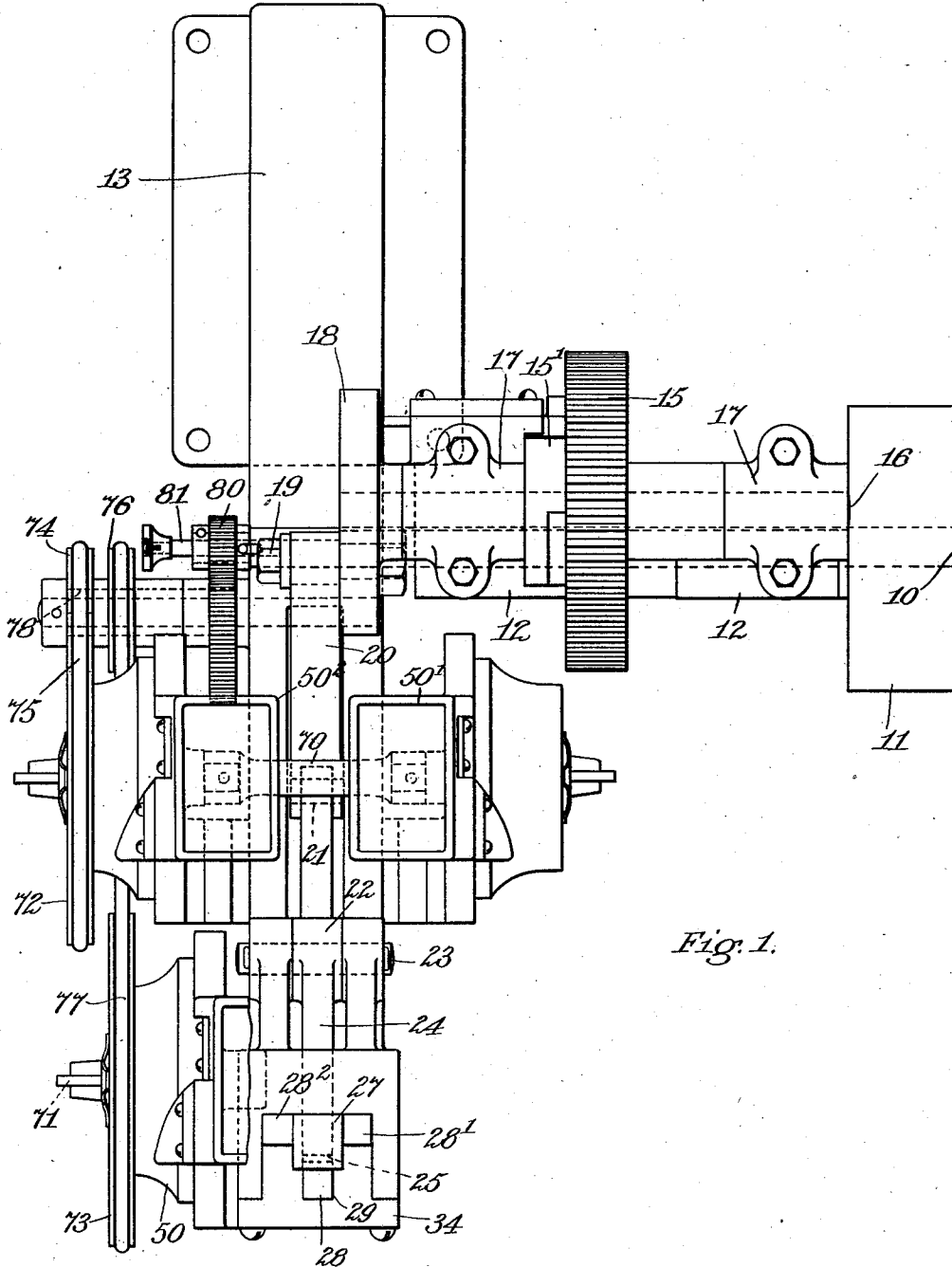


Fig. 1.

Witnesses:

Sydney E. Taft.
 Leonard A. Powell

Inventor:

Arthur R. Havener,
 by his attorney,
 Charles S. Gooding.

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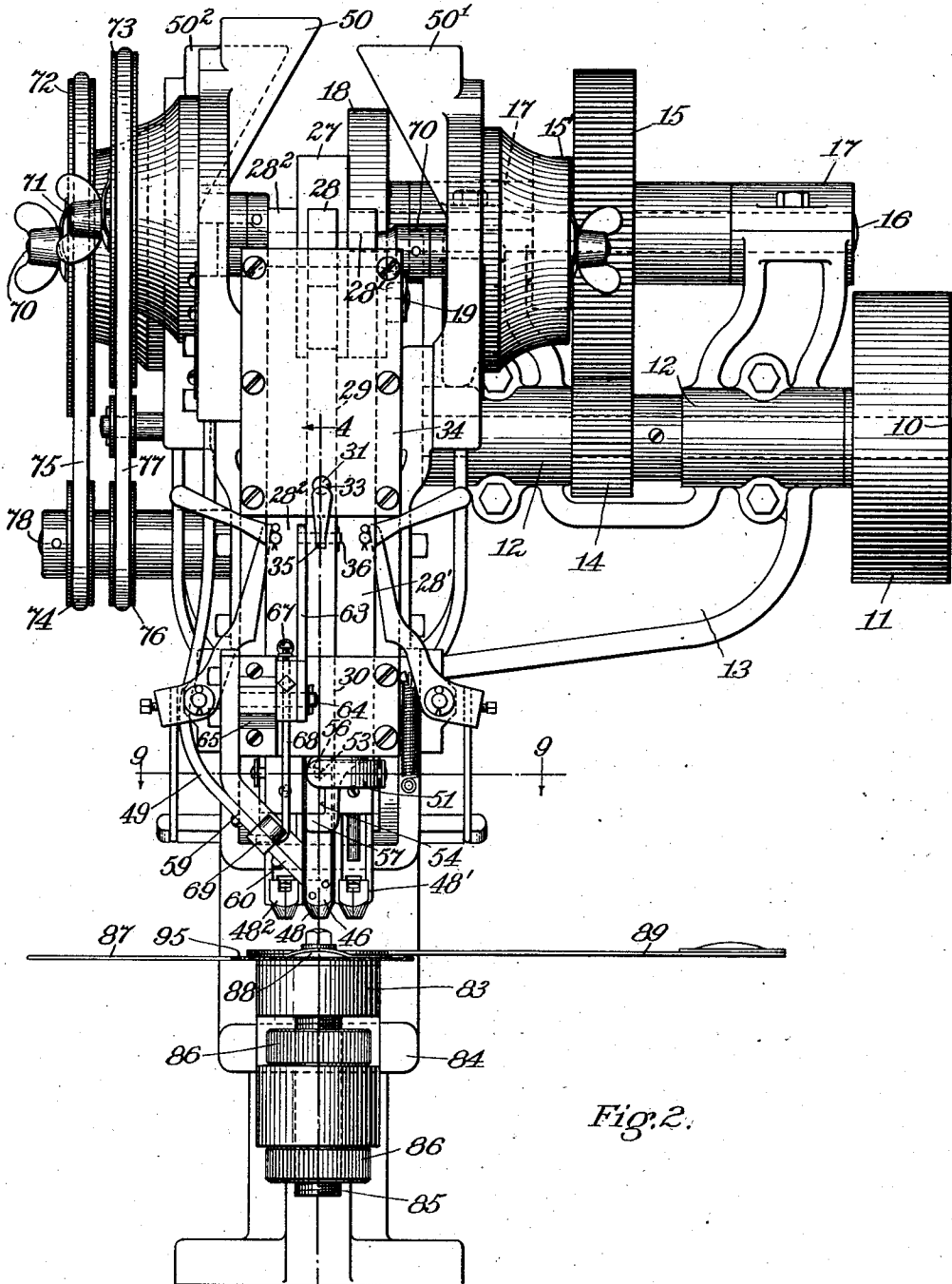


Fig. 2.

Witnesses:

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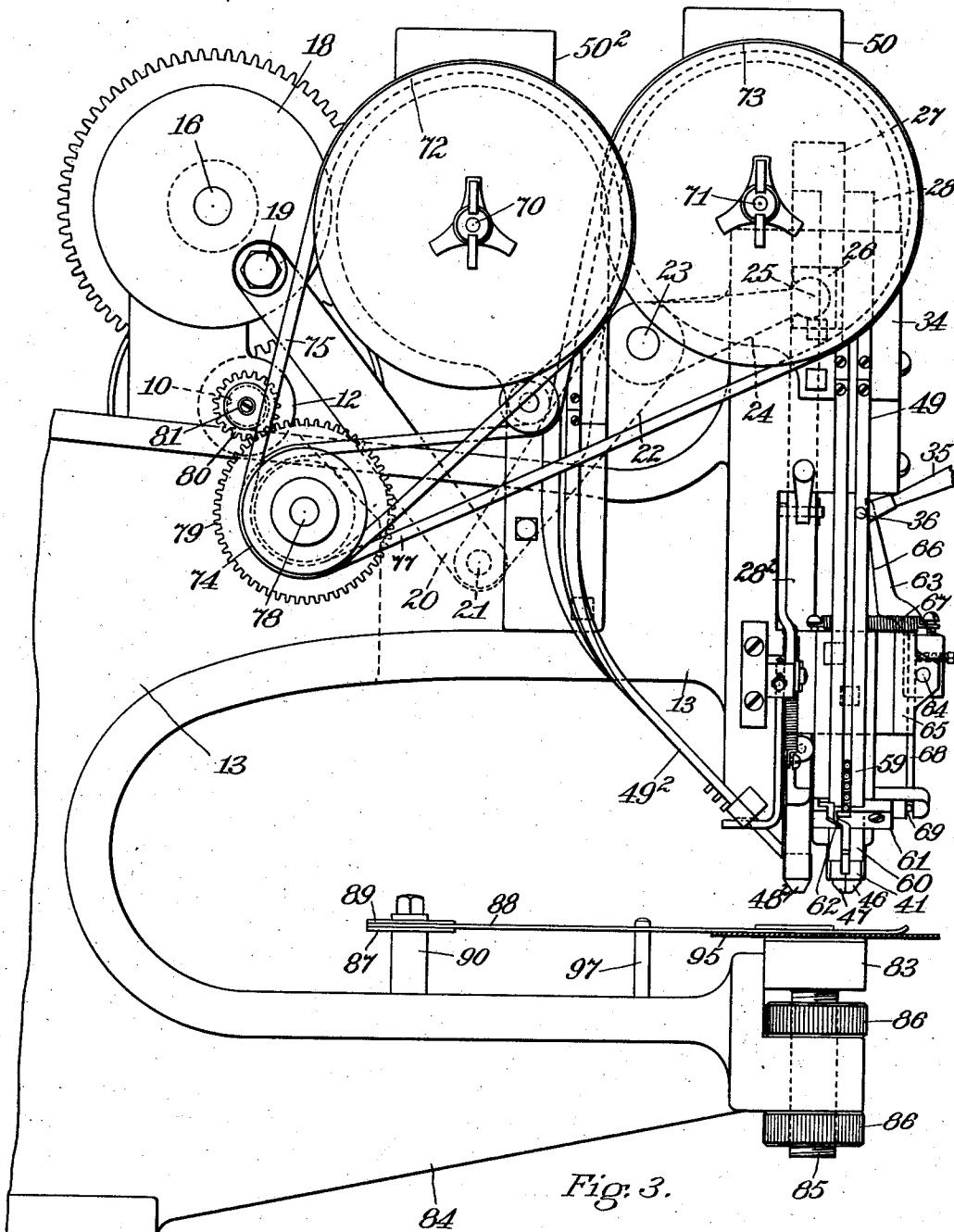


Fig. 3.

Witnesses:

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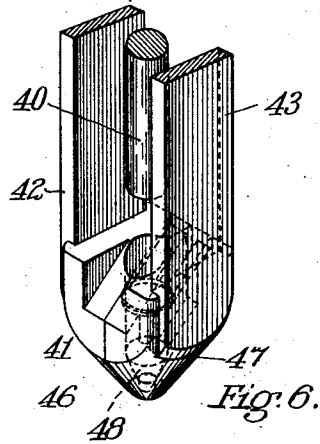
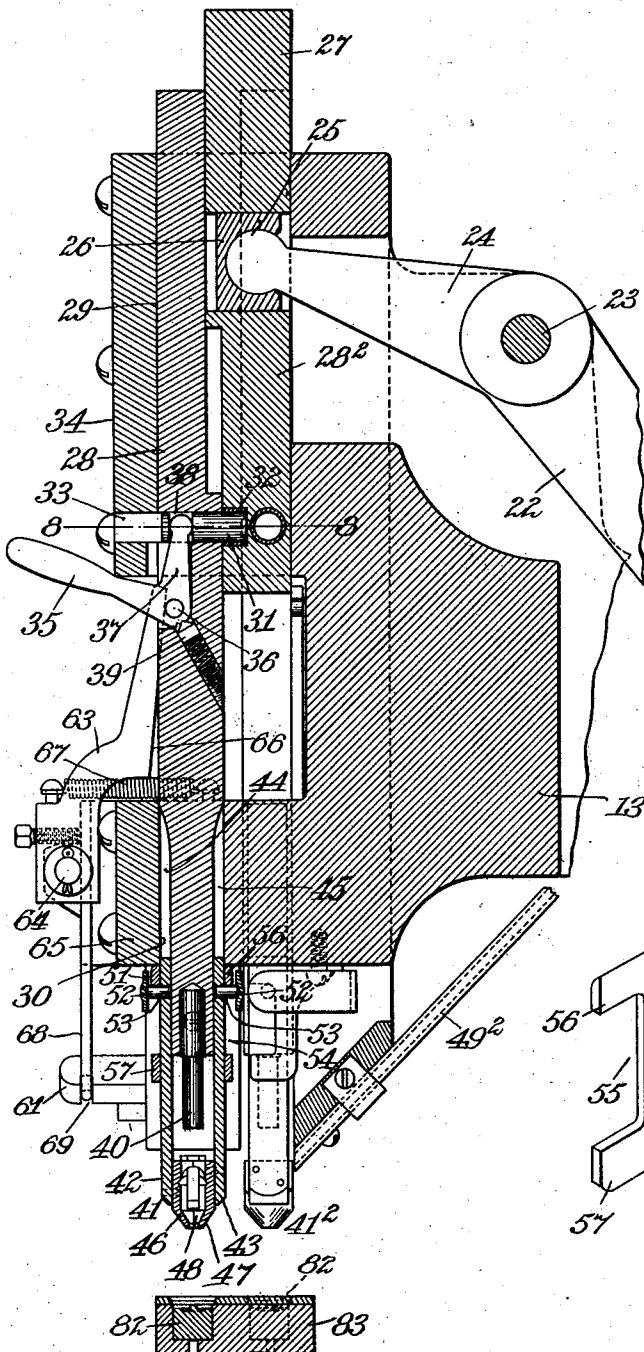


Fig. 4

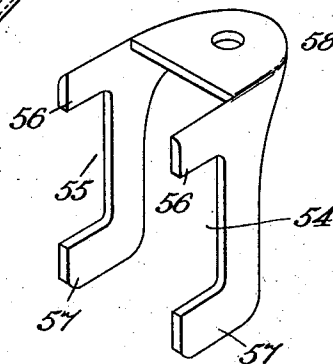


Fig. 5.

Witnesses:
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5 SHEETS-SHEET 5.

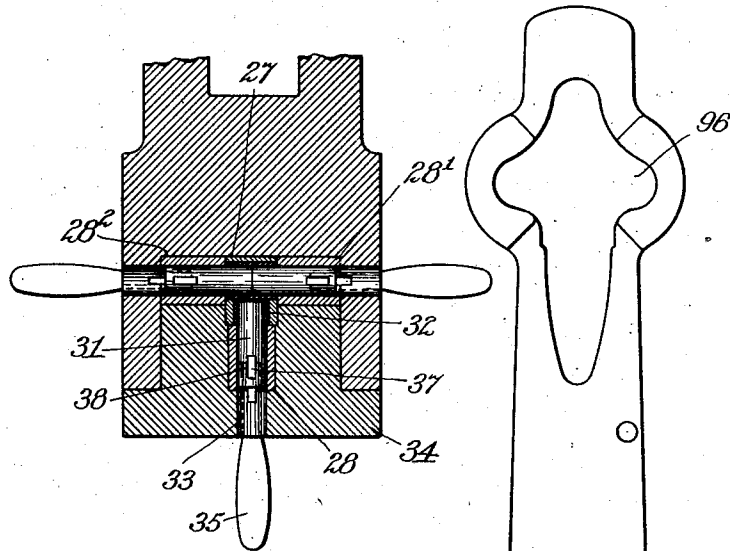


Fig. 8.

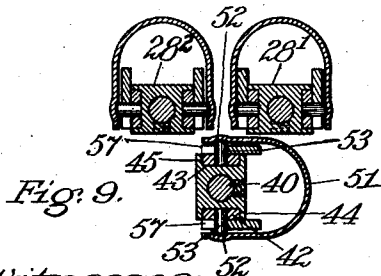
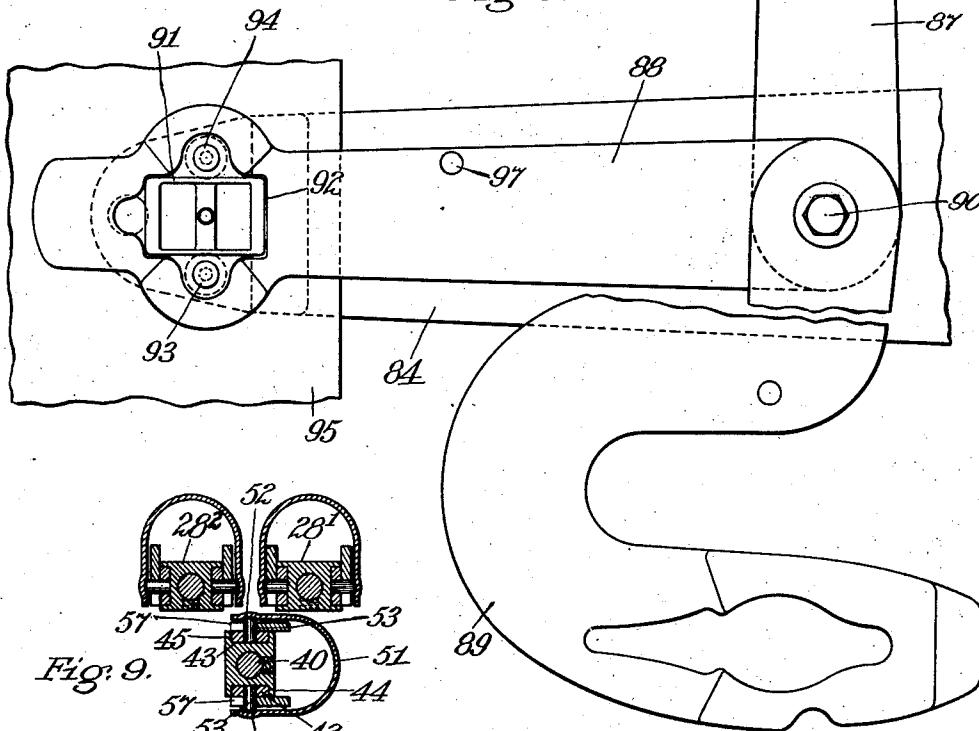


Fig. 9.

Witnesses:
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Fig. 7.

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UNITED STATES PATENT OFFICE

ARTHUR R. HAVENER, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO JUDSON L. THOMSON M'FG CO., A CORPORATION OF MAINE.

MULTIPLE-RIVET-SETTING MACHINE.

1,021,869.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed October 20, 1910. Serial No. 588,053.

To all whom it may concern:

Be it known that I, ARTHUR R. HAVENER, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Multiple-Rivet-Setting Machines, of which the following is a specification.

This invention relates to a machine for setting rivets and the like. The same is illustrated as particularly adapted for setting rivets, but by slight changes in the shape of the pockets or rivet holders and the raceways which lead thereto, it is evident that the same mechanism could be utilized for setting lacing hooks, eyelets and such like articles.

The object of the invention is to provide a rivet setting machine which can be utilized to set a plurality of rivets at one time, and which is also adapted to be operated to set one rivet at a time—that is, any of the rivet holders and drivers may be thrown out of action when desired and the remaining holders and drivers operated to set rivets.

The invention further relates to an improved positioning device for positioning the material relatively to the rivet setting instrumentalities, and still further the invention relates to an improved device for holding the rivet in position for being set.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the drawings.

Referring to the drawings: Figure 1 is a plan view of my improved multiple rivet setting machine. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation as viewed from the left of Fig. 1, the frame being broken away to save space in the drawings. Fig. 4 is a sectional elevation taken on line 4—4 of Fig. 2, the anvil holder and frame being broken away to save space in the drawings. Fig. 5 is a perspective view of one of the stop brackets. Fig. 6 is a perspective view of one of the rivet holders with a rivet dotted therein. Fig. 7 is a plan view of the positioning arms and a portion of the frame of the machine shown in connection therewith, one of the

positioning arms being broken away to save space, in the drawings and a portion of fabric, together with a buckle being shown in connection with one of the positioning arms. Fig. 8 is a sectional plan taken on line 8—8 of Fig. 4. Fig. 9 is a sectional plan taken on line 9—9 of Fig. 2.

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

In the drawings, 10 is the main driving shaft, driven by means of a suitable pulley 11 and journaled in bearings 12, 12 in the frame 13. The shaft 10 has a pinion gear 14 fast thereto which meshes into a gear 15 which runs loose upon a shaft 16 and may be locked thereto at the will of the operator by a suitable clutch 15' in a manner well known to those skilled in the art. Said shaft 16 is journaled to rotate in bearings 17, 17 upon the frame 13 and has fastened to the left hand end thereof (Figs. 1 and 2) a crank disk 18 which has a crank-pin 19 fastened thereto (see Figs. 2 and 3), said crank-pin having connected thereto a link 20 which is pivotally connected at 21 to a lever 22 pivoted at 23 to the frame of the machine, the arm 24 of said lever being rounded at 25 to enter a sliding block 26 adapted to slide transversely of the main driving slide 27 (see Fig. 4). This main driving slide 27 is the slide which actuates a plurality of driver bar slides to set the rivets, the driver bar slides each having frictionally mounted thereon a rivet holder. These driver bars are grouped upon three sides of the main driving slide 27 (see Fig. 8), and each of the driver bars is adapted to be locked at the will of the operator either to the slide 27 or to the frame. The description of one of these driver bars and the sliding rivet holder thereon, together with the means for operating the separator arranged in the rivet raceway to feed rivets to the rivet holder will be sufficient to describe all three of said instrumentalities for feeding and driving the rivet and I will now proceed to describe these instrumentalities.

Referring to Fig. 4 it will be seen that the driver bar 28 is arranged to slide in bearings 29, 30 in the frame 13 and is locked to the slide 27 by a locking pin 31 when the parts are in the position illustrated in Fig.

4. This pin 31 is arranged to slide transversely of the bar 28 from one side to the other thereof, and when moved to the right, as in Fig. 4, it projects into a recess 32 in the slide 27 and locks the driver bar 28 to the slide 27 when the parts are in the position illustrated in Fig. 4—that is, when the driver bar is in its extreme uppermost position the locking pin 31 comes into alignment with a hole 33 in the cap plate 34 upon the frame 13, and can be moved out of engagement with the slide 27 and into the hole 33, or into engagement with the stationary part 34, by means of the lever 35 which is pivoted upon a pin 36 extending through the driver bar 28, the vertical arm 37 projecting into a slot 38 extending vertically and transversely of the locking pin 31. When the lever 35 is moved to rock the same upon its pivot 36 the pin 31 moves out of the recess 32 in the slide 27 and into the recess 33 in the cap plate 34, and then the driver bar 28 is locked to the frame of the machine, while the slide 27 can be moved up and down without moving the driver bar 28. A spring actuated pin 39 locks the lever 35 in either of the hereinbefore described positions by springing into one of two holes provided therefor in the lever 35.

30 The driver bar 28 has fastened thereto a driver 40 and also has slidably mounted thereon a rivet holder 41 consisting of two parts 42 and 43 adapted to slide vertically in ways 44, 45, respectively, in the opposite sides of the driver bar 28. These two slidable parts 42 and 43 have fingers 46 and 47, respectively, which together form a pocket 48 to receive the rivet in readiness to carry the same down against the material and be subsequently driven. The rivet enters this pocket from a raceway 49 which extends upwardly therefrom and into a hopper 50.

The parts 42 and 43 are held against the driver bar 28 with a suitable amount of friction by means of a U-shaped spring 51 (see Figs. 4 and 9). The free ends of said U-shaped spring 51 are provided with recesses 52, 52 which bear against pins 53, 53 fast to the upper ends of the parts 42 and 43, so that said spring can be rocked upon the pivotal pins 53, 53, and also press the parts 42 and 43 into the ways 44 and 45, so that said parts 42 and 43 shall slide with frictional resistance within said ways. The pins 53, 53 project into notches 54, 55 which are located between the stops 56, 56 and 57, 57 at the top and bottom of said slots, respectively. These stops 56 and 57 are engaged by the pins 53, 53 when the driver bar 28 is moved upwardly or downwardly, respectively, said stops 56 and 57 thus limiting the distance to which the parts 42 and 43 of the rivet holder can be moved upwardly or downwardly, respectively.

65 As will be seen by reference to Fig. 5, the

stops 56 and 57 form part of a U-shaped bracket 58 which is fastened by a suitable screw to the frame of the machine.

A column of rivets which stands in the upper part 59 of the raceway 49 are fed one by one downwardly to the lower part 60 of said raceway by a separator slide 61 which extends transversely of said raceway (see Fig. 3), and has an inclined slot 62 therein along which the rivet passes in passing from the upper part 59 to the lower part 60 of the raceway. This form of separator for separating the rivets one by one from the column of rivets in the upper part of the raceway to feed them downwardly into the lower part of the raceway is well known to those skilled in the art and, therefore, no detailed description or illustration of the same is necessary. The manner in which it is operated by a lever from the driver bar itself is believed to be new, and this operation of the separator slide 61 is performed by the lever 63 which is pivoted at 64 to the cap plate 65 of the bearing 30. The upper arm of the lever 63 has an inclined face 66 which bears against the pin 36 forming the pivot of the lever 35 where said pin projects beyond the side of the driver bar 28 (see Figs. 2, 3 and 4). The upper arm of the lever 63 is held against this pin by a spring 67. The lower arm 68 of the lever 63 consists of a spring wire which, at its lower end, enters a groove 69 in the separator slide 61, so that as the driver bar 28 is moved upwardly or downwardly, the lever 63 is rocked upon its pivot 64, and through this spring arm 68 moves the separator slide 61 toward the right or left, respectively (Fig. 4) thus alternately bringing the slot 62 into alignment with the bottom of the space between the opposite sides of the upper part 59 of the raceway and the lower part 60 of said raceway, thus allowing the lowermost rivet in the column of rivets upon the upper part of the raceway to drop into the inclined slot in the separator, and subsequently bringing the lower end of said inclined slot into alignment with the lower part of the raceway, so as to allow the rivet to pass out of the separator slide and down the lower part of the raceway into the pocket 48 in the rivet holder 41. Thus, it will be seen that when the driver bar 28 is in operation—that is, moving upwardly and downwardly, rivets are being fed one by one to the rivet holder, but when said driver bar is stationary said rivets are not fed down to the rivet holder.

The driver bars 28' and 28² are provided with similar pockets 48' and 48², respectively, to which rivets are fed through raceways 49' and 49², respectively, which lead to hoppers 50' and 50², respectively; each of the hoppers 50, 50' and 50² has a rotary member located therein and the rotary members within the hoppers 50' and 50² are op-

erated from the same shaft 70 (Figs. 1 and 3), while the rotary member in the hopper 50 is rotated by a shaft 71. The shaft 70 has fastened thereto a pulley 72, and the shaft 71 has fastened thereto a pulley 73. The pulley 72 is rotated by a pulley 74 to which it is connected by a belt 75. The pulley 73 is rotated by a pulley 76 to which it is connected by a belt 77, and these pulleys 74 and 76 are fastened to a countershaft 78 which is rotated by a gear 79 which meshes into a pinion 80 fast to the main driving shaft 10. A clutch pin 81 is provided in the end of the main driving shaft 10 which locks the pinion gear 80 to the shaft 10, so that said pinion gear can be thrown into or out of action by manipulating the clutch pin 81, and thus the rotary members of the hoppers 50, 50' and 50² can be thrown out of action when desired by the operator.

Anvils 82, 82 are provided in a work-support 83 at the outer end of the arm 84 of the frame 13, and this work-support can be raised or lowered by means of the screw-threaded stem 85 thereon (see Fig. 3), said screw-threaded stem having screw-threaded engagement with the nuts 86 and being locked in position, when the work-support is at the proper height, by means of the lock-nuts 86.

A positioning device for different styles of buckles or other articles to be attached to the sheet material is illustrated in Fig. 7 and consists of a plurality of positioning arms 87, 88 and 89, all pivoted upon a stud 90 fast to the arm 84 (see Figs. 3 and 7). The arm 88 is shown with a buckle 91 located in the hole 92 provided in said arm, the same being in position to be riveted, and two rivets 93 and 94 being shown as having been driven therein and into the sheet material 95 to which the buckle is fastened. The arm 87 has a hole 96 therein adapted to receive a different formed article and one which is attached to the sheet material by three rivets.

It will be noted that the arms 87, 88 and 89 are formed of thin sheet steel, so that they can be sprung down to the top of the work-support and are locked in position when so placed by a vertical locking pin 97 (Fig. 3) which projects through a hole in the positioning arm which is in position to be used, and thus lock said arm firmly in position during the riveting operation. When the riveting operation is concluded and it is desired to place another arm in position, then the arm which is in engagement with the pin 97 is lifted slightly to disengage the same therefrom and the desired arm is swung around upon the pivot 90 and into position to be locked by the locking pin 97.

The general operation of the mechanism

hereinbefore specifically described is as follows: The pulley 11 is rotated by means of a suitable belt and imparts rotary motion to the shaft 10 and gear 14, thus rotating the gear 15 which, when the operator desires, is thrown into clutch with the shaft 16 by means of the clutch 15'. This shaft 16 rotates the disk 18 and thus, through the link 20, imparts a rocking motion to the lever 22 which, in its turn, imparts a reciprocatory motion to the slide 27. The slide 27, it will be understood, is the main driving slide which operates the three driver bars 28, 28' and 28² with their respective rivet holders 41, 41' and 41². Assuming the different driver bars to be locked to the main driving slide 27, then all of these driver bars will move upwardly and downwardly with the slide 27 and at each complete movement a rivet will be fed down each of the raceways into the pocket of its respective rivet holder. As the driver bars move upwardly and downwardly the pins 53, 53 engage the stops 56, 56 and 57, 57, alternately, thus limiting the upward and downward movement, respectively, of the parts 42 and 43 which form a rivet holder 41. As the driver bar descends, it carries the rivet holder down until the points of the rivet, or the lower end of its shank, engages the material which rests upon the work-support 83. At this time the pins 53, 53 engage the stops 57, 57 and the downward movement of the rivet holder ceases, but the downward movement of the driver bar 28 continues and the driver 40, entering the pocket 48, drives the rivet downwardly through the article which is to be attached and through the material until the end of the rivet shank strikes the anvil 82, when said shank will be clenched against the under side of the material. The driver bar then moves upwardly, the fingers 46, 47 which have been spread apart by the downward movement of the driver therethrough are brought together again by the action of the U-shaped spring 51, which, it will be observed, acts not only to press the parts 42 and 43 of the rivet holder against the driver bar so that they will remain where they are located until they strike the stops 56 and 57, but also acts to bring the fingers 46 and 47 toward each other after the rivet has been driven out from between said fingers by the action of the driver. When it is desired to throw any one driver bar out of action, it is done by depressing the forwardly projecting handle of the lever 35, which unlocks the driver bar from the main driving slide 27 and locks it to the frame of the machine by moving the locking pin 31 out of engagement with said slide 27 and into engagement with the frame of the machine, or with the cap plate 34.

The rivets are fed down their respective

raceways from their respective hoppers in a manner well known to those skilled in this art and are separated by their respective separators in a manner hereinbefore
5 described, and the rotary members of the different hoppers 50, 50' and 50² are rotated by means of the shafts 71 and 70, driven from the counter-shaft 78 which, in turn,
10 is driven by the shaft 10 by means of the pinion gear 80 which meshes into the gear 79 fast to the shaft 78, the respective pulleys and their belts by means of which the shafts 71 and 70 are driven having been
hereinbefore fully described.

15 The operator, before starting the machine, places a washer within the recess in the work-support above each of the anvils 82, then places the material upon the work-support 83, then swings the proper positioning arm for the article which is about
20 to be attached into position and into engagement with the locking pin 97, then places the buckle or whatever article he desires to attach to the sheet material within the hole provided in the positioning arm, such as
25 the hole 92, or the hole 96, and then starts the machine, the same having been arranged to set one, two, or three rivets as may be desired. After the rivets have been
30 set and the parts returned to the starting position, the clutch automatically throws out the driving shaft and the machine is in condition to attach another article to the sheet material in the manner hereinbefore
35 described.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

40 1. A rivet setting machine having, in combination, a slide, mechanism adapted to impart a reciprocatory motion thereto, a rectangular driver bar, a stationary member, and a locking pin mounted upon and adapted
45 to slide transversely of said driver bar and alternately into and out of recesses provided in said slide and stationary member, respectively, the recesses in said slide and stationary bar being of substantially the
50 same extent, vertically, as the diameter of said locking pin whereby, when said locking pin is engaging either of said recesses, relative movement between said driver and the part with which said pin is engaged will be
prevented.

55 2. A rivet setting machine having, in combination, a slide, mechanism adapted to impart a reciprocatory motion thereto, a driver bar, means adapted at all times to prevent said driver bar from being rotated, a stationary member, a locking pin mounted
60 upon and adapted to slide transversely of said driver bar and into and out of recesses provided in said slide and stationary member, respectively, and a lever pivoted to rock on said driver bar and adapted to move said

locking pin into and out of said recesses alternately.

3. A rivet setting machine having, in combination, a slide, mechanism adapted to impart a reciprocatory motion thereto, a driver bar, a stationary member, a locking pin adapted to slide transversely of said driver bar and into and out of recesses provided in said slide and stationary member, respectively, a lever pivoted to said driver bar and adapted to move said locking pin into and out of said recesses alternately, and means to lock said pin in either of said recesses.

4. A machine for setting rivets and the like having, in combination, a driver bar, a rivet holder in two parts slidably mounted on opposite sides of said driver bar, each of said parts having a lateral outwardly disposed projection thereon, a U-shaped spring provided with recesses adjacent to the extremities of each of the legs thereof, adapted to receive the outer ends of said projections, whereby said holder parts, respectively, are yieldingly pressed against opposite sides of said driver bar.

5. A machine for setting rivets and the like having, in combination, a driver bar, mechanism adapted to impart a reciprocatory motion thereto, a rivet holder in two parts slidably mounted on said driver bar, yielding means adapted to press said holder parts against said driver bar, and a stationary U-shaped bracket with two stops on each leg of said bracket adapted to engage, respectively, said two parts and limit the distance said parts may be moved by said driver bar in opposite directions.

6. A machine for setting rivets and the like having, in combination, a driver bar, mechanism adapted to impart a reciprocatory motion thereto, a rivet holder in two parts slidably mounted on said driver bar, each of said rivet holder parts having a lateral outwardly disposed projection thereon, a stationary U-shaped bracket with two stops on each leg of said bracket adapted to engage, respectively, said projections, and a U-shaped spring adapted to engage the outer ends of said projections and yieldingly press said rivet holder parts against said driver.

7. A machine for riveting articles to sheet material having, in combination, a work-support, a plurality of anvils thereon, a corresponding number of rivet holders, a corresponding number of driver bars, and a pivotally mounted positioning arm having a hole therein adapted to receive and position said articles between said work-support and driver.

8. A machine for riveting articles to sheet material having, in combination, a work-support, a plurality of anvils thereon, a corresponding number of rivet holders, a corre-

sponding number of driver bars, and a plurality of pivotally mounted positioning arms, each having a hole therein adapted to receive one of said articles, respectively,
5 and position the same between said work-support and driver.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

ARTHUR R. HAVENER.

Witnesses:

CHARLES S. GOODING,
LOUIS A. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
