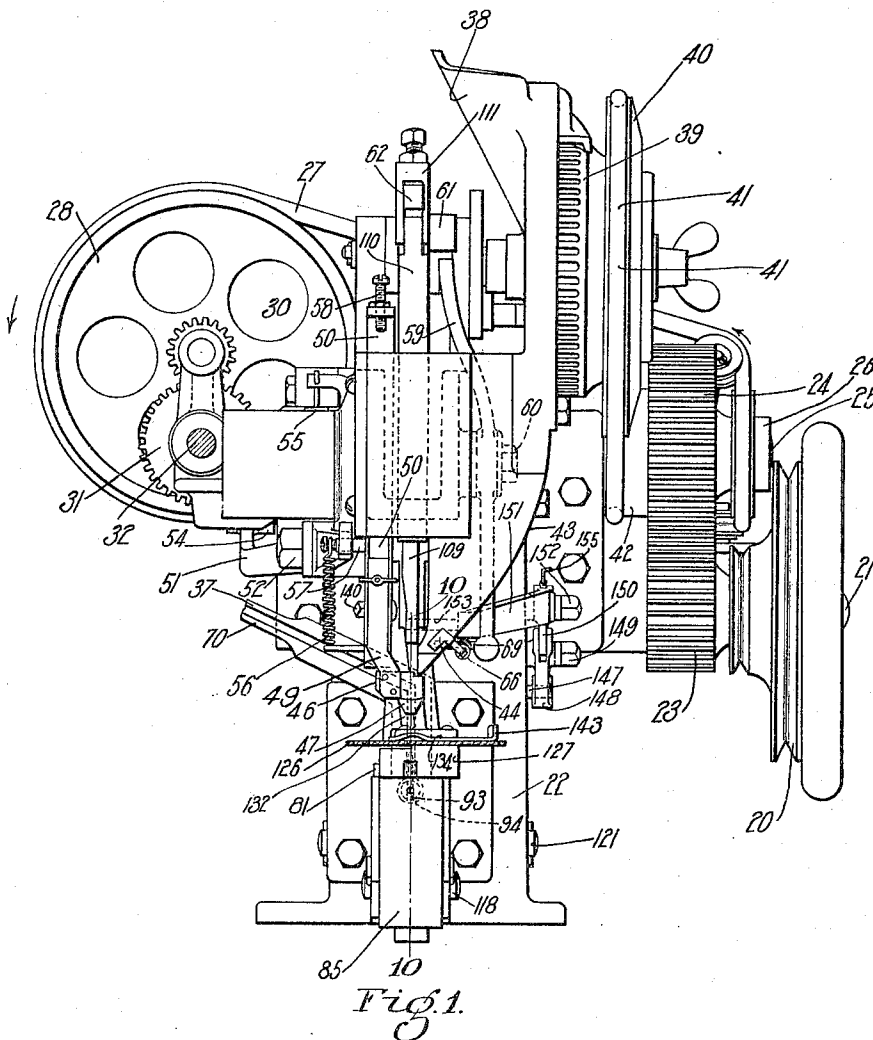


A. R. HAVENER.
MACHINE FOR ATTACHING ARTICLES TO SHEET MATERIAL.
APPLICATION FILED SEPT. 27, 1915.

1,179,917.

Patented Apr. 18, 1916.
7 SHEETS—SHEET 1.

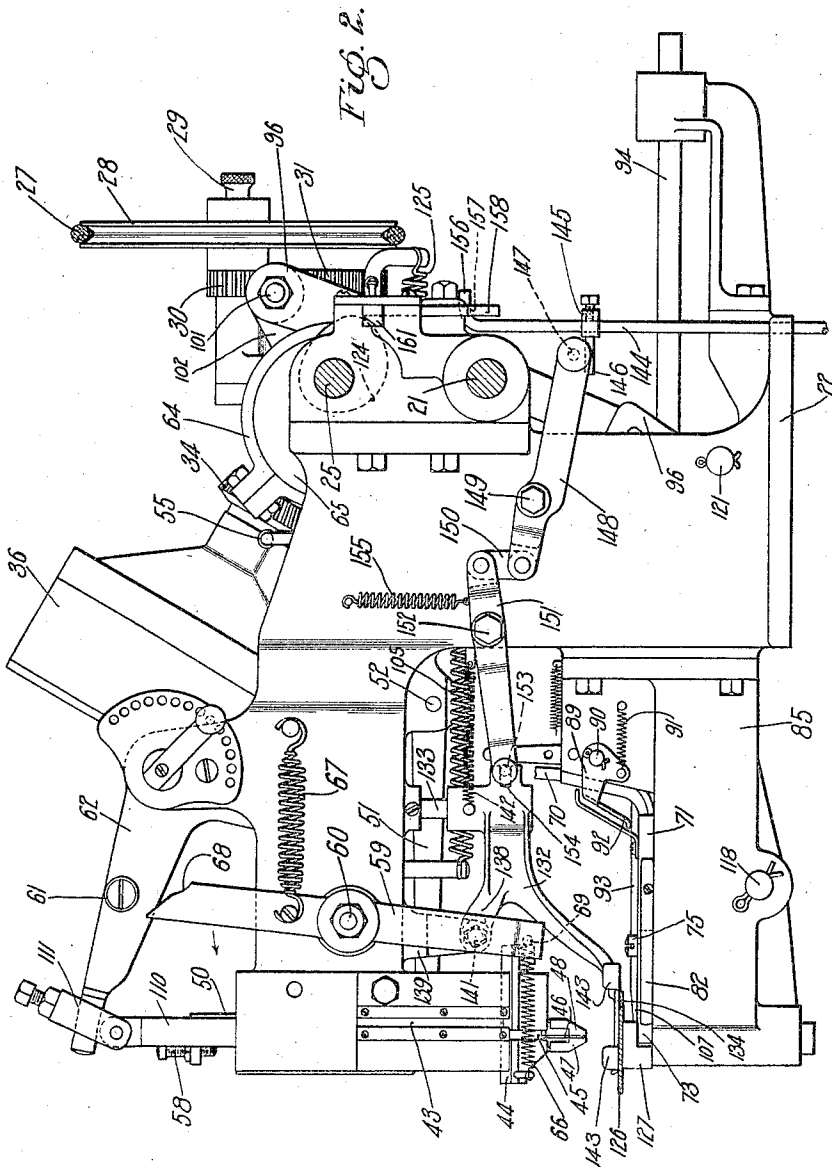


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7 SHEETS—SHEET 2.



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7 SHEETS—SHEET 3.

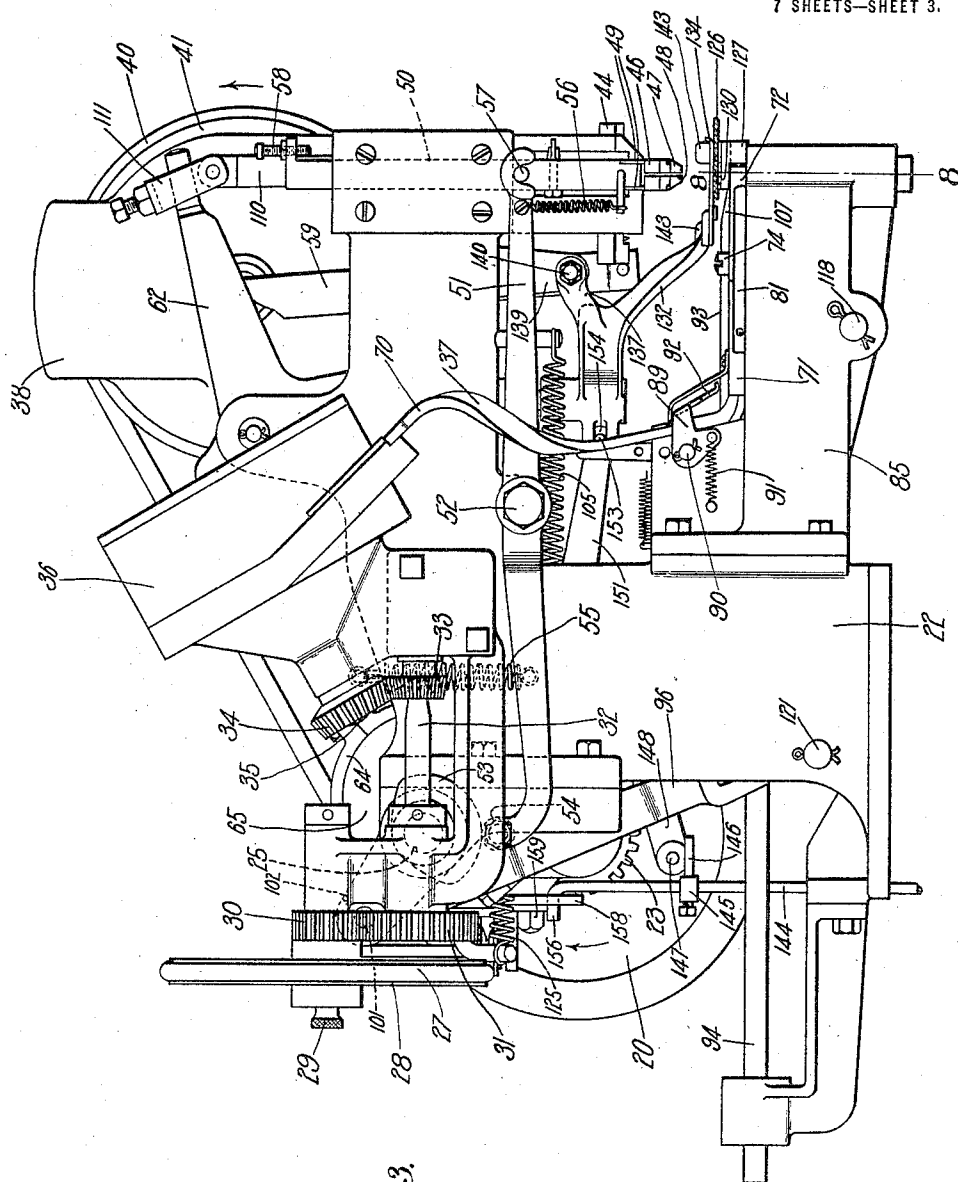


Fig. 3.

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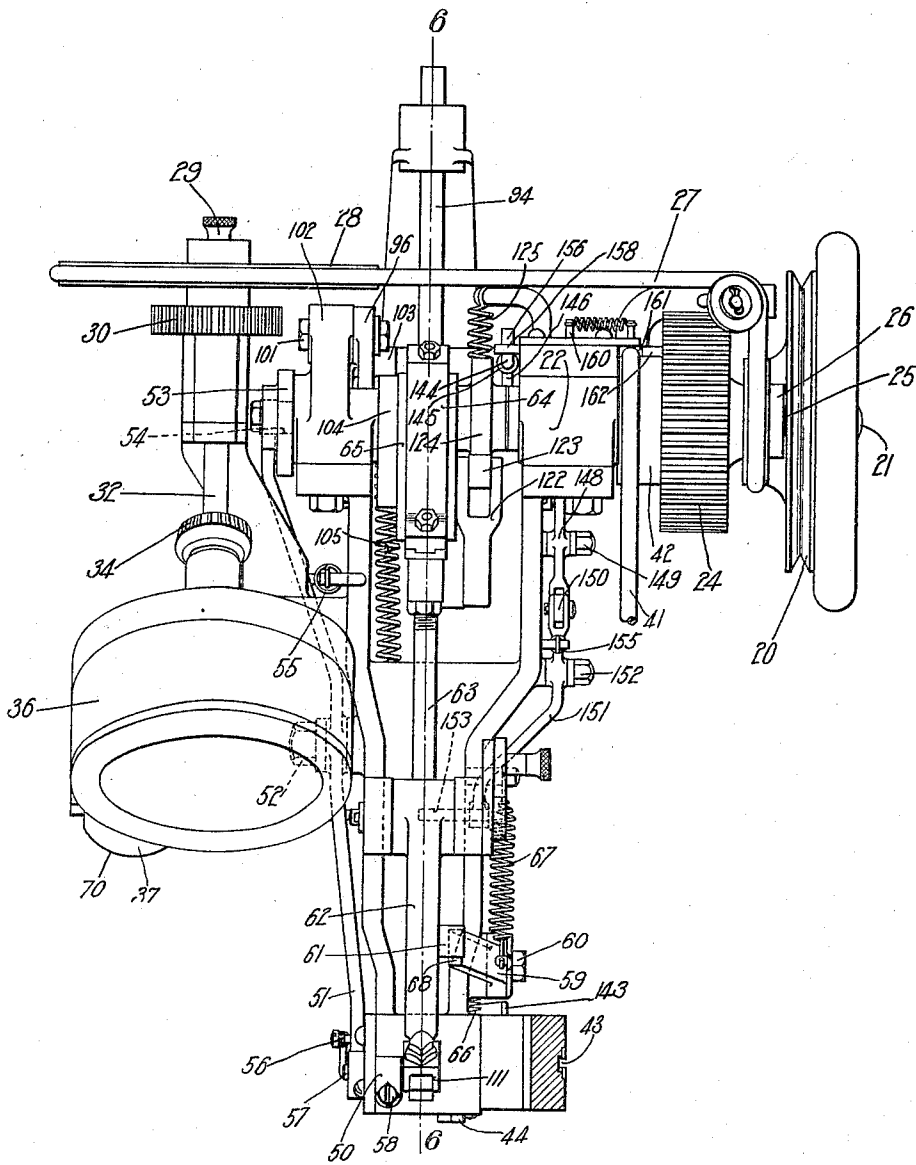


Fig. 4.

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7 SHEETS—SHEET 5.

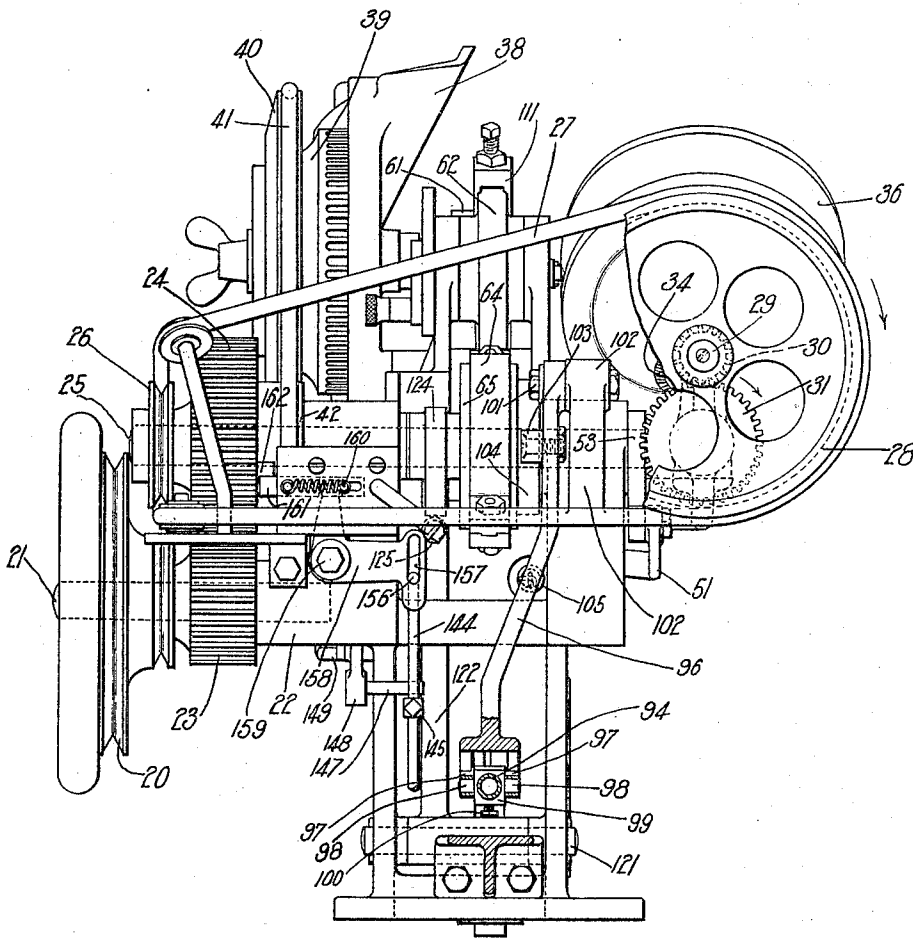


Fig. 5

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7 SHEETS—SHEET 6.

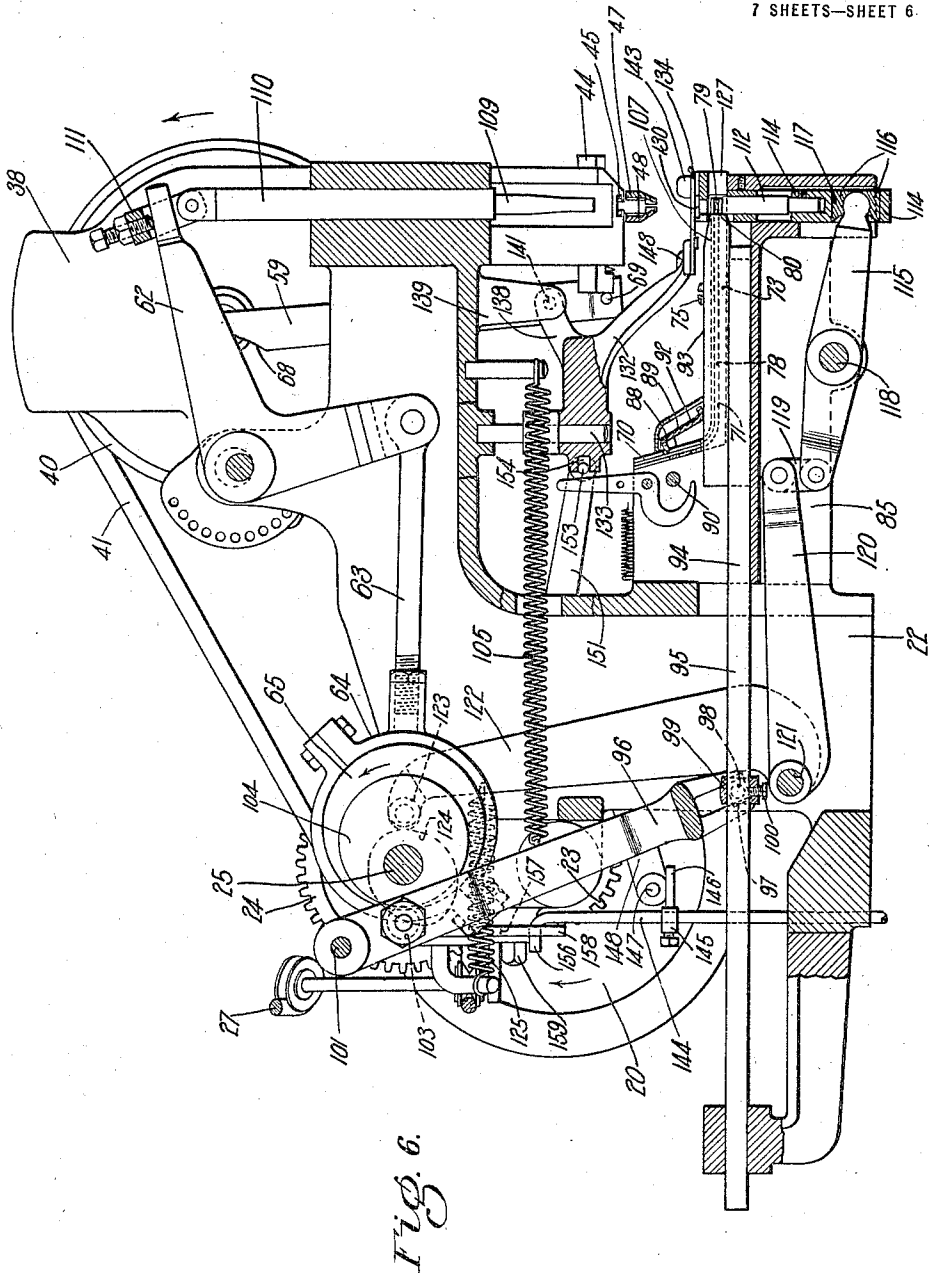


Fig. 6.

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7 SHEETS--SHEET 7.



UNITED STATES PATENT OFFICE.

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MACHINE FOR ATTACHING ARTICLES TO SHEET MATERIAL.

1,179,917.

Specification of Letters Patent.

Patented Apr. 18, 1916.

Application filed September 27, 1915. Serial No. 52,816.

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 Machines for Attaching Articles to Sheet Material, of which the following is a specification.

This invention relates to a machine for driving a rivet through sheet material and setting it in a rivet cap, and is particularly adapted to be used for attaching articles to sheet material.

The object of the invention is to provide a machine which can be utilized for attaching articles to sheet material by means of rivets and rivet caps, such, for example, as the clasps and hasps of buckles of that style used for raincoats. In buckles of this class the plate of the buckle and the hasp are attached to the clothing by two rivets and caps, and it is desirable that after attaching the plate of the buckle to the clothing by one rivet, the machine should be arranged and constructed so that the plate can be moved the desired distance to bring the second hole for the rivet in alinement with the rivet setting instrumentalities.

To accomplish this object a special presser foot has been devised which forms an important part of this invention and which has a recess therein to receive the plate of the buckle or the hasp plate and after one rivet has been set, this presser foot is moved by the operator against a stop so located that the second hole in the plate is brought into line with the rivet setting instrumentalities.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof, said invention pertaining particularly to feeding and setting instrumentalities for the rivet and cap and to the positioning devices for the article which is to be riveted to the sheet material or clothing.

Referring to the drawings: Figure 1 is a front elevation of my improved rivet and cap setting machine, with the hopper for feeding the rivet caps removed and its raceway broken away. Fig. 2 is a side elevation of the same as viewed from the right

of Fig. 1, with the hopper for feeding rivets removed and two of the shafts shown in section. Fig. 3 is a side elevation as viewed from the left of Fig. 1. Fig. 4 is a plan view with the hopper for feeding the rivets removed. Fig. 5 is a rear elevation partly broken away. Fig. 6 is a sectional elevation taken on line 6—6 of Fig. 4. Fig. 7 is a plan view in detail of the presser foot and a portion of the work-support, the presser foot stop being shown in section and said presser foot being shown in its two extreme positions, one in full lines and the other in dotted lines. Fig. 8 is a sectional elevation taken on line 8—8 of Fig. 3. Fig. 9 is a plan view partly broken away and shown in section illustrating the forward end of the raceway. Fig. 9^a is a sectional elevation taken on line 9^a—9^a of Fig. 9. Fig. 10 is a sectional elevation taken on line 10—10 of Fig. 1. Figs. 11, 12 and 13 are sectional elevations similar to Fig. 8 illustrating the different relative positions of the driving and setting instrumentalities. Fig. 14 is a detail section taken on line 14—14 of Fig. 7 illustrating a portion of the presser foot in contact with the work. Fig. 15 is a perspective view, partly broken away and shown in section, of a buckle which is adapted to be fastened to the material by the machine of this invention and illustrating in connection with said buckle a portion of the material and the rivets by which the buckle is fastened to said material. Fig. 16 is a plan view of the buckle hasp. Fig. 17 is a plan view of a reinforcing blank.

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

In the drawings, 20, is the main driving pulley which is journaled to rotate upon a stud 21 which is fastened to the frame 22 of the machine (see Fig. 5). The pulley 20 has fastened thereto a gear 23. The gear 23 meshes into a gear 24 mounted on a shaft 25 which rotates in suitable bearings in the frame 22. A pulley 26 is fastened to the gear 24 and drives by means of a belt 27 a pulley 28 (see Fig. 3) said pulley 28 being detachably connected by a clutch pin 29 to a gear 30, which meshes into a gear 31. The gear 31 is fast to a shaft 32 and said shaft 32 has a bevel gear 33 fastened to one end thereof and meshing into another bevel gear

34. The bevel gear 34 is fastened to a shaft 35 which rotates a rotary member (not shown in the drawings, but contained within a stationary hopper 36).

5 The hopper 36 contains rivet caps in mass and they are separated in a manner well known to those skilled in the art and fed from said hopper down a raceway 37. The rivets are contained in mass in a hopper 38 (Fig. 1), the rotary member 39 of which is rotated by a pulley 40 which is driven by a belt 41 from a pulley 42 fast to the main shaft 25 of the machine. As stated, the rivets are contained in mass in the hopper 38 and are separated in a manner well known to those skilled in the art and fed downwardly along a raceway 43 toward the work. At the lower end of the raceway 43 (see Fig. 2) the rivets are carried by a transverse slide 44 to a raceway 45 which leads said rivets downwardly into a two-part carrier 46.

The two parts 47 and 48 of said carrier 46 are supported by springs 49 from a slide 50 which slides in suitable ways provided in the frame of the machine (see Fig. 3), and has a reciprocatory motion imparted thereto by a lever 51 pivoted at 52 to the frame of the machine, said lever having a rocking motion imparted thereto by a cam 53 against which a roll 54 is held by a spring 55. The lever 51 is attached to the slide 50 by a spring 56 which holds the end of the lever 51 against a pin 57 on the slide 50 and the upper end of the slide 50 is provided with a screw-threaded stop 58 to regulate the distance to which the slide 50 can be moved downwardly by the lever 51. The spring 56 which attaches the lever 51 to the slide 50 is arranged to yield in case there should be any obstruction to the upward movement of the slide 50 and the spring 55 imparts a yielding downward movement to the slide 50 through the lever 51, so that if said slide 45 should encounter obstructions in either direction, there will be no breaking of the parts nor injury to the machine in any way, on account of the yielding character of the mechanism whereby said slide has a reciprocatory motion imparted thereto.

The column of rivets in the raceway 43 are fed one by one to the raceway 45 by the slide 44 in a manner well known to those skilled in this art, the slide 44, however, being driven in opposite directions by yielding mechanism so as to avoid any injury to the rivet in case it should become jammed during its passage from one of said raceways to the other. This yielding mechanism consists of a lever 59 pivoted at 60 to the frame of the machine and having a rocking motion imparted thereto by a roll 61 journaled upon a bell-crank lever 62 (see Figs. 2 and 6). The bell crank lever 62 is operated by means of an eccentric rod 63 which

is fastened to an eccentric strap 64 encircling an eccentric 65 which is fastened to the shaft 25. The lower end of the lever 59 is connected to the slide 44 by a spring 66 and the upper end of said lever is drawn toward the right (Fig. 2) by a spring 67, so that when a rocking motion is imparted to the lever 59 by the roll 61 engaging the cam-shaped end 68 of said lever 59, the slide 44 will be moved toward the right (Fig. 2) through the spring 66, said spring, under normal conditions, holding the slide 44 against a pin 69 fast to the lower end of the lever 59. If, however, any obstruction should be met to the free movement of the slide 44 toward the right (Fig. 2), then the spring 66 will yield and there will be no damage done to any of the parts of the machine. The lower end of the lever 59 is moved toward the left and the slide 44 is driven toward the left (Fig. 2) by the pin 69 and by the spring 67, so that if any obstruction should be encountered by the slide 44, the spring 67 will cease to impart motion to the lever 59. Thus it will be seen that the slide 44 is driven in opposite directions by springs and, therefore, no harm can be done to the parts of the machine or to the rivets if any obstruction is encountered in the reciprocatory movement of the slide separator 44.

The rivet caps are fed into position to be riveted to the material by the following means and mechanism: The rivet cap raceway 37 consists of two portions, a vertically disposed portion 70 and a horizontally disposed portion 71. The horizontally disposed portion 71 terminates at its front end in two fingers 72 and 73 which are pivoted at 74 and 75, respectively, to the two sides of the horizontally disposed portion 71 of the raceway (see Fig. 9).

The movable parts 72 and 73 of said raceway are movable simultaneously away from each other, or each part can be moved independently of the other so as to remove any rivet cap that may become clogged in its feed to a position to be riveted to the goods.

The horizontally disposed portion 71 of the raceway is provided with a slot 76 and the opposite sides of said horizontally disposed portion of the raceway and of the fingers 72 and 73 are provided with grooves 77 and 78, respectively, these grooves acting as guides whereby the rivet cap may be guided along the slot 76 and into a chamber 79 formed in the oppositely disposed edges of the fingers 72 and 73. The fingers 72 and 73 are also provided with ears or abutments 80 which prevent the rivet cap from retreating or moving backwardly in the grooves 77 and 78.

The fingers 72 and 73 are forced toward each other by springs 81 and 82, respectively, and are positioned relatively to each other

by stop pins 83 and 84 which are fastened to a bracket 85 fast to the frame 22 of the machine (see Figs. 2, 9 and 9^a) and are arranged with their outer ends projecting into slots 86 and 87.

The rivet caps are fed and guided from the hopper 36 to a position in line with the anvil and driver to be attached to the material by the rivet by means and mechanism similar in certain respects to that set forth in a copending application made by me Serial No. 863, filed January 6, 1915, entitled "Rivet and cap setting machine." Said rivet caps are fed from the hopper 36 down the vertically disposed portion 70 of the raceway 37 and stand in a column in said vertically disposed portion of said raceway, with the lowermost rivet cap held in position in the vertically disposed portion of said raceway by a stop pin 88 which is fastened to a lever 89 pivoted at 90 to the bracket 85. Said stop pin normally projects into the vertically disposed portion 70 of the raceway and bears against the lowermost rivet cap in said raceway, being held in contact therewith by a spring 91 (see Figs. 3 and 6).

The lever 89 has a downwardly depending arm 92 which is arranged to be engaged at certain times by a plate 93 which is fastened to a tube 94, said plate 93 and tube 94 constituting together a slide 95. The slide 95 has a reciprocatory motion imparted thereto by a lever 96 which is forked at its lower end, as illustrated in Fig. 5, to engage sliding blocks 97 pivotally mounted upon pins 98 which project laterally from a block 99 which is adjustably fastened by a set-screw 100 to the tube 94 of the slide 95. The lever 96 is pivoted at 101 to a bracket 102 fast to the frame of the machine and has a roll 103 journaled thereon and held in engagement with a cam 104 by a spring 105 (Fig. 6).

When the slide 95 is moved forwardly the inclined end 107 thereof engages the lower end of the arm 92 and rocks the lever 89 to the position illustrated in Figs. 3 and 6, thus removing the pin 88 from engagement with the lowermost rivet cap in the vertically disposed portion of the raceway 37, and allows the lowermost rivet cap in said vertically disposed portion of the raceway to pass downwardly and rest against the upper edge of the slide plate 93. Then, when the slide 95 is retracted in position the lever 89 will be moved by the spring 91 so that the pin 88 will engage the next to the lowermost rivet cap in the vertically disposed portion of the raceway, holding it stationary in said vertically disposed portion of said raceway, and the lowermost rivet cap will drop down into the horizontally disposed portion 71 of said raceway, with its edges projecting into the grooves

77 and 78, while the stop pin 88 remains resting against said next to the lowermost rivet cap and prevents its descending the vertically disposed portion of said raceway until the lever 96 is again operated, whereupon, in the sequence of operations, the slide 95 will be moved forward, the lever 89 will be tipped to release the rivet cap against which the pin 88 is pressing and the rivet cap which had before descended into the slot in the horizontally disposed portion of the raceway will be fed forward to the position illustrated in Fig. 9, wherein a rivet cap 108 is shown held in position by the fingers 72 and 73 and resting within the chamber 79. During this forward motion of the slide 95 the inclined edge 107 of the plate 93 will engage the lower end of the arm 92 and rocking the lever 89 to the position illustrated in Fig. 6 will allow the rivet cap against which the pin 88 has been formerly resting to descend in the vertically disposed portion of the raceway 37 until it rests upon the upper edge of the slide plate 93, ready to be allowed to drop into the horizontal portion of said raceway when the slide 95 is again retracted.

The rivets are driven out of the rivet carrier 46 and through the goods, as herein-after more fully described, by a driver 109 which is fastened to a slide 110 (Fig. 6) and to which a reciprocatory motion is imparted by the lever 62 which is connected thereto by a link 111.

The rivet caps are moved upwardly into contact with the material by an anvil 112 which has a recess 113 in its upper end (see Figs. 8, 11, 12 and 13). Said anvil 112 is fastened to a slide 114 (Fig. 8) and a vertical reciprocatory motion is imparted to said slide by a lever 115, the front end of which projects into a two-part sliding block 116 located in the slot 117 in the lower end of said anvil.

The lever 115 is pivoted at 118 to the frame of the machine and is connected by a link 119 to a lever 120 which is pivoted at 121 to the frame of the machine and has an upwardly extending arm 122, upon which is journaled a roll 123 which is held in contact with a cam 124 fast to the shaft 25 by a spring 125 (Fig. 6).

The sheet material 126 is placed upon a stationary work-support 127 to have the buckle plate 128 or the hasp 129 fastened thereto by rivets and rivet caps (see Figs. 7 to 17 inclusive.) Said work-support is provided with a recess 130 in its upper face which is adapted to receive a piece of material 131, constituting a stay or strengthening piece, illustrated in detail in Fig. 17 and in section in Figs. 10, 11, 12 and 13. The sheet material 126 is held in position on the upper face of the stationary work-support 127 by means of a presser foot 132, 130

which constitutes one of the principal features of this invention. Said presser foot 132 (see Figs. 2, 3, 6, 7 and 10) is rotatably mounted upon a stud 133, constituting a pivot therefor. This presser foot has a plate 134 fast thereto which is provided with a recess 135, said recess 135 being shaped to receive the buckle plate 128 or the hasp plate 129 and position it for the rivets to be inserted therethrough and into the material.

The buckle plate 128 and the hasp plate 129 are each provided with two holes 136 and in attaching the plates to the clothing a rivet is inserted through one of these holes and subsequently through the other and the presser foot, by being pivotally mounted, enables the operator to accurately locate the holes 136 in the plate which is being attached with relation to the driver and anvil.

By reference to Fig. 7 it will be seen that the presser foot 132 has a pair of arms 137 and 138 which have in screw-threaded engagement therewith a pair of stop-screws 140 and 141, respectively, arranged to alternately engage a stop 139. A spring 142 (Fig. 2) normally holds the stop-screw 140 in engagement with the stop 139. As soon as the operator, therefore, has set one of the rivets, he can rock the presser foot horizontally upon its pivotal stud 133 so as to bring the stop-screw 141 against the stop 139 and thus bring the other hole 136 in the hasp or buckle plate, as the case may be, in alinement with the driver and anvil.

As a convenient means of rocking the presser foot, as hereinbefore set forth, ears 143 are provided which extend upwardly from the plate 134. The presser foot 132 may be moved vertically and out of contact with the material 126 by means of a treadle (not shown in the drawings) and a treadle rod 144 (Fig. 2). Said treadle rod has a collar 145 adjustably fastened thereto which has an arm 146 thereon adapted to engage a pin 147 on a lever 148. The lever 148 is pivoted at 149 to the frame of the machine and is connected by a link 150 to another lever 151 pivoted at 152 to the frame of the machine and having a pin 153 projecting laterally therefrom at its forward end into a slot 154 in the presser foot 132. A spring 155 normally holds the presser foot down in engagement with the material upon the work-support. When the treadle is operated to move the treadle rod 144 upwardly the presser foot will be raised by the levers 148 and 151, so that the material can be inserted beneath the presser foot and rest upon the work-support.

The treadle rod 144 terminates at its upper end in a rearwardly extending arm 156 which projects into a slot 157 formed in a bell crank lever 158 pivoted at 159 to the frame of the machine. The vertical arm of

said bell crank lever is arranged to engage a pin 160 fast to a slide 161 which is arranged to engage one member 162 of a clutch mechanism which is contained within the gear 24 and operates in a manner well known to those skilled in this art, so that when the treadle rod 144 is moved downwardly the slide 161 will be moved to the right (Fig. 5) and the clutch member 162 released so as to allow the clutch to operate to lock the gear 24 to the cam shaft 25 and the machine will then operate to drive a rivet, as hereinafter more fully set forth.

The general operation of the mechanism hereinbefore specifically described is as follows: The operator raises the presser foot 132 by elevating the treadle rod 144 which, through the levers 148 and 151, will cause said presser foot 132 to be lifted away from the work-support 127. He then places a stay piece 131 in the recess 130 in the upper surface of the work-support 127 and then places the material to which the buckle clasp or hasp is to be attached beneath the presser foot and resting upon the upper surface of the work-support 127. He then lowers the presser foot by allowing the treadle rod to move downwardly. The spring 155 will then act to move the presser foot downwardly and into contact with the material which it will hold firmly in position. The operator then places the buckle plate 128 or the hasp 129, as the case may be, in the recess 135. The parts are now in position to have a buckle riveted thereto. The operator now presses the treadle to move the treadle rod 144 downwardly which will operate the clutch and in proper sequence cause the rivet carrier 46 to descend and properly position a rivet 163 to be driven through the material, as illustrated in Fig. 11, while the anvil 112 will move upwardly from the position illustrated in Fig. 8 to the position illustrated in Fig. 11, the upper end of said anvil passing through the opening between the front ends of the spring-actuated fingers 72 and 73 and transferring the rivet cap 108 from the chamber 79 to the position shown in Fig. 11, with the cap resting against the under face of the stay-piece 131. During this upward movement the fingers 72 and 73 will be forced apart by the anvil coming into contact with the beveled under edges 164 of said fingers 72 and 73. Subsequently the driver 109 will engage the rivet 163 while the same is still being held in position by the carrier 46, and will drive said rivet out of the carrier downwardly through one of the holes 136 in the plate 128 and drive the prongs of said rivet through the material 126, through the stay-piece 131 and clench it in the rivet cap 108 in a manner well known to those skilled in the art and as illustrated in Fig. 12. The driver and the anvil will then move away from each

other, leaving the parts in the relative positions illustrated in Fig. 13, whereupon the rivet cap is subsequently fed along the horizontal portion of the raceway by the slide 5 95, while a rivet will be fed down the raceway 45 and into the carrier 46 ready for another operation. Before the second rivet is driven the operator moves the presser foot 132 from the right toward the left, or from 10 the position shown in full lines (Fig. 7) to the position shown in dotted lines therein, thus moving the material, the stay-piece and the buckle, with the presser foot, into position to bring the other hole 136 of the plate 15 to be attached in alinement with the driver and anvil and bringing the stop-screw 141 into contact with the stop 139. Holding the presser foot in this position against the action of the spring 155, the operator again 20 operates the treadle to set another rivet, as hereinbefore described, and the operation is repeated. After this second riveting operation is performed he operates the treadle to raise the presser foot out of contact with the material and out of engagement with the 25 buckle plate, and releasing his hold upon the presser foot, the spring 142 will rock the presser foot upon the stud 143 and move it toward the right to the position illustrated in full lines (Fig. 7) with the stop-screw 140 30 resting against the stop 139. The operator then moves the material along to a position where he wishes to have another buckle attached and the operation hereinbefore described is repeated. 35

The material is removed by raising the presser foot in the manner hereinbefore described which relieves the material 126 so that the goods can be moved to the left by 40 the operator, the recessed portion 130 in the upper face of the work-support 127 allowing this feeding movement of the goods to be performed by the operator without difficulty. 45

The feeding of the rivets to the rivet carrier and the operation of the rivet carrier and driver have been fully hereinbefore described and also the mechanism for feeding the rivet caps to the anvil has been fully 50 hereinbefore described.

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

1. A machine for attaching articles to 55 sheet material having, in combination, a work-support, a presser foot constructed and arranged to press said material against said work-support, and instrumentalities constructed and arranged to position a rivet 60 and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein constructed to receive one of said articles and being movable horizontally, whereby said article after being 65 riveted to said material, may be fed hori-

zontally with said material by means of said presser foot.

2. A machine for attaching articles to sheet material having, in combination, a work-support, a presser foot constructed 70 and arranged to press said material against said work-support, mechanism constructed and arranged to position a rivet adjacent to one face of said sheet material, mechanism constructed and arranged to position a rivet 75 cap adjacent to the opposite face of said sheet material, and mechanism constructed and arranged to drive said rivet through said sheet material and clench the same in said rivet cap, said presser foot having a 80 recess therein constructed to receive one of said articles and being movable horizontally, whereby said article, after being riveted to said material, may be fed horizontally with said material by means of 85 said presser foot.

3. A machine for attaching articles to sheet material having, in combination, a work-support, a presser foot constructed and arranged to press said material against 90 said work-support, and instrumentalities constructed and arranged to position a rivet and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein to receive one of said arti- 95 cles and being movable horizontally, whereby said article, after being riveted to said material, may be fed horizontally with said material by means of said presser foot, and a top arranged to be engaged by said 100 presser foot to limit the horizontal movement thereof.

4. A machine for attaching articles to sheet material having, in combination, a work-support, a presser foot constructed 105 and arranged to press said material against said work-support, mechanism constructed and arranged to rivet said article to said sheet material, said presser foot having a recess therein constructed to receive one of 110 said articles and being movable horizontally, whereby said article, after being riveted to said material, may be fed horizontally with said material by means of said presser foot, a stop, and a pair of arms on 115 said presser foot constructed and arranged to engage opposite sides, respectively, of said stop to limit the horizontal movement of said presser foot in opposite directions.

5. A machine for attaching articles to 120 sheet material having, in combination, a work-support, a presser foot constructed and arranged to press said material against said work-support, and instrumentalities constructed and arranged to position a rivet 125 and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein constructed to receive one of said articles and being movable horizontally and vertically, whereby said arti- 130

cle after being riveted to said sheet material may be fed horizontally with said sheet material by means of said presser foot to a new position and subsequently released by moving said presser foot vertically.

6. A machine for attaching articles to sheet material having, in combination, a work-support, a presser foot, mechanism constructed and arranged to move said presser foot toward and away from said work-support, and instrumentalities constructed and arranged to position a rivet and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein constructed and arranged to receive one of said articles and being movable horizontally whereby said article after being riveted to said sheet material may be fed horizontally with said sheet material by means of said presser foot.

7. A machine for attaching articles to sheet material having, in combination, a work-support, a vertical stud, a presser foot rotatably and slidably mounted thereon, and instrumentalities constructed and arranged to position a rivet and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein constructed to receive one of said articles, whereby said article, after being riveted to said sheet material, may be fed horizontally with said sheet material by means of said presser foot, and subsequently released by moving said presser foot vertically on said stud.

8. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work support and anvil, a raceway located beneath said work-support, mechanism constructed and arranged to feed a rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and subsequently through said work-support and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

9. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway located beneath said work-support, means constructed and arranged to feed said rivet cap onto said raceway, mechanism constructed and ar-

ranged to feed said rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and subsequently through said work-support and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

10. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway located beneath said work-support and terminating at its forward end in two independently movable parts, means constructed and arranged to feed said rivet cap onto said raceway, mechanism constructed and arranged to feed said rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

11. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway located beneath said work-support and terminating at its front end in two pivotally mounted spring-actuated parts, means constructed and arranged to feed said rivet cap onto said raceway, mechanism constructed and arranged to feed said rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

12. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway located

beneath said work-support, mechanism constructed and arranged to feed a rivet cap along said raceway and into alinement with said anvil, mechanism to move said rivet carrier toward said anvil and work-support, mechanism constructed and arranged to move said anvil through said raceway and subsequently through said work-support and toward said driver, and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

13. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway located beneath said work-support and terminating at its front end in two independently movable parts, each of said parts having a groove extending longitudinally thereof, said grooved parts coöperating to form a portion of said raceway, mechanism constructed and arranged to feed a rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

14. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver, oppositely disposed to said work-support and anvil, a raceway located beneath said work-support, a slide adapted to engage a rivet cap and feed the same along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and toward said driver and mechanism constructed and arranged to move said driver toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

15. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway compris-

ing a vertically disposed portion and a horizontally disposed portion, said horizontally disposed portion being located beneath said work-support, a slide constructed and arranged to support a column of rivet caps within the vertically disposed portion of said raceway, said slide constructed and arranged to engage the lowermost of said rivet caps in said column and to feed said rivet cap along said raceway and into alinement with said anvil, mechanism constructed and arranged to move said anvil through said raceway and toward said driver and mechanism constructed and arranged to move said driver through said carrier toward said anvil, whereby said rivet cap will be removed from said raceway and held against said material while said rivet is being driven through said material and clenched in said rivet cap.

16. A machine for driving a rivet in a piece of sheet material and clenching the same in a rivet cap having, in combination, a rivet carrier, a stationary work-support arranged to support said sheet material, an anvil, a driver oppositely disposed to said work-support and anvil, a raceway terminating at its end in two pivotally mounted parts, said parts being constructed and arranged to yield both in unison and independently of each other, a groove extending longitudinally of each of said parts, a feed slide constructed and arranged to support a column of rivet caps, and yielding means constructed and arranged to feed said caps one at a time through said raceway to a position above said anvil, said driver adapted to engage a rivet within said rivet carrier and drive said rivet through a plurality of layers of sheet material and clench said rivet within said rivet cap.

17. A machine for inserting a rivet in a piece of sheet material and clenching the same within a rivet cap having, in combination, an anvil, rivet inserting instrumentalities, a stationary work-support, a raceway located beneath said work-support and interposed between said rivet inserting instrumentalities and anvil, said raceway comprising two independent yieldingly mounted parts having a slot therebetween arranged to guide a rivet cap and mechanism constructed and arranged to move said rivet cap along said slot and into alinement with said anvil.

18. A machine for inserting a rivet in a piece of sheet material and clenching the same within a rivet cap having, in combination, an anvil, a stationary work-support, rivet inserting instrumentalities, a raceway interposed between said rivet inserting instrumentalities and said anvil, said raceway comprising two independently pivotally mounted parts, said parts being movable toward and away from each other, and having a slide therebetween constituting a raceway

for a rivet cap and mechanism constructed and arranged to move a rivet cap along said slot and into alinement with said anvil.

19. A machine for inserting a rivet in a
5 piece of sheet material and clenching the
same within a rivet cap having, in combina-
tion, an anvil, rivet inserting instrumental-
ities, a stationary work-support, a raceway
10 interposed between said rivet inserting in-
strumentalities and anvil, said raceway com-
prising two independent parts, a vertical
pivot for each of said parts and a spring
acting to move said parts toward each other,
15 there being a slot between said parts adapted
to guide a rivet cap and mechanism con-
structed and arranged to move a rivet cap
along said slot and into alinement with said
anvil.

20. A machine for inserting a rivet in a
20 piece of sheet material and clenching the
same within a rivet cap having, in combina-
tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
25 in two parts interposed between said rivet
inserting instrumentalities and anvil, said
parts being movable away from each other
and yielding means normally acting to move
said parts toward each other, said parts hav-
30 ing a chamber between their opposing edges
arranged to receive a rivet cap.

21. A machine for inserting a rivet in a
piece of sheet material and clenching the
same within a rivet cap having, in combina-
35 tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
in two parts movable away from each other
interposed between said rivet inserting in-
40 strumentalities and said anvil and yielding
means normally acting to move said parts
toward each other, said parts having a
chamber between their opposing edges, the
edges of said parts being beveled below said
45 chamber, whereby when said beveled edges
contact with said anvil said parts will be
forced apart and said rivet cap will be de-
posited in said recess.

22. A machine for inserting a rivet in a
50 piece of sheet material and clenching the
same within a rivet cap having, in combina-
tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
55 in two parts interposed between said rivet
inserting instrumentalities and said anvil,
said anvil being movable toward and away
from said raceway and said parts being
movable away from each other, and yield-
60 ing means normally acting to move said
parts toward each other, said parts having
a chamber between their opposing edges ar-
ranged to receive a rivet cap.

23. A machine for inserting a rivet in a
65 piece of sheet material and clenching the

same within a rivet cap having, in combina-
tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
70 terminating at its forward end in two parts
and interposed between said rivet inserting
instrumentalities and said anvil, said anvil
being movable toward and away from said
raceway and said parts of said raceway be-
75 ing movable away from each other, and
yielding means normally acting to move
said parts toward each other, said parts
having a chamber between their opposing
edges arranged to receive a rivet cap, the
80 edges of said parts being beveled below said
chamber, whereby when said anvil is
brought into contact with said beveled edges
said parts will be forced apart and said
rivet cap deposited in said recess.

24. A machine for inserting a rivet in a
85 piece of sheet material and clenching the
same within a rivet cap having, in combina-
tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
90 having two parts at its forward end mov-
able toward and away from each other and
yielding means normally acting to move said
parts toward each other, said parts having
a chamber between their opposing edges ar-
95 ranged to receive a rivet cap, the edges of
said parts of said raceway being beveled
below and above said chamber for the pur-
pose specified, said raceway interposed be-
tween said rivet inserting instrumentalities
100 and said anvil, said anvil being movable to-
ward and away from said recess.

25. A machine for inserting a rivet in a
piece of sheet material and clenching the
same within a rivet cap having, in combina-
105 tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support interposed
between said rivet inserting instrumental-
ities and said anvil, a raceway terminating
110 at its front end in two parts movable away
from each other and yielding means nor-
mally acting to move said parts toward each
other, said parts having a chamber between
their opposing edges arranged to receive a
115 rivet cap, said parts being normally sepa-
rated by a slot arranged to guide a rivet
into said chamber.

26. A machine for inserting a rivet in a
piece of sheet material and clenching the
120 same within a rivet cap having, in combina-
tion, rivet inserting instrumentalities, an
anvil provided with a recess in its upper
face, a stationary work-support, a raceway
terminating at its front end in two parts in-
125 terposed between said rivet inserting in-
strumentalities and said anvil beneath said
work-support, said two parts being mov-
able away from each other, and yielding
means normally acting to move said parts
130

toward each other, said parts having a chamber between their opposing edges arranged to receive a rivet cap, said parts being normally separated by a slot arranged to guide a rivet cap into said chamber, and mechanism constructed and arranged to move a rivet cap along said slot and into said chamber.

27. A machine for attaching articles to sheet material having, in combination, a stationary work-support, a presser foot constructed and arranged to press said material against said work-support and mechanism constructed and arranged to rivet said article to said sheet material, said presser foot having a recess therein constructed to receive one of said articles and being movable horizontally, whereby said article after being riveted to said sheet material may be utilized to feed said sheet material by means of said presser foot.

28. A machine for attaching articles to sheet material having, in combination, a stationary work-support, a presser foot constructed and arranged to press said material against said work-support, and mechanism constructed and arranged to rivet said article to said sheet material, said presser foot having a recess therein to receive one of said articles and being movable horizontally, whereby said article after being riveted to said sheet material may be utilized to feed said sheet material by means of said presser foot, and a stop arranged to be engaged by said presser foot at the end of the horizontal movement thereof.

29. A machine for attaching articles to sheet material having, in combination, a stationary work-support, a presser foot constructed and arranged to press said material against said work-support, and mechanism constructed and arranged to rivet said article to said sheet material, said presser foot having a recess therein constructed to receive one of said articles and being movable horizontally and vertically, whereby said article after being riveted to said sheet material may be utilized to feed said sheet material horizontally by means of said presser foot and subsequently released by moving said presser foot vertically.

30. A machine for attaching articles to sheet material having, in combination, a stationary work-support, a presser foot constructed and arranged to press said material against said work-support, mechanism constructed and arranged to move said presser foot toward and away from said work-support, and mechanism to rivet said article to said sheet material, said presser foot having a recess therein constructed and arranged to receive one of said articles and

being movable horizontally thereof, whereby said article after being riveted to said sheet material may be utilized to feed said sheet material horizontally by means of said presser foot.

31. A machine for attaching articles to sheet material having, in combination, a stationary work-support, a vertical stud, a presser foot rotatably and slidably mounted thereon, and mechanism constructed and arranged to rivet said article to said sheet material, said presser foot having a recess therein constructed to receive one of said articles whereby said article after having been riveted to said sheet material may be utilized to feed said sheet material horizontally by means of said presser foot and subsequently be released by moving said presser foot vertically on said stud.

32. A machine for attaching articles to sheet material having, in combination, a work-support, a presser foot constructed and arranged to press said material against said work-support, instrumentalities constructed and arranged to position a rivet and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein to receive one of said articles and being movable horizontally and mechanism constructed and arranged to move said presser foot vertically, whereby said article after being riveted to said sheet material may be fed horizontally with said sheet material by means of said presser foot and subsequently released by moving said presser foot vertically.

33. A machine for attaching articles of sheet material, having, in combination, a work-support, a presser foot constructed and arranged to press said material against said work-support instrumentalities constructed and arranged to position a rivet and to insert said rivet in said article and in said sheet material, said presser foot having a recess therein to receive one of said articles and being movable horizontally and manually operable mechanism constructed and arranged to move said presser foot toward and away from said work-support, whereby said article after being riveted to said sheet material may be fed horizontally with said sheet material by means of said presser foot and subsequently released by moving said presser foot vertically.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR R. HAVENER.

Witnesses:

CHARLES S. GOODING,
SYDNEY E. TAFT.