E. J. NIELSEN.

RIVET SORTING DEVICE.

APPLICATION FILED FEB. 11, 1918.

1,305,152.

Patented May 27, 1919.

3 SHEETS—SHEET 1.

Fig. 1.

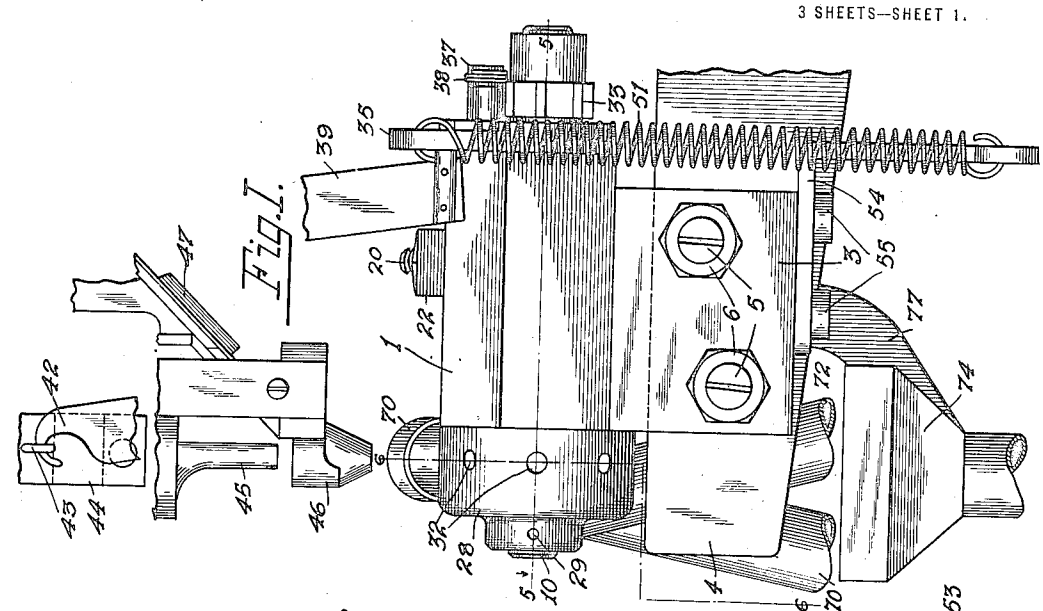
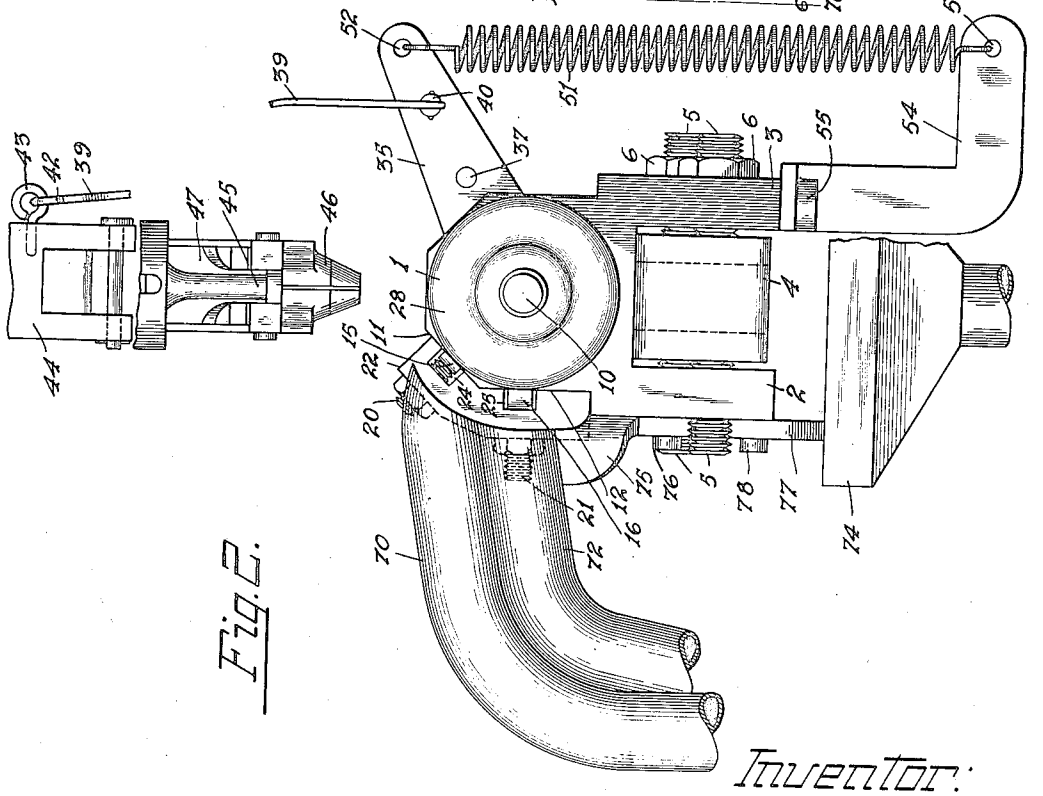


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

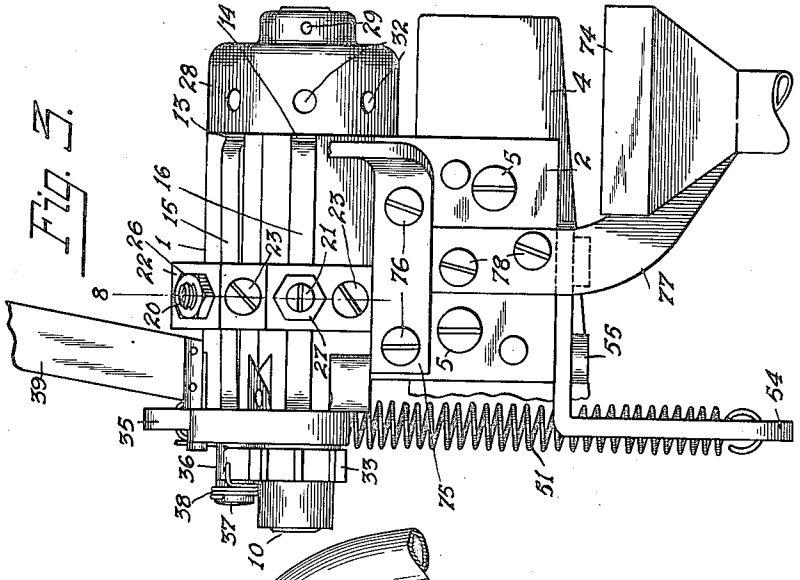
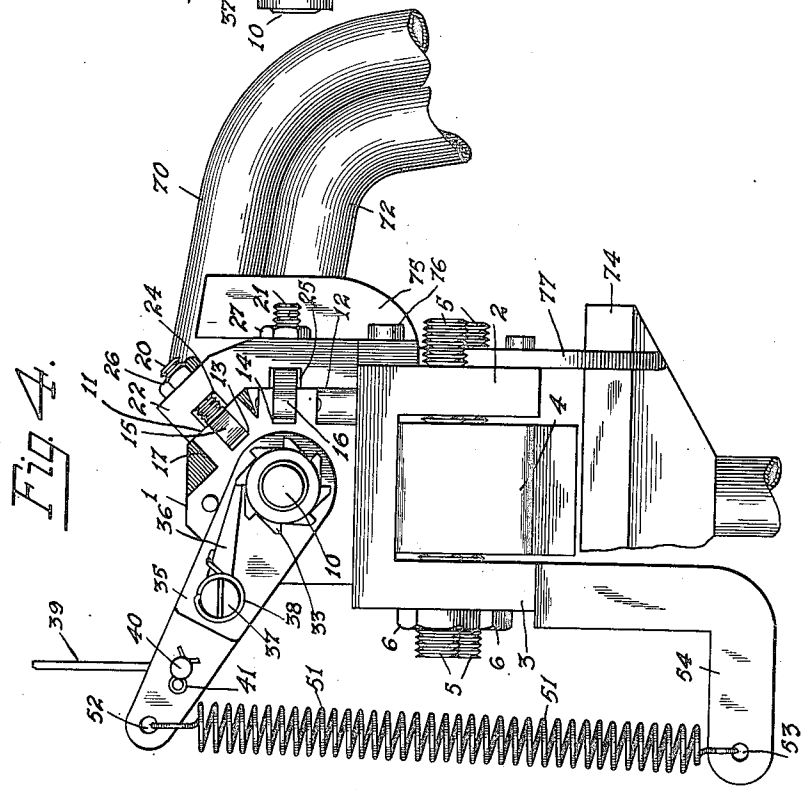


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 7.

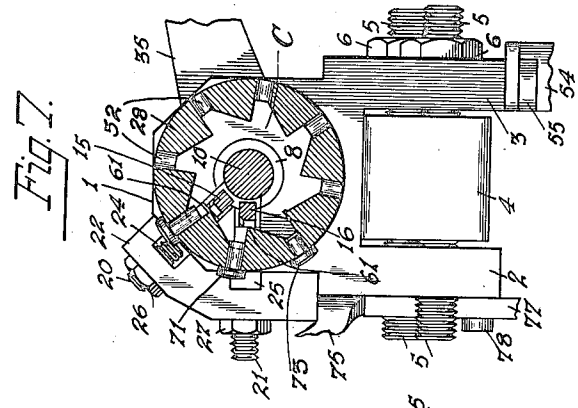


Fig. 10.

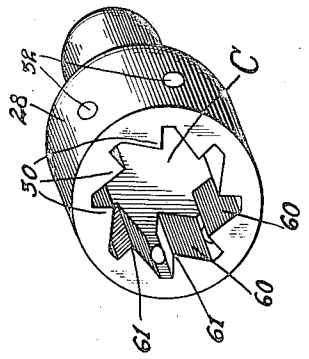


Fig. 6.

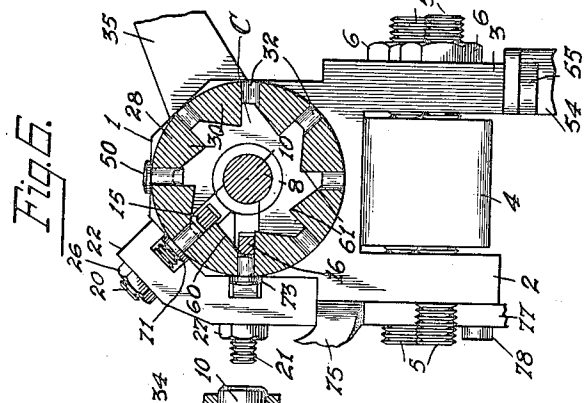


Fig. 9.

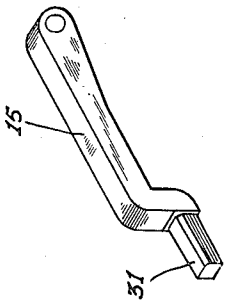


Fig. 5.

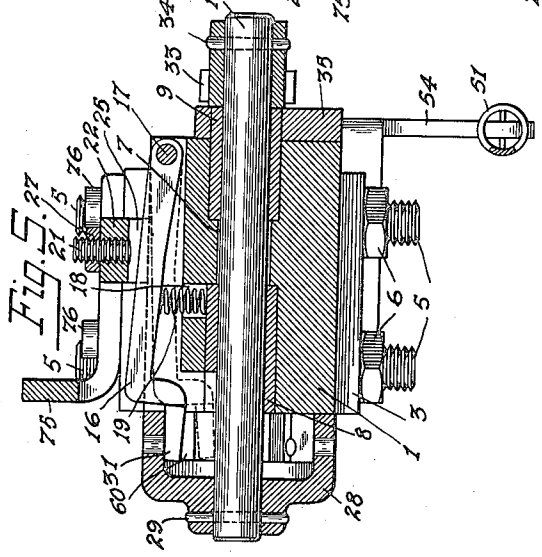
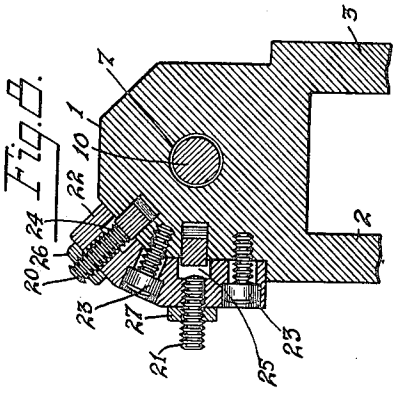


Fig. 8.



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UNITED STATES PATENT OFFICE.

EMIL J. NIELSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD & SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RIVET-SORTING DEVICE.

1,305,152. Specification of Letters Patent. Patented May 27, 1919.

Application filed February 11, 1918. Serial No. 216,454.

To all whom it may concern:

Be it known that I, EMIL J. NIELSEN, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Rivet-Sorting Devices, of which the following is a specification.

My invention relates to machines in general, and has to do more particularly with a machine which I will term a rivet sorting device, which machine sorts out rivets of different lengths, and discharges them into their respective chutes through which they are deposited into receptacles, properly sorted.

The rivet sorting device of my invention is adapted to be attached to the anvil of a riveting machine, known in the art as a tubular riveting machine, and connected so as to be operatively associated therewith. In manufacturing plants where riveting machines of the above type are used, the rivets for use in the said machines are more or less carelessly handled in supplying the machines, and from time to time these rivets, which are of different lengths, become mixed and this necessitates that the rivets be sorted before they can be used. This sorting has heretofore been done by hand, thereby increasing the cost of production of the output of the machine.

With the device of my invention, the hand sorting process is eliminated, and the rivets are automatically separated according to their different lengths. The rivets of different lengths are placed in the hopper of the riveting machine and are then fed automatically to the sorter upon each tripping operation of the machine. The device of my invention is thus operated to discharge the rivets in their proper chutes, properly sorted as to lengths.

The main object of my invention is the provision of a machine which automatically separates or sorts out rivets of different lengths, and deposits them in different receptacles.

Other features of my invention will be hereinafter more fully pointed out in the ensuing specification and in the appended claims.

I have stated that the device shown in the accompanying drawings is adapted to operate in conjunction with a rivet sorting machine, but it is not limited to such use as the device may be used separately or in conjunction with any riveting machine.

For a better understanding of my invention, reference may be had to the accompanying drawings in which I illustrate the preferred form of my invention, and in which like reference characters in the several views denote like parts, and in which:

Figure 1 is a side view of the rivet sorting device of my invention showing the plunger of a riveting machine operatively associated therewith;

Fig. 2 is a left end view of Fig. 1;

Fig. 3 is a side elevation of my device, looking in the direction opposite to that of Fig. 1;

Fig. 4 is a left end view of Fig. 3;

Fig. 5 is a sectional view along the line 5—5 of Fig. 1;

Fig. 6 is a sectional view along the line 6—6 of Fig. 1;

Fig. 7 is a view similar to that of Fig. 6 but showing the head in an intermediate position just before the rivets are ejected from the rotating head;

Fig. 8 is a sectional view along the line 8—8 of Fig. 3 showing the screw stop adjustment for the rivet ejecting pawls;

Fig. 9 is a perspective view of one of the rivet ejecting pawls; and

Fig. 10 is a perspective view of the rotating head showing the internal cam which operates the rivet ejecting pawls.

Referring now more in detail to my invention as illustrated in the accompanying drawings, it comprises a housing 1, which is polyhedron in shape. The said housing 1 has two depending sides 2 and 3 forming a saddle which fits over the anvil 4 of the riveting machine. Set screws 5 are provided which have screw-threaded engagement with suitable openings in the sides 2 and 3. The screws 5 pass through the depending sides of the housing 1 and engage the sides of the anvil 4. Lock nuts 6 are provided which lock the screws 5 in engaging position with the anvil 4 to rigidly support the rivet sorting device in operative relation with the actuating plunger of the said riveting machine.

The housing 1 is provided with a central opening 7 extending the length thereof, and the ends of the opening 7 are enlarged to a size to receive the bearings 8 and 9 which

are of suitable material, such as phosphorus bronze. A shaft 10 of a size to fit in the openings of the bearings 8 and 9, is provided, and rotates therein when the device is operated, as will presently be described. Two of the plane surfaces 11 and 12 of the housing 1 have channels 13 and 14 cut into them of a size and depth to receive the ejecting pawls 15 and 16, respectively. The said pawls 15 and 16 are pivotally secured in their respective channels by means of pivot pins 17. The pawls 15 and 16 are held in their normal positions by means of spiral springs 19 which are provided and which rest in openings 18 in the bottom of the channels 13 and 14. The said springs 19 bearing against the under surface of the pawls 15 and 16 maintain said pawls in their normal position. I provide adjustment means for the pawls 15 and 16 in the form of adjustable stop screws 20 and 21. A block 22 for supporting the adjustable stop screws 20 and 21 is provided and is of a shape to conform with the plane surfaces 11 and 12 of the housing 1. The block 22 is fastened to the housing 1 by means of the screws 23, which screws 23 have screw-threaded engagement with suitably tapped holes in the housing 1. Channels 24 and 25 are cut in the block 22 into which the said ejecting pawls 15 and 16 are moved by the springs 19 when in their normal position. The adjustable stop screws 20 and 21 have screw-threaded engagement with suitable tapped holes in the block 22 and are used for adjusting the pawls 15 and 16, as will be more fully hereinafter described.

Lock nuts 26 and 27 are provided which lock the stop screws in position after being properly adjusted in relation with the ejecting pawls 15 and 16. A rotating head 28 is provided which is secured to the shaft 10 by means of a pin 29. The head 28 is provided with a cam C which has a plurality of teeth 30 with which the ejecting pawls 15 and 16 coöperate. The pawls 15 and 16 are provided with angular extensions in the form of noses 31 which extend into the rotating head in proximity with the teeth of the cam so as to be actuated by the said teeth 30 of the cam C.

The rotating head 28 is provided with a plurality of orifices 32 which extend through the head 28, said orifices 32 receiving the rivets from the riveting machine upon each actuation of said rivet machine plunger, all of which will be described more in detail when describing the operation of the sorting device.

A ratchet wheel 33 is fastened to the shaft 10 by means of a pin 34, and an arm 35 loosely mounted upon the bearing 9 is placed between said ratchet wheel 33 and the housing 1. A pawl 36 is pivotally secured upon the arm 35 by means of a pivot screw 37, and a coil spring 38 is provided and arranged so that its tension is such that it forces the pawl 36 into engagement with the teeth of the ratchet wheel 33. A connecting link 39 is provided having one end fastened to the arm 35 by means of the stud 40 and cotter pin 41, the other end of which is provided with a hooked end 42. The said hook 42 passes through an eyelet 43, which eyelet is fastened to the operating head 44 of the riveting machine. Chutes 70 and 72 and a hopper 74 are provided for receiving three different lengths of rivets as they are being sorted out by the device. A coiled spring 51 is provided and is used to return the arm 35 to its normal position when moved therefrom.

Having described the construction of the rivet sorting device of my invention, I will now describe in detail the operation of the same. In the drawings I have shown a small portion of the riveting machine operatively associated with the sorting device, including the operating head 44, the nose 45 of the actuating plunger, the rivet receiving chuck 46, and the rivet feeding chute 47. The rivets are fed into the chute 47 from a hopper, as is well known, and when the machine is in operation a rivet is always in place in the chuck 46 ready to be released upon the downward movement of the plunger 45. Upon the upward stroke of the plunger 45, a rivet is released from the chute 47 and dropped into the chuck 46 ready for the next actuation of the plunger 45, all of which is well known in the art, and a detailed description thereof is not necessary.

The rivet sorting device of my invention is adapted to sort three sizes of rivets, but I do not wish to be limited to this number, as the housing 1 may be built to accommodate any number of ejecting pawls 15 and 16. The rivets, as previously described, being mixed as to different lengths, are deposited in the hopper of the riveting machine and are fed into the inclined feeding chute 47 and work down to the jaws at the bottom of the chute. Assuming that the operator of the riveting machine now steps on the tripping pedal, the plunger is released and moves in a downward direction, depositing a rivet, as 50, in one of the openings 32 of the rotating head 28. The connecting link 39, connecting the operating head 44 of the riveting machine and the arm 35 of the rivet sorter, transmits this downward movement to the arm 35. The combined movement of the connecting link 39 and the pull of the spring 51, which is normally under tension, rotates the arm 35, which is loosely mounted upon the bearing 9, in a counter-clockwise direction. The tension spring 51 has its one end connected through a suitable opening 52 in the arm 35, and its other end connected through a suitable opening 53 in the angular

arm 54, which arm 54 is fastened to the depending stud 3 of the housing 1 by means of the screws 55. The connecting link 39, due to its length and light construction, does not insure a positive movement of the arm 35 upon the downward movement of rivet machine plunger 45. Therefore, the spring 51 is provided which is normally under tension when the riveting machine plunger 45 is in its uppermost position so that as soon as the plunger 45 is released to start its downward movement the link 39 moves therewith allowing the spring 51 to draw the arm down in a counter-clockwise direction. The pawl 36 is mounted upon the arm 35 and, therefore, is moved with it, thus passing over a tooth of the ratchet wheel 33 into position to engage the next adjacent tooth. Upon the return upward movement of the plunger 45, the arm 35 of the rivet sorter is rotated in a clockwise direction due to the connection 39 between the arm 35 and operating head 44. The pawl 36 having engaged a tooth of the ratchet 35 brings about the rotation of the shaft 10. The shaft 10 is rotated a distance of one tooth of the ratchet 33 and as the rotating head 28 is also pinned to the shaft 10 it also rotates therewith to place the next opening 32 in alinement with the plunger 45 of the riveting machine to receive another rivet upon the next tripping operation of the plunger 45.

In Fig. 6, I show a sectional view of the rotating head 29 with three rivets in three different orifices. The rivet 50 has just been deposited in the opening 32 by the downward movement of the plunger 45, as just explained. The rivets 50, 71 and 73, as shown, are of different lengths, and I will now describe how they are ejected according to length by the pawls 15 and 16.

Referring now to Fig. 7, let it be assumed that the plunger 45 has started upon its return movement, and due to the connection 39 between arm 35 and head 44, the arm 35 is moved in a clockwise direction. This motion is transmitted to the shaft 10 and head 28, as before described, rotating the shaft 10 and head 28 in a clockwise direction. The noses 31 of the pawls 15 and 16, being in operative relation with the teeth 30 of the cam C, as the head 28 revolves are engaged by the inclined surfaces 60 of the teeth, forcing the said pawls 15 and 16 downward against the normal tension of the springs 19. When the noses 31 of the pawls 15 and 16 pass the apexes 61 of the teeth, they snap back due to the tension of spring 19, and should rivets be in the orifices 32 of a length to be engaged by the pawls 15 and 16 they will be ejected from the orifices that they are in by the snap action of the pawls 15 and 16.

In Figs. 6 and 7, I show the pawl 15 so adjusted that the longest of the three lengths of rivets will be ejected by the snap action of this pawl, and the pawl 16 is so adjusted that the next length of rivet will be ejected by the snap action of pawl 16 when it is operated. The rivets that the pawl 16 ejects are too short to be ejected by pawl 15 and consequently pass pawl 15 without being ejected thereby. The rivet 73, which is the shortest, passes by pawls 15 and 16 without being affected and is dropped into the lower hopper.

Now, when the noses 31 of the pawls 15 and 16 pass beyond the apexes 61 of the cam teeth 30, the pawls snap back due to the spring 19 being placed under tension when the pawls 15 and 16 are forced downward by the inclined surfaces 60 of cam teeth 30. The nose 31 of the pawl 15 being adjusted to eject the longest rivet, strikes the end of the rivet 50, which protrudes into the cam, a sharp blow by the snap action caused by the spring 19. The rivet 50 is ejected with enough force to throw it free of the opening 32 in the head 28 into the receiving tube 70 through which it drops into a receptacle placed beneath the said tube 70. The nose of the pawl 16 strikes the end of the rivet 71, which protrudes into the cam, a sharp blow, as previously described, with enough force to throw it free of the opening 32 in the head 28, into a receiving tube 72 through which it drops into a receptacle. The length of rivet 73 is such that it does not protrude into the head 28 and is not ejected by either pawl 15 or 16 but when the head is approximately in the position illustrated in Fig. 7, the said rivet 73 drops out of the opening 32 in the head 28, by gravity, into a hopper 74. The tubes 70 and 72 are mounted upon a suitable bracket 75, which bracket is fastened to the housing 1 by means of the screws 76. The hopper 74 is also fastened to a suitable bracket 77 which bracket is fastened to the housing 1 by means of the screws 78.

While I have shown rivets 50, 71 and 73 in regular order as to length in the opening 32 of the head 28, I do not wish it understood that they are fed in the sorting device in this manner as they are placed in the openings 32 of the head 28 by the plunger 45 regardless of order as to length so that no matter how they are placed in the opening 32 as to length the rivets will be ejected by the pawls 15 and 16 according to the adjustment of the pawls 15 and 16, thus insuring the proper ejection of the rivets 50, 71 and 73 as to length. The pawl 15 will always eject rivets 50 and allow rivets 71 and 73 to pass by. Pawl 16 will always eject rivets 71 and allow rivet 73 to pass, thus allowing rivet 73, which is the shortest, to drop out, due to gravity.

From the above description, it may be seen that each time the tripping pedal of the riveting machine is operated, the plunger 45

is released and places a rivet in an opening 32 of the head 28. Upon the return of the plunger 45, the arm 35 is moved in a clockwise direction, as previously described. The rotating of the arm causes the pawl 36 to engage a tooth of the ratchet 33 to rotate the shaft 10 and head 28. The noses 31 of the pawls 15 and 16 ride over the angular portions 60 of the cam teeth 30 and when they pass the apexes 61, the rivets in the openings 32 are ejected into their proper chutes 70 and 72.

From the foregoing, it will be seen that my machine sorts rivets of different lengths automatically according to their length. The sorter is substantially built, and most efficient in its operation, and while I have shown a sorter which sorts three different lengths of rivets, I do not wish to be limited to the same as the housing may be constructed so as to accommodate more than two ejecting pawls and their associated adjustable stops so as to automatically sort a greater number of lengths of rivets.

If it is desired, the device may be set so as to sort rivets into two general classes, providing there are more than three different lengths of rivets to be sorted. The device is then set to automatically separate the rivets of each general class into the number of classes found in each general class.

I am also aware that many changes may readily suggest themselves to those skilled in the art, and I therefore do not wish to be limited to the exact structure as shown, but aim to cover all such modifications which come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent is:

1. A machine of the character described including a feeding device, a sorting device, recesses in said sorting device adapted to receive articles to be assorted from said feeding device one by one as devices are operated, and mechanism for ejecting said articles from the recesses in said sorting device into different receptacles, according to the size of the articles to be assorted.

2. A sorting device of the character described including a movable member, a feeding device for automatically supplying articles to be assorted to said movable member, and spring-controlled mechanism included in said assorting device for automatically ejecting said articles into different receptacles, according to their size.

3. A sorting machine of the character described including a movable member, means for automatically feeding articles to be assorted into recesses in said movable member as said movable member is operated, and spring-controlled mechanism for ejecting said articles into different receptacles, according to the size of said articles.

4. A rivet assorting machine including a rotary drum, a device for placing rivets of different sizes into apertures in said drum, and means for forcing said rivets out of said apertures into different receptacles according to the size of the rivets.

5. A rivet assorting device including a step-by-step rotary drum adapted to receive rivets of different sizes, and spring means within said drum adapted to be released at each step of said drum to force out said rivets into different receptacles according to their size.

6. A rivet assorting device including a step-by-step rotary drum adapted to receive rivets of different sizes, spring means within said drum adapted to be released at each step of said drum to force out said rivets into different receptacles according to their size, and a stop setting device for limiting the movement of said spring means.

7. A rivet assorting device of the character described including an inclosing casing, a rotary drum supported by said casing and provided with internal teeth, a plurality of spring controlled pawls contained within said casing and adapted to be actuated by the teeth of said drum, stop setting means for limiting the extent of movement of said pawls, means for feeding rivets of different sizes into apertures of said rotary drum, and means for rotating said drum whereby said pawls operate to force out said rivets into different receptacles according to the size of the rivets.

8. An assorting device including an inclosing casing, a rotary drum secured to a shaft extending through said casing, an internal serrated surface for said drum, spring controlled levers pivotally secured to said casing and adapted to be operated by the serrations on said surface, orifices in said drum adapted to receive articles of different sizes, and means for rotating said drum thereby operating said levers to cause them to force out the articles from said orifices into receptacles according to their size.

9. A sorting device including a rotatable drum, apertures in said drum, automatic means for feeding articles of different sizes into said apertures, spring-controlled members extending into said drum, and means for automatically operating said spring-controlled members when said drum is rotated to force out the articles from said apertures into receptacles, according to their size.

10. A sorting device of the character described including a movable member, apertures in said movable member adapted to receive articles to be assorted from a feeding device, a plurality of spring-controlled members, means for operating said spring-controlled members and for moving said movable member into a position for coöp-

eration with said spring-controlled members, whereby one of the spring-controlled members operates to place the largest size articles into one receptacle and another spring-controlled member operates to place the next largest size article into another receptacle, etc.

11. A machine of the character described including an assorting device, receptacles in said assorting device, rivets to be assorted, a feeding device for automatically supplying said rivets to said receptacles, and spring-controlled means contained within said assorting device for automatically separating said rivets into different groups according to their size.

Signed by me at Chicago, county of Cook and State of Illinois, this 8th day of February, 1918.

EMIL J. NEILSEN.