

T. M. HOUSE AND H. R. McCONNELL.

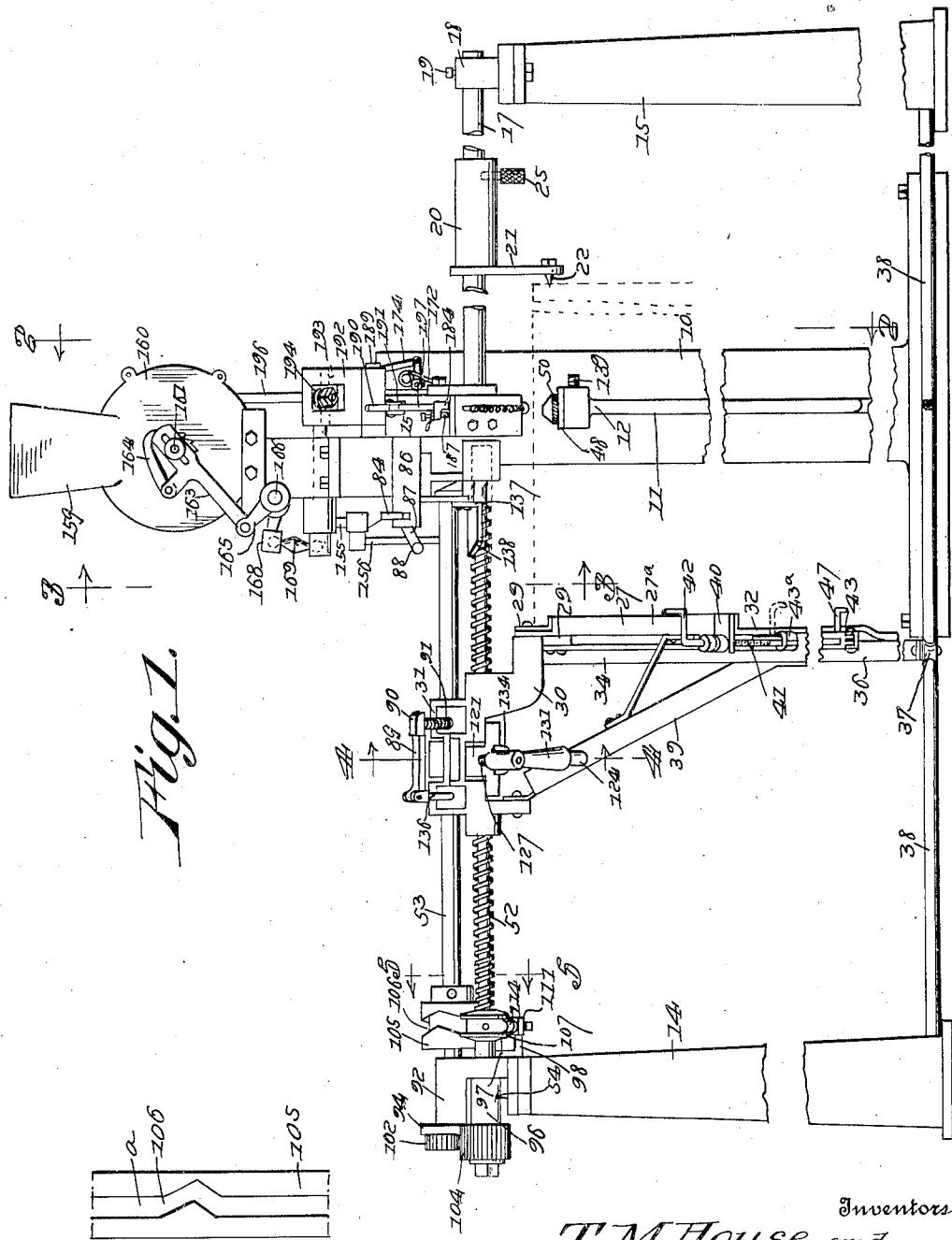
TRUNK RIVETING MACHINE.

APPLICATION FILED JULY 14, 1920.

1,410,182.

Patented Mar. 21, 1922.

6 SHEETS—SHEET 1.



Inventors

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H. R. M^cConnell,

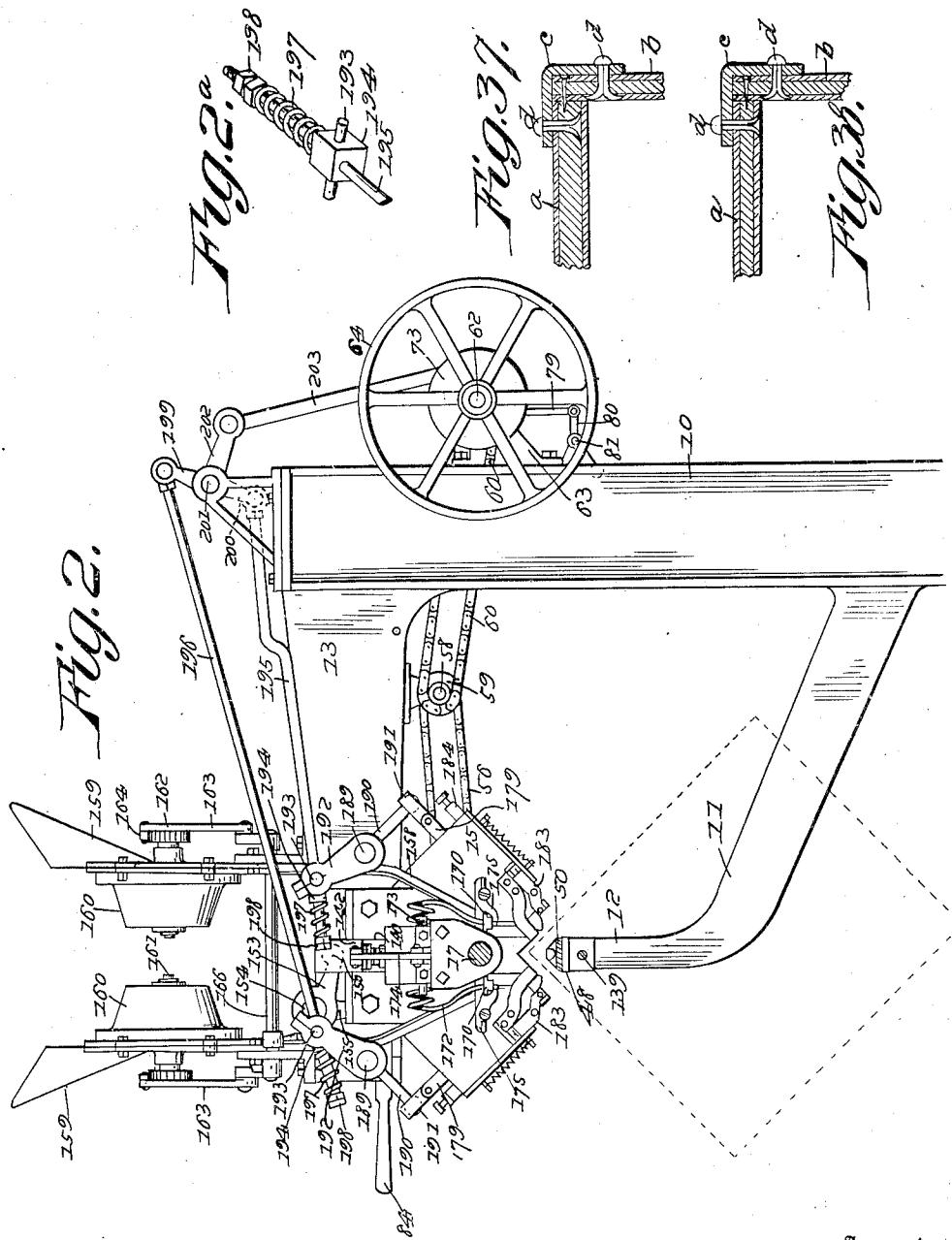
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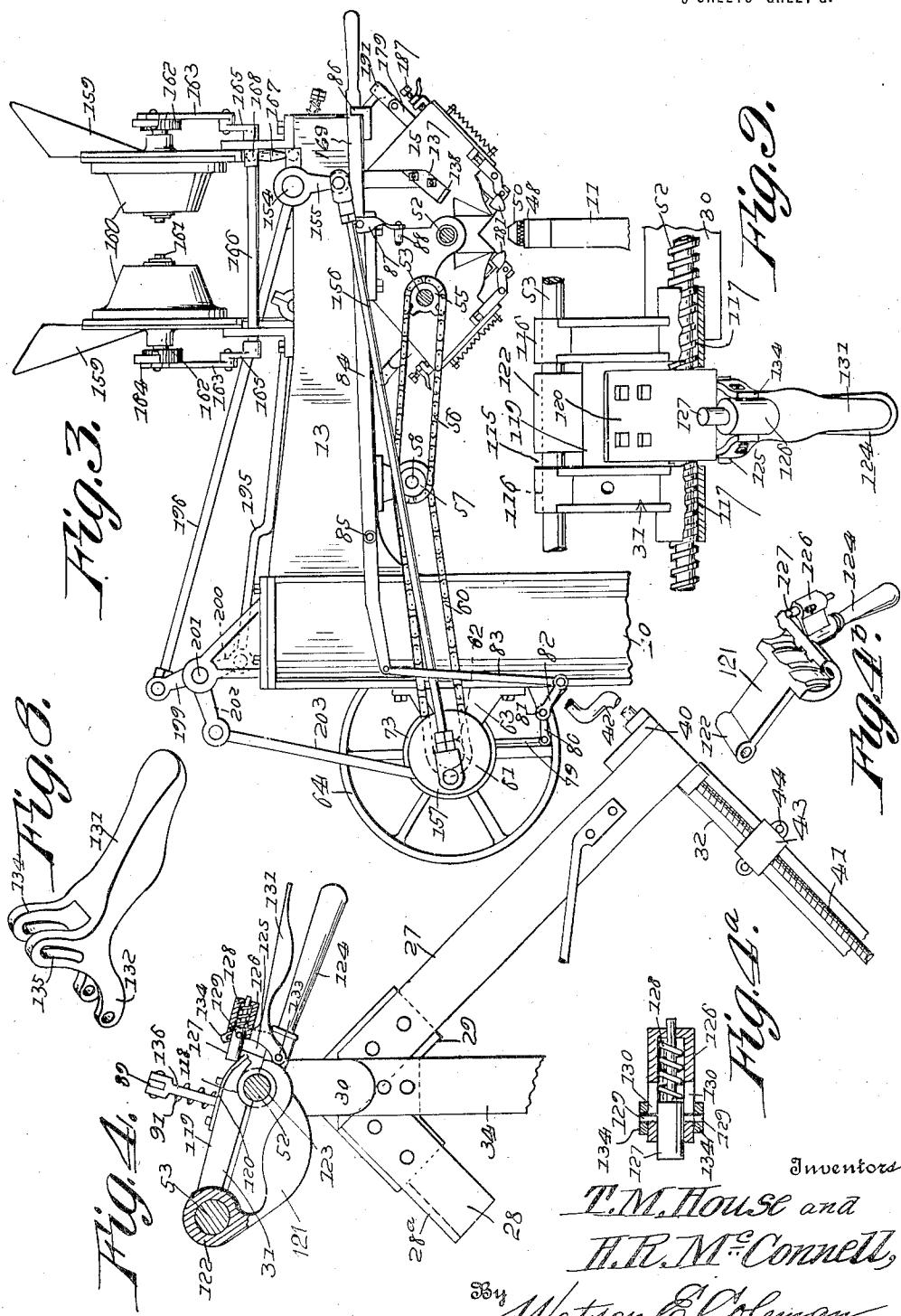
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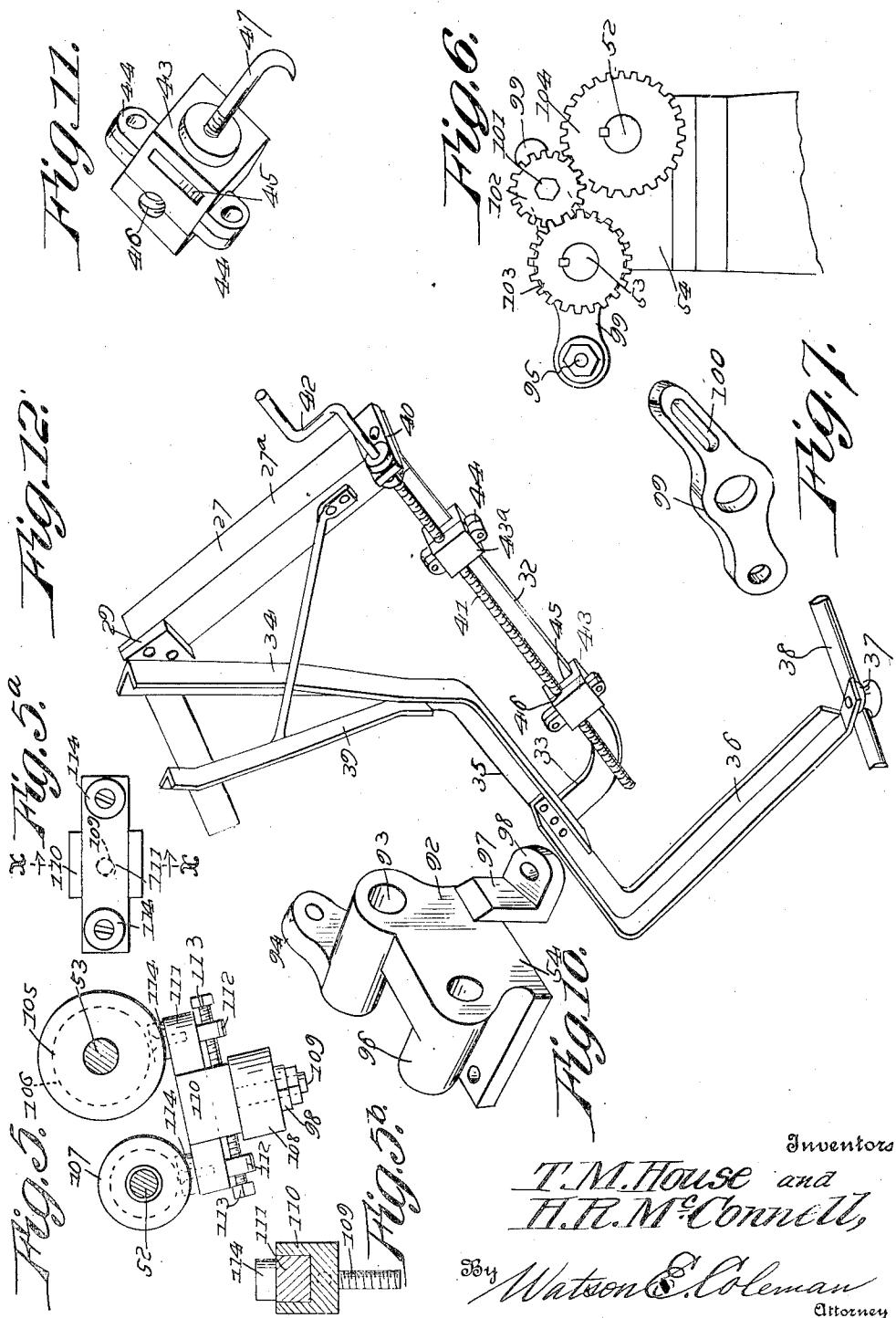


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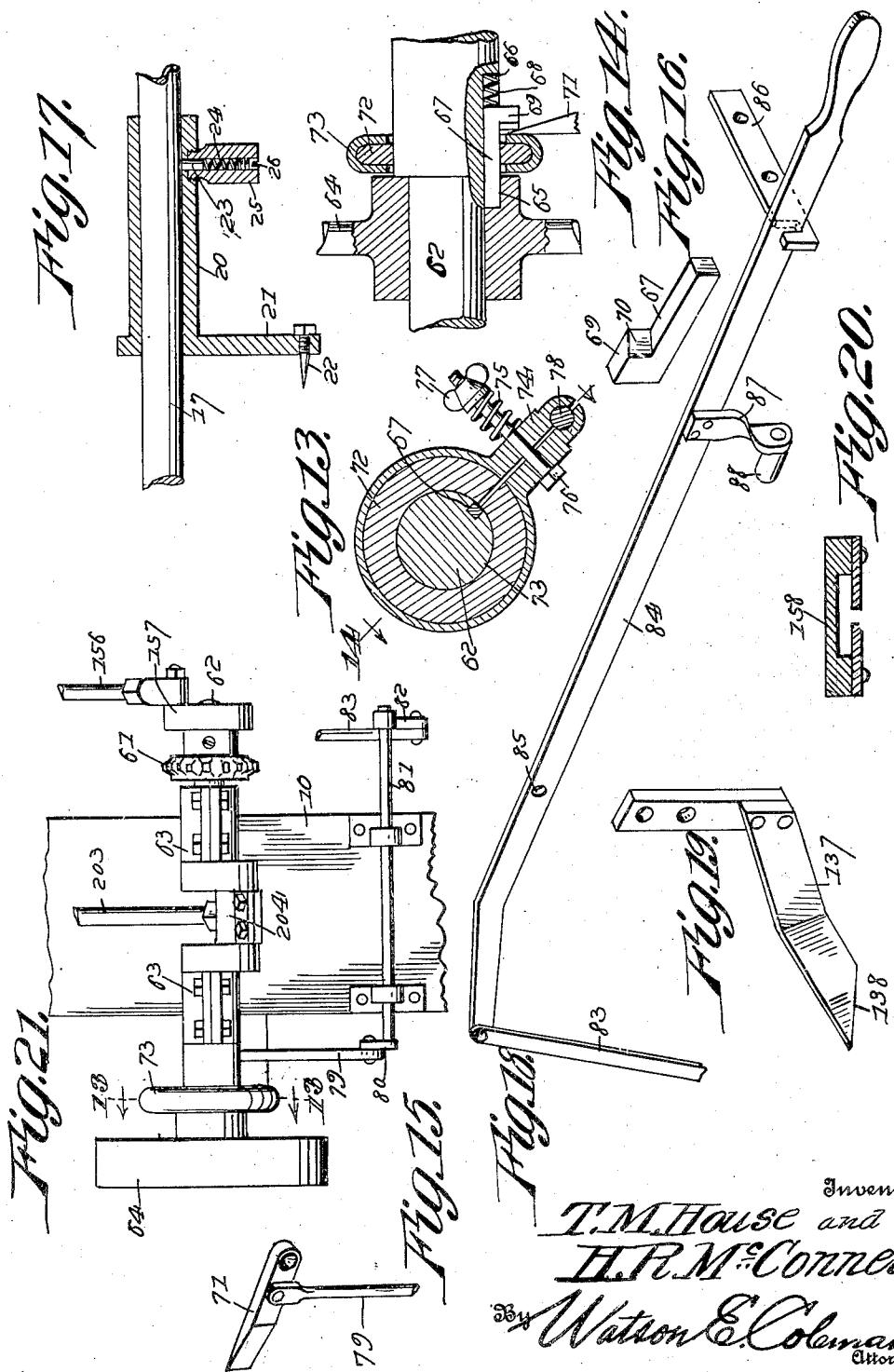
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6 SHEETS—SHEET 5.



Dimensions.

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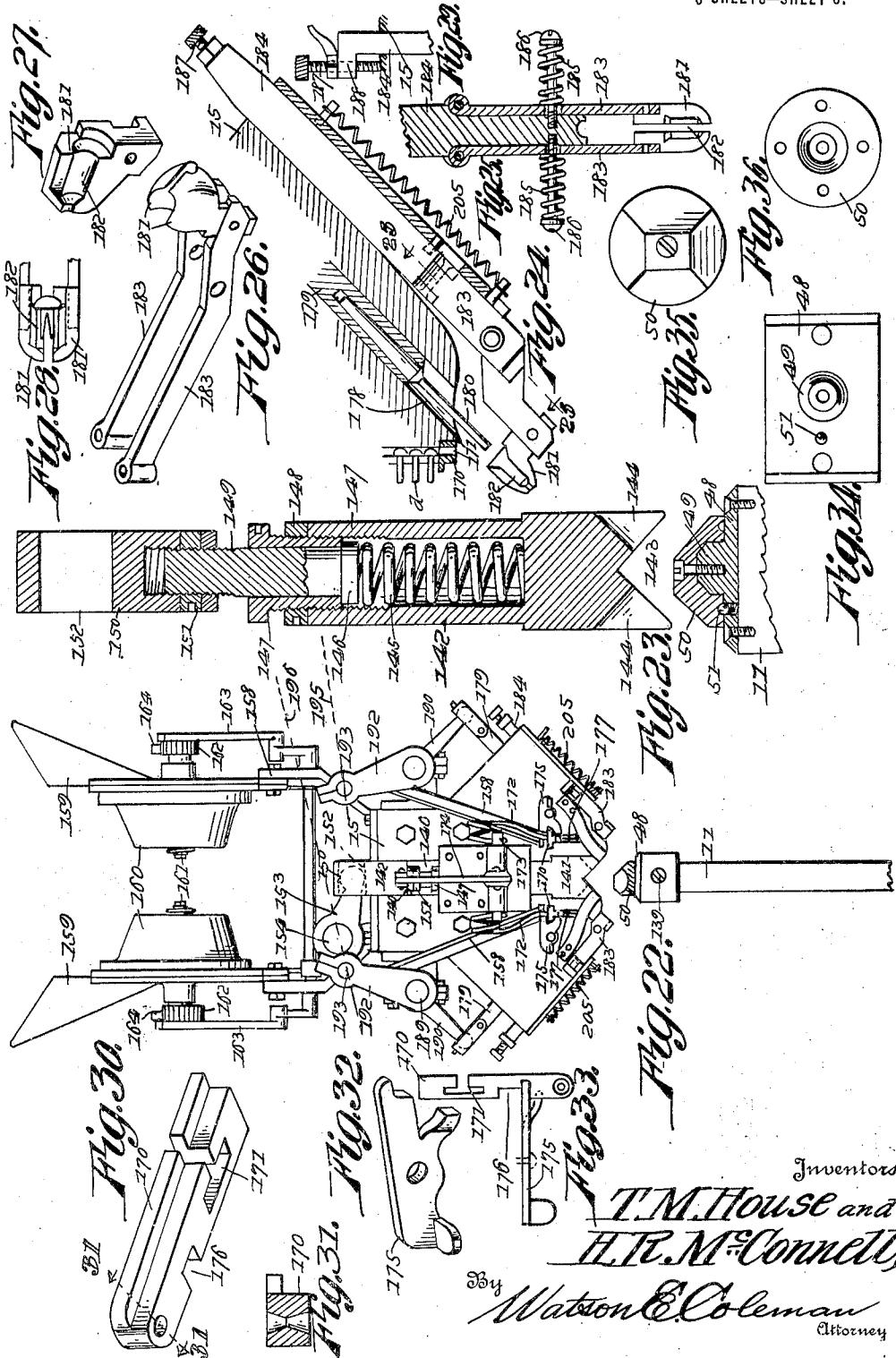
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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

THOMAS M. HOUSE AND HARRY R. McCONNELL, OF RICHMOND, VIRGINIA, ASSIGNEES
TO SEWARD TRUNK AND BAG COMPANY, OF PETERSBURG, VIRGINIA, A CORPORA-
TION OF VIRGINIA.

TRUNK-RIVETING MACHINE.

1,410,182.

Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed July 14, 1920. Serial No. 396,109.

To all whom it may concern:

Be it known that we, THOMAS M. HOUSE and HARRY R. McCONNELL, citizens of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Trunk-Riveting Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to rivet applying mechanism, and particularly to mechanism for riveting a reinforcing strip of metal or fabric over the joints of the trunk or other container.

In a copending application Serial No. 396,110 of even date herewith, we have illustrated and described a mechanism for riveting this reinforcing strip over the joint between the side and end walls of the trunk or like container, but the mechanism described in this copending application is not adapted for applying the strip and riveting it at the junction of the bottom, side and end walls of the container.

The general object of the present invention is to provide a mechanism of this character whereby rivets may be forced through the reinforcing strip of fabric and into or through the wood or other stock of which the container is made.

A further object is to provide means for supporting a trunk or container with its corner upon a suitable anvil and feeding the trunk or container step by step over this anvil so as to apply the rivets along the junction between the side walls and bottom wall of the trunk at evenly spaced distances.

A further object is to provide means whereby the mechanism may be adjusted so as to adjust or control the spacing between the rivets.

Still another object is to provide means whereby the trunk may be firmly clamped in place upon the machine and whereby containers of different sizes may be riveted upon the same machine by a suitable adjustment.

Another object is to provide means for automatically releasing the feeding mechanism when the final rivet of a line of rivets has been applied.

Still another object is to provide means whereby the machine will not overrun, but

that as soon as the power is cut off, the mechanism will stop.

Still another object is to provide means for supporting the trunk or container upon an anvil and feeding this trunk forward and, as before stated, controlling the feed of the machine so as to space the rivets at uniform distances, and in this connection to provide a continuously operating screw which would ordinarily feed the trunk or container continuously without stopping, but provide means whereby the screw which feeds the carriage supporting the trunk, while continuously revolving, may be carried rearward at the same speed at which the trunk carriage is being fed forward so as to thereby hold the trunk in a relatively stationary position with relation to the rivet driving position so that the trunk is stationary while any one pair of rivets is being driven.

Still another object is to provide simple and positively acting means for manually throwing the operating mechanism into or out of operative engagement with the driving gear therefor.

Other objects will appear hereafter and have to do with the details of construction and arrangement of parts as will more fully appear later.

Our invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a riveting machine constructed in accordance with our invention;

Figure 1^a is a diagrammatic view of the cam 105;

Figure 2 is a front elevation of the machine shown in Figure 1;

Figure 2^a is a detail view of the sleeve 194 and its connected parts;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is an enlarged section on the line 4—4 of Figure 1;

Figure 4^a is a detail view of the bolt 127 and its casing;

Figure 4^b is a fragmentary perspective view of the nut 123 and its handle;

Figure 5 is a section on the line 5—5 of Figure 1;

Figure 5^a is a top plan view of the members 110 and 111;

Figure 5^b is a section on the line x—x of Figure 5^a;

Figure 6 is a fragmentary rear elevation of the machine;

Figure 7 is a perspective view of the gear carrying arm 99;

5 Figure 8 is a perspective view of the lock operating handle for the divided nut;

Figure 9 is a top plan view of the feed operating nut partly in section;

Figure 10 is a perspective view of the 10 bearing 92 on the rear column;

Figure 11 is a perspective view of one of the adjustable trunk engaging hooks and its slide;

Figure 12 is a perspective view of the 15 trunk supporting frame;

Figure 13 is a section on the line 13—13 of Figure 21;

Figure 14 is a section on the line 14—14 of Figure 13;

20 Figure 15 is a perspective view of the clutch operating blade and the link extending therefrom;

Figure 16 is a view of the clutch operating pin;

25 Figure 17 is a sectional view of the trunk supporting sleeve, the supporting rod therefor being in elevation;

Figure 18 is a perspective view of the clutch controlling lever;

30 Figure 19 is a perspective view of the bracket and cam for automatically throwing off the clutch;

Figure 20 is a cross sectional view through one of the rivet feed chutes;

35 Figure 21 is a fragmentary elevation of the column 10 and the driving mechanism;

Figure 22 is a front elevation of the anvil, the head at the forward end of the machine, the rivet hoppers, and of the rivet 40 driving mechanism;

Figure 23 is a vertical sectional view through the rivet driving plunger and the anvil;

45 Figure 24 is a fragmentary vertical sectional view through one side of the head 15 showing one of the rivet driving plungers and the rivet holder and the transfer bar;

Figure 25 is a fragmentary section on the line 25—25 of Figure 24;

50 Figure 26 is a perspective view of one of the rivet carriers;

Figure 27 is a perspective view of one of the rivet carrying heads of the jaws of the rivet carrier;

55 Figure 28 is a top plan view of a pair of rivet carrying jaws;

Figure 29 is a fragmentary elevation of the means for limiting the upward movement of the rivet carrying rod;

60 Figure 30 is a perspective view of the transfer bar;

Figure 31 is a vertical section on the line 31—31 of Figure 30;

65 Figure 32 is a perspective view of the transfer bar latch;

Figure 33 is a top plan view of the transfer bar and the latch therefor;

Figure 34 is a top plan view of the anvil base plate;

Figure 35 is a top plan view of the anvil; 70

Figure 36 is an under side view of the anvil;

Figure 37 is a sectional view through the corner of a trunk at the junction of an end and a bottom wall and showing stock of 75 unequal thicknesses;

Figure 38 is a like view to Figure 37 but showing stock having the same thickness.

Referring to Figures 1, 2, and 3, wherein the general construction of the machine is 80 illustrated, it will be seen that our mechanism comprises a supporting column or standard 10 which, as seen in Figure 2, is disposed to one side of the trunk support, and from the lower portion of this standard 85 there extends out laterally the supporting arm 11, which then extends upward, as at 12, and supports on it an anvil, as will be hereafter more fully described.

Extending laterally from the upper end 90 of the supporting post is a bracket 13 which supports the riveting mechanism immediately over the anvil carried on the upper end of the arm 11. At the rear end of the machine and approximately in line with the 95 anvil is the supporting column 14, and carried on the bracket 13 is a riveting head 15, which is illustrated in detail in Figures 22 to 36, and it will be later described in detail. This riveting head is bolted or otherwise attached to the bracket 13. This riveting head is illustrated in the drawings as disposed immediately above the anvil carried on the arm 11, and this riveting head supports the rear end of a longitudinally 100 extending rod 17, the forward end of which is supported in a supporting collar 18 fixed upon the upper end of the column 15 and having the set screw 19 whereby the rod 17 may be held from longitudinal movement. 105 Slidingly mounted on this rod 17 is a sleeve 20, illustrated in detail in Figure 17, and having a depending hanger 21 formed at its lower end with a rearwardly extending spike 22 which is intended to be forced slightly 110 into the forward end of the trunk or other container to a position supporting and centering the trunk. This sleeve 20 is adapted to be shifted longitudinally upon the supporting rod 17 by means of the feed mechanism later to be described, but is held from any movement independently of the container or trunk by means of a friction device comprising a block 23 forced against the rod 17 by means of a spring 24, this 115 spring block being contained within a cylindrical housing 25 screw-threaded into the sleeve 20, the housing having a bore to receive the block and spring, this bore being closed by a screw-threaded plug 26 at its 120

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extremity, which bears against the spring so that by turning this plug in one direction or the other, the tension of the spring may be regulated.

5 The rear end of the trunk is supported on a longitudinally shiftable support or carrier, illustrated in Figures 4 and 11 and in side elevation in Figure 1. This carrier consists of two angle irons 27 and 28 which are 10 joined together by a gusset 29 and attached at their upper ends to a downwardly and forwardly extending horn 30 forming part of and depending from a sliding body, designated generally 31, and which is engaged 15 with a longitudinally extending feed screw, as will be later described. The angle irons 27 and 28, as illustrated in Figure 4, extend downward and laterally at right angles to each other, and the forwardly projecting 20 flanges 27^a and 28^a of these angle irons engage over the end of the trunk. The angle iron 28 is relatively shorter than the angle iron 27. The vertical web of the angle iron 27 is continued downward and inward, as at 25 32, and then extends laterally inward, as at 33. Rearward of the angle irons 27 and 28 is a vertical angle iron 34 which extends vertically downward for a certain distance and then extends laterally and downward, as at 30 35, and then is angularly bent and extends laterally downward in a reverse direction to a point substantially beneath the vertical portion 34, as at 36, and the extremity of this leg 36, as it may be called, is provided with 35 a roller 37 engaging with a longitudinally extending rod 38 constituting a track, and mounted upon the bases of the columns 14 and 15. Extending upward and rearward from the lower portion of the vertical part 40 34 is a brace 39, which at its upper end is bolted or otherwise attached to the rear end of the body 31, as shown clearly in Figure 1.

Mounted upon a bracket 40 extending rearward from the lateral extremity of the 45 angle iron 27, is an adjusting screw 41 which is held from longitudinal movement and which is provided at its upper end with a crank handle 42 whereby it may be rotated, and sliding upon the bar 32 are two slides 50 43 and 43^a. One of these slides is designed for use with relatively shallow container sections, like the tops of trunks, and the other is to be used with a body of a trunk. Both of these slides are of the same character, and one of these slides, as for instance, the slide 43 is shown in Figure 11. This slide is formed in two sections, the sections having ears 44 whereby they may be clamped together, and each slide is formed with a 55 longitudinally extending slot 45 through which the bar 32 passes. Rearward of this slot the slide is formed with a screw-threaded bore 46 with which the adjusting screw 41 engages. Having screw-threaded engagement with a boss on the face of the slide or

otherwise detachably engaged therewith is a supporting hook 47 which engages beneath the trunk, as illustrated in Figure 1. This hook 47 engages over the end wall of the trunk, with the trunk in the position shown 70 in Figure 2, and the slide 43 is adjustable so as to force the trunk up firmly against the forwardly projecting flanges of the angle irons 27 and 28 and hold the trunk firmly in place over the anvil carried on the projecting arm 11, this arm extending in the body of the trunk (or the opening in the top of the trunk) in the manner illustrated in Figure 2. The anvil, as illustrated in Figure 23, and as particularly described in our co-pending application, comprises a plate 48 formed with a central stud 49, and rotatably adjustable upon this stud is the anvil proper 50. This anvil in one position has its two sides inclined upward equi-distantly from 80 the axial center of the anvil, and when rotated in the other position, has one of its sides terminating nearer to the center than the other side. This is fully described in our co-pending application and claimed 90 therein and, therefore, need not be described in detail in the present application. This anvil is held in its adjusted positions by a ball 51 constituting a locking device.

It is to be understood that the carriage 95 formed of the members 27, 28 and of the bar 34, is to be shifted step by step forward, and that this, through the trunk itself, will shift the sleeve 20 forward on the guide bar 17 and that thus the trunk will be shifted step 100 by step forward over the anvil. The mechanism which we will now describe is designed to shift the trunk forward one step and then the trunk remains stationary while the rivets are being applied. Then the trunk moves 105 forward another step and is again held stationary while the second set or pair of rivets are being applied, these rivets being applied as illustrated in Figure 37, wherein *a* and *b* designate the bottom and side walls of the 110 trunk respectively and *c* a strip of hard fiber or like material which is to be applied over the joint, *d* indicating rivets which are forced through the strip and into the stock of the trunk.

For the purpose of feeding the carriage and thus feeding the trunk forward over the riveting anvil, we provide a screw-threaded shaft 52 and a parallel power transmitting shaft 53. The forward end 115 of the screw-threaded shaft 52 is rotatably mounted in the riveting head 15 in any suitable manner and the rear end of this shaft is mounted in a suitable bearing casting 54 carried by the column 14. The shaft 53 is 120 likewise mounted at its forward end in the head 15 and at its rear end in a bearing in the column 14. This shaft 53 at its forward end carries a sprocket wheel 55, as illustrated in Figure 3, over which passes 125 130

a sprocket chain 56, which in turn passes over a sprocket wheel 57 mounted upon a shaft 58 and carrying a sprocket wheel 59 over which passes a sprocket chain 60, which 5 in turn passes over a sprocket wheel 61 mounted upon a shaft 62 mounted in suitable bearing brackets 63 extending from the laterally disposed column 10, as shown in Figures 2, 3, and 12. This shaft 62 carries 10 upon it at one end a band wheel 64 whereby power is transmitted to the shaft 62 from any suitable source. This band wheel, as illustrated in Figure 14, is loose on the shaft 62, but the hub of the band wheel is provided 15 with a recess 65 adjacent one end face of the hub. That portion of the shaft which supports the hub of the band wheel is reduced in diameter from the main portion of the shaft, as illustrated in Figure 14, 20 and adjacent this reduced portion of the shaft, the shaft 62 is longitudinally recessed, as at 66, for the reception of a clutch pin 67 (see Figure 16) which is urged longitudinally into engagement with the recess 65 25 in the hub of the band wheel by means of a spring 68. This pin 67 is formed with an angularly extending lug 69, the inner end face of which is bevelled, as at 70. A clutch 30 operating blade 71 (see Figure 15) is pivotally mounted adjacent this clutch pin 67, and when this blade is shifted in one direction, the bevelled end of the blade will engage behind the clutch and force the clutch against the action of the spring 68 35 out of the recess 65 and thus unclutch the wheel 64 from the shaft 62. When, however, the blade is shifted out of engagement with the bevelled end face 70 of the clutch pin, the spring 68 will urge the clutch back 40 into engagement. Thus, as soon as the plate 71 is operated in one direction by a controlling lever, as will be later stated, power is disconnected from the shaft 62, and as soon as the blade is shifted in the other direction, the shaft 62 is connected to the source of power. For the purpose of preventing the shaft from overrunning after it is disconnected from the source of power, constant friction is applied to the shaft 62. 45 This friction comprises a friction disk 72 embraced by a friction ring 73. This ring, as illustrated in Figure 13, is formed in two sections, each of these sections being provided with an outstanding arm 74 resiliently urged toward each other by a spring 75 carried by a bolt 76 extending through these arms, the tension of the spring being controlled by the wing nut 77. These arms 55 clamp upon a pin 78 which forms the pivot pin for the blade 71. This friction device and the clutch mechanism are fully described and illustrated in our copending application. 60

The blade 71 is operated by a link 79 connected to a crank arm 80 on a shaft 81

mounted in the column 10, as illustrated in Figure 21, this shaft 80 extending through suitable bearings on the column and being provided at its extremity with a crank arm 82, in turn connected by a link 83 to a lever 84 which is pivoted at 85 and extends laterally, as illustrated in Figure 3, to the right hand side of the machine and is engaged in a longitudinally extending supporting bar 86. When the handle end of this lever is raised upward, the blade 71 is forced into engagement with the clutch pin 67 to retract the clutch pin from its engagement with the driving wheel 64, and when the handle end of the lever is forced downward, the blade 71 releases its engagement with the clutch pin and the clutch again engages the shaft 62 with the driving wheel 64. 70 75 80

Attached to the lever 84 is a downwardly 85 extending arm 87 which has a laterally projecting pin, upon which is mounted a roller 88. This roller is adapted to be operatively engaged by a lifting finger 89 pivotally mounted upon the slide 31, as illustrated in Figure 1, and provided at its forward end with a forwardly bevelled head 90 resiliently supported in a position to engage the roller 88 by means of a spring 91. When this slide 31, therefore, has moved 95 forward to its full extent, this head 90 engages beneath the roller 88 and causes a lifting of the lever and the disconnection of the power wheel 64 from the master shaft 62 of the machine. This master shaft is 100 geared, as will be later described, with the rivet feeding and driving mechanism and is operatively connected to the shaft 53 by means of the sprocket chains 56 and 60, as shown in Figure 3. 105

The shafts 52 and 53 are mounted in the casting shown in Figure 10, which is attached to the column 14, this casting being designated 54. The casting is formed with an upwardly projecting portion 92 having 110 a relatively long bearing 93 for the shaft 53 having a laterally projecting lug 94 perforated for the passage of a bolt 95. This casting is also formed with a relatively long bearing 96 for the worm shaft 52, and the 115 casting is provided with a downwardly extending bracket 97 having a forwardly projecting, perforated lug 98 which is laterally inclined, as illustrated in Figures 5 and 10. The shaft 53, as before stated, passes 120 through the bearing 93 and also passes through a gear wheel supporting arm 99 (see Figure 7) which is extended beyond its central aperture in both directions and has one end perforated for the passage of 125 the screw 95 and its opposite end longitudinally slotted, as at 100, for the passage of a bearing bolt 101 supporting an intermediate gear wheel 102. The shaft 53 carries upon it a gear wheel 103 (see Figures 130

1 and 6) which meshes with the intermediate gear wheel 102, and this intermediate gear 102 meshes with a gear wheel 104 mounted upon shaft 52. This gear wheel 104, as illustrated in Figure 1, is relatively long so as to provide for a longitudinal shifting movement of the screw shaft 52. This screw shaft 52 is longitudinally reciprocated by a cam 105 (see Figures 1 and 10 5) mounted upon the driving shaft 53, this cam having a cam groove 106 in its periphery. Mounted upon the screw shaft is a peripherally grooved wheel 107. Pivotally mounted upon the face of the lug 98 15 is a block 108 through which passes a pivot bolt 109, and mounted upon the end of this pivot bolt is a bifurcated yoke or holder 110 through which passes a transversely extending carrier bar 111 having downwardly extending lugs 112 adjacent its opposite ends. Through these lugs pass adjusting screws 113 which engage the end faces of the yoke 110, and by adjusting these screws, one in one direction and the 20 other in the other direction, the carrier bar 111 or lever may be shifted transversely. This lever 111 carries upon its ends the rollers 114 which engage respectively in the cam groove 106 and in the groove of the wheel 107. By adjusting this lever 111 in one direction or the other, the relative lengths 25 of the arms of the lever may be varied. Thus, by adjusting this lever 111 toward the right in Figure 5^a, that portion of the 30 lever to one side of the pivot 109 is increased, and that arm of the lever to the other side of the pivot 109 is decreased so that a relatively slight reciprocation will be given to the screw shaft 52 on each rotation of the cam 105, and vice versa if the lever 111 be adjusted toward the left in Figure 5, a greater stroke will be given to the shaft 52.

The purpose of reciprocating the screw shaft 52 is broadly as follows: The shaft 52 is constantly rotating and is engaged with a nut carried upon the body 31 of the carriage, but inasmuch as the shaft 52 is reciprocatable and is reciprocated by the 40 cam 105, it follows that if this cam be of the proper form at one period of rotation of the shaft 52, the shaft 52 will be bodily shifted reversely at a speed the same as the speed at which the carriage is moving forward so that the carriage, while moving forward on the screw 52, is held stationary with reference to the riveting mechanism so that the riveting can be performed. When the riveting has been performed, the roller 114 has moved into that portion of the cam groove 106 which is disposed entirely at right angles with the plane of rotation so that there is no bodily movement of the screw 52, and hence the rota-

tion of the screw will carry the carriage 45 forward to a position for a new riveting operation, when once more the roller 114 will engage in the eccentric portion of the cam groove 106 and the shaft 52 will again move bodily rearward as the carriage is 50 forced forward with relation to the riveting mechanism.

The carriage, as before stated, carries a nut which engages with the screw-threads of the shaft 52. This nut is a half nut 55 and is adapted to be raised out of engagement with the screw-threaded shaft or depressed into engagement with it either automatically or manually. To this end, the body 31 is recessed, as at 115, the two 60 walls defining this recess being bored, as at 116, to receive the shaft 53, the body being longitudinally bored at its ends, as at 117, to slide freely on without screw-threaded engagement with the screw-threaded 65 shaft 52, the intermediate portion of the body between these bores 117 being cut away so as to provide a portion 118 having a semi-circular recess on its under face forming a continuation of the bores 70 117 and resting loosely and sliding on the shaft 52. (See Figure 9). The upper face of the body carries a plate 119 which extends downward and forward, as at 120. Hingedly supported between the arms 75 formed by the recess 115 and swinging on the shaft 53 is a member 121 (see Figure 4^a) which is formed with an upwardly extending sleeve 122 at one end to loosely surround the shaft 53, as before stated, and at its free end is formed with a semi-circular recess 123 having interrupted 80 screw-threads constituting a half nut. This plate or body 121 is formed with an outwardly extending handle 124. Extending 85 upward from this handle is a supporting shank 125 carrying a tubular barrel 126 in which is disposed a bolt 127 urged outward by a spring 128, this bolt having laterally projecting pins 129 passing through 90 slots 130 in the barrel. (See Figure 4^a). Pivoted at the junction of the handle with the bolt 121 is a releasing lever or hand grip 131, the inner end of which is bifurcated to provide two arms 132 embracing 95 the handle 124 and pivoted thereto by a pivot pin 133, the upper ends of these arms extending upwardly and inwardly to form ears 134, these ears being arcuately slotted, as at 135, to engage the pin 129 of the 100 bolt 127.

It will be obvious now that when the handle 124 and the hand grip 131 are grasped that the bolt will be retracted from over the downwardly turned lip 120 of the plate 119 105 and that the half nut formed by the body 121 will then swing downward and out of engagement with the shaft 52, but that nor-

mally the bolt 127 engaging the inclined face 120 of the plate 119 will hold the half nut in screw-threaded engagement with the shaft 52. Thus, if at any time it be desired 5 to shift the carriage by hand, as for instance, in adjusting the carriage to receive a trunk or other container, it is only necessary to release the bolt 127 and shift the carriage to any desired position, again engaging the bolt 10 127 with the lip 120. The body 131 carries upon it an upwardly extending shank 136 to which the tripping member 89 is pivoted, the body also carrying, of course, the spring 91 which yieldingly holds it in a predetermined 15 position.

We have also provided means for automatically tripping the half nut formed by the member 121, this tripping member being illustrated in detail in Figure 19 and designated 20 137. This tripping member, as illustrated in Figures 1 and 3, is attached to the rear face of the riveting head 15 and extends downwardly and rearwardly therefrom, the rear extremity of this tripping member being 25 bevelled, as at 138. This bevelled edge 138 is adapted to engage with the bolt 127 and wedge the bolt rearward until it escapes the lip 120, whereupon the half nut automatically drops out of engagement with the 30 shaft and the feed of the carriage stops. It will thus be seen that we have two tripping devices, one the member 90 which acts to shift the tripping member 88 on the lever 84 and thus throw off the power, and the 35 tripping finger 137 which acts to trip the half nut if the carriage runs too far forward. In order to adjustably limit the distance between the end of the trunk or other container and the center of the anvil when 40 the trunk is in position for the first pair of rivets to be driven, we have provided the upper end of the arm 11 immediately beneath the anvil with an adjustable stop in the form of a screw 139. It will be obvious 45 that when this screw is turned very far in, there will be a relatively short distance between the end of the trunk and the anvil, in other words between the end of the trunk and the placing of the first rivet. When this 50 screw is turned outward, there will be a greater distance between the end of the trunk and the first pair of rivets. The amount of this distance will be dependent upon the distance that the pairs of rivets are 55 to be placed apart in the trunk.

The rivet feeding mechanism and the rivet setting or overturning mechanism are practically the same as are illustrated in our co-pending application for patent before referred to, and consists of the head 15, front and rear views of this head being shown in Figures 2 and 3 and the head being shown in detail in Figures 22 to 36. This head is carried upon the arm 13 to which the head is bolted or otherwise attached, and the front

face of the head is vertically recessed, as at 140, from the top of the head downward for a certain distance, then the recess is enlarged, as at 141, and extends downward to the bottom of the head. Operating in this 70 recess is a plunger, illustrated in Figure 23, and designated generally 142, this plunger being enlarged at its lower end to form a head, the lower end of this head having a triangular recess 143 which fits against the 75 angular side faces of the anvil when the plunger is depressed. This plunger constitutes a pressing foot and will hereafter be termed a presser foot. The lower end of the head of the presser foot on each side of the 80 recess is cut away, as at 144. The head of the presser foot is hollow, and disposed therein is the coil spring 145. Operating within the bore of the head is a shank 146 which bears against the spring 145. This shank is formed 85 with a head at its lower end and having screw-threaded engagement with the upper end of the presser foot is a screw-threaded bushing or sleeve 147 having a head whereby it may be rotated and adjusted. This 90 bushing limits the upward movement of the member 142 relative to the member 146. A jam nut 148 holds this bushing in its adjusted position. The upper end of the shank 146 is screw-threaded, as at 149, and 95 engages in a yoke 150 and is held in adjusted position in this yoke by the jam nuts 151. The yoke is bifurcated and perforated to form ears 152. These ears are operatively connected to an arm 153 mounted on a short 100 longitudinal shaft 154, mounted upon the supporting arm 13 and having a depending arm 155 (see Figure 3) connected to a transversely extending, relatively long connecting rod 156 which extends to a crank 157 mounted upon shaft 62. Thus the rotation of this shaft 62 will cause the shaft 154 to rock and cause the reciprocation of the presser foot toward and from the anvil. The head 15 is formed on each side of the recess 140 with 110 downwardly and inwardly extending recesses or grooves which open at its lower end into the enlarged portion of the recess 140, and disposed in these grooves are the lower ends of rivet chutes 158 which extend downward 115 from hoppers 159 within which the rivets are placed. The rivets are fed from the hoppers by means of feeding mechanism enclosed within the housings 160. This feeding mechanism forms no part of our invention and is a well known construction and, therefore, there is no necessity of describing the feeding mechanism in detail, suffice it to say that it includes for each hopper and each housing 160 a shaft 161 carrying a ratchet wheel 162. Each shaft 161 passes through a longitudinal groove on an arm 163, which arm has a lateral projection upon which is pivoted a pawl 164, which pawl 120 engages with the ratchet teeth. 125 130

It will be obvious now that as the arm 163 is oscillated, a step by step feed motion will be given to the shaft 161. Each arm 163 at its extremity is connected to an arm 165 mounted on a shaft 166, this shaft in turn being operated by a link 167 (see Figures 1 and 3) having a ball and socket joint at its upper end with an arm 168 projecting from the shaft 166 and at its lower end 10 with a socket on an arm 169 projecting from and carried by the shaft 154. Thus, as this shaft 154 is oscillated, the rivet feeding mechanism is operated.

The rivets are fed downward through the 15 chutes 158, and the lower ends of the chutes are engaged by reciprocating transfer bars, designated 170, these bars travelling in transverse grooves or tracks formed in the head 15, and each of these bars being formed 20 with a T-shaped, vertically extending slot 171. These transfer bars 170 are connected to the lower ends of spring arms 172, which at their upper ends are coiled and engaged with a transverse rock shaft 173 having an 25 outwardly projecting arm engaged with an upwardly extending link 174, this link being operatively pivoted to the plunger so that as the plunger is depressed, the shaft 173 will be rocked in a direction to carry 30 the transfer bars 170 inward where their slots 171 will align with the chutes, and when the plunger moves upward, the transfer bars will be drawn outward.

The reason for reciprocating the transfer bars by means of the resilient arms 172 is to permit these bars to be locked in an inoperative position by means of the latches 175 (see Fig. 32), these latches being pivoted on the head 15 and being shiftable into or 40 out of engagement with grooves 176 when the transfer bars are drawn outward. Thus when the transfer bars are drawn outward and these latches are shifted into engagement with the transfer bars, the transfer 45 bars will be held outward and from reciprocating movement, the spring arms 172 yielding as the rock shaft 173 is rocked.

The purpose of latching the transfer bars in their outward or inoperative position is 50 to prevent the descent of rivets without stopping the machine when rivets have been placed defectively and it is desired to withdraw the rivets and insert new rivets. When the transfer bars are pulled outward 55 by the spring arms 172, they transfer the rivets to slots or guideways 177. Each of these guideways at its lower end opens into an upwardly and outwardly inclined plunger bore 178 (see Figure 24) wherein is disposed 60 a plunger 179 having therein a riveting tool 180. The rivets, when they drop from the guideway 177, are received in a holder formed of two laterally disposed jaws 181, these two jaws being formed with mating 65 rivet receiving recesses 182. These are fully

described in our co-pending application and, therefore, it is believed that it is not necessary to describe these receiving jaws in detail in the present case. The jaws of this rivet holder are each mounted on an arm 70 183 which extends laterally from the jaws, then is downwardly deflected, and extends longitudinally and at its end is pivoted to an upwardly and outwardly extending bar 184.

It will be seen from Figure 25 that the two arms 183 are disposed on each side of the bar 184 and pivoted thereto, and that they are urged towards each other by means of springs 185 surrounding pins 186 which engage the bar 184 and extend outward through perforations in the arms 183. Thus these jaws 181 are normally urged towards each other, as illustrated in Figure 28, and when the jaws are brought close together, 85 they form a holder in which the rivet is received, one end of the holder being formed with an enlargement for the head of the rivet, while the other end of the holder is formed with a relatively small aperture in 90 alignment with which the point of the rivet is disposed. Now when the plunger 179 descends, the riveting tool will force the rivet out through the small aperture formed by the smaller ends of the jaws and into the 95 work, and as the rivet is forced out and into the work, it will act to spread these jaws apart against the action of the springs 185.

It will be seen that the jaws 181 are disposed normally within the cut-away portions 144 of the plunger and the distance of this rivet holder formed of the jaws 181 from the work may be controlled by adjusting the set screw 187 which is mounted upon a bracket 188 which bears against the upper 105 end of the bar 184. The plungers 179 are reciprocated by longitudinally extending shafts 189, these shafts having downwardly and laterally projecting arms 190 each formed with a ball and socket joint connection to links 191 pivotally connected to the upper ends of the plungers 179. Each of these shafts 189 has mounted upon it the upwardly extending arms 192. These arms are pivotally connected to pins 193 mounted 115 upon sleeves 194 which are slidably mounted on connecting rods 195 and 196 respectively. Between the sleeves 194 and the ends of these connecting rods are coiled springs 197 which at the ends of the connecting rods bear against nuts 198. These connecting rods 195 and 196 are connected to oppositely projecting arms 199 and 200 which are mounted to rock with a shaft 201, which shaft in turn has a third arm 120 202 connected by a link 203 to a crank 204 formed on shaft 62.

Thus it will be obvious that as the shaft 62 is rotated, the shaft 201 will be oscillated, and it will also be seen from Figure 2 that 125 130

when the arm 199 moves laterally outward in the direction of the arrow in Figure 2 and the lower arm 200 moves laterally inward in the direction of the arrow, the arms 192 will 5 be rocked towards each other, thus lifting both plungers 179, and that when the shaft 201 is rocked in the opposite direction, the arms 192 will be rocked in opposite directions to cause the descent of the plungers, and 10 it will be obvious from Figure 2 that the plungers will be forced yieldingly downward by the yielding of springs 197. Thus the plungers will push the rivets downward into and through the stock instead of delivering a blow upon the rivets to force 15 them suddenly through the stock. This is of importance, as a blow delivered upon the rivet to force it through the stock will tend to break the stock and tend to prevent the 20 proper overturning of the rivet against the anvil.

The rivet feeding, guiding and driving mechanism has all been fully described in our co-pending application heretofore referred 25 to, and hence we have not believed it necessary to describe this mechanism in all its details, but it will be obvious from what has gone before that when the drive shaft 62 is operatively connected by means of the 30 clutch mechanism shown in Figures 13 and 14 to the power transmission wheel 64, that as the work is brought to a standstill over the anvil at a particular point, a pair of rivets which have been deposited in the oppositely disposed holders formed by the jaws 181 will be presented to the work, and that the plungers will be forced downward, forcing the rivets into and through the stock and against the anvil, spreading the bifurcated 35 ends of the rivets in the manner illustrated in Figure 38 against the stock, and that upon an upward movement of the plungers 179, the transfer bars 170, which have heretofore been forced inward to receive rivets 40 in their T-shaped slots 171, will be shifted outward to transfer these rivets so received into the respective holders formed by the jaws 181 ready for the driving of the next pair of rivets, and that this rivet driving operation 45 will continue until the clutch engaging the power driven wheel with the drive shaft 62 has been automatically thrown out by the member 90 carried by the carriage 30, as illustrated in Figure 1.

50 It will, of course, be understood that, as before stated, the container is moved step by step over the anvil and as before explained, if this screw 52 was not shiftable, as described, the container would not stop at any particular place over the anvil, but would be constantly shifted across the anvil which would, of course, prevent the rivets from being driven. Therefore, it is necessary, as before stated, to stop the container 55 intermittently, and to this end is provided

the cam 105. This cam operates, as before described, to oscillate the lever 111 so that at the instant when the rivet is to be driven, this cam 105 acts to shift the screw 52 rearward to exactly the same extent that the 70 carriage 30 is being driven forward so that the carriage and container are held stationary relative to the anvil at this time. Then after the rivets have been driven and the cam 105 has been rotated so that the 75 roller 114 is disposed in the concentric portion of the cam, the screw shaft 52 will be shifted forward, while the screw shaft 52 is revolving, thus carrying the carriage forward until the roller 114 again strikes the 80 concentric portion *a* of the cam track 106, when the shaft 52 will be drawn rearward, as before explained.

It will be understood that the feed spacing, that is rivet spacing, is controlled by 85 the gears 102, 103 and 104, shown in Figures 1 and 6. For example, the feed worm or feed screw 52 makes one revolution to one revolution of the shaft 53 for a $\frac{1}{4}$ " rivet spacing. The pitch of the feed worm under 90 these circumstances is $1\frac{1}{4}$ ". The cam gives a reciprocation of $\frac{1}{8}$ " to the feed worm, and the cam groove 106 has the same pitch as the feed worm or screw, thus causing the feed worm or screw 52 to be drawn backward 95 at the same speed as it is being driven forward by the gearing at the time that the rivets are being driven. When, however, the rivets are spaced $\frac{1}{8}$ " apart, the screw 52 will make $\frac{1}{2}$ turn to one revolution of the 100 main shaft. Therefore, the carriage 30 is advanced $\frac{5}{16}$ " during a quarter turn of the worm, and the cam rocker 111 operated by the cam 105 advances the worm $\frac{1}{16}$ ". Thus while the rivet is being driven, the screw 105 52 is drawn backward by the cam 105 $\frac{5}{16}$ " and the feed nut is being advanced $\frac{1}{16}$ ", leaving a space between the nut and carriage on the forward end of $\frac{1}{16}$ ". During the feed, the nut 121 is advanced $\frac{1}{16}$ ". The cam advances 110 the feed screw and the carriage bodily $\frac{1}{8}$ ". The two operations occur at the same time.

The riveting proceeds until the container carried upon the carriage 30 and by sleeve 20 has arrived at such a position that its rear end is in a predetermined spaced relation from the anvil and the last pair of rivets have been driven. At this time the head 90 on the carriage engages beneath the roller 88 on the controlling lever 84 and raises the 115 controlling lever, causing the clutch shifting blade 71 to oscillate past and against the bevelled face 70 of the clutch pin 67, withdrawing the clutch pin and unclutching the shaft 62 from the driving wheel 64. The 120 friction members 72 and 73, as soon as the power is unclutched from the shaft 62, cause the immediate stoppage of the shaft 62 so that it does not overrun. The trunk may be then turned to bring another corner into 125 130

position over the anvil. The carriage is pushed back until one end of the container bears against the adjusting screw 139 and the operation is repeated.

5 In Figure 12 we have shown two container engaging slides 43 and 43^a, and it is to be understood that the slide 43^a is for the purpose of engaging a shallow container or box-like body, as for instance, the top section of 10 a trunk with the machine for the purpose of applying the corner strips to the corners of the top of the trunk, while the slide 43 is for the purpose of engaging relatively larger containers, as for instance, the body 15 of the trunk to the carriage.

It will be noted that we have provided two means for stopping the forward motion of the carriage and the actuation of the riveting members, one of these means being 20 the head or dog 90 with the roller 88, the other means being the blade 137 which comes in contact with the latch of the half nut 121 on the feed carriage and retracts the latch so that the half nut can fall away from the feed 25 worm or screw shaft 52. The bars 184 holding the rivet holding arms 183, as before stated, are forced inward by the screw 187 so as to carry the rivets nearer to the work, but these bars are drawn outward by strings 30 205, as illustrated in Figure 24. Thus as before stated, the rivet holders may be adjusted nearer to or further from the work. This is fully illustrated, described and claimed 35 in our co-pending application.

35 We claim:—

1. A riveting machine of the character described including a supporting column, a supporting arm extending laterally from the supporting column and then extending 40 upward, an anvil carried upon said supporting arm, riveting mechanism mounted upon the column and disposed above the supporting arm and anvil, a carriage mounted in line with the anvil for movement in a plane 45 at right angles to the supporting arm, said carriage being vertically disposed and having trunk engaging clamps projecting from one face whereby to engage the end of a trunk, and power operated mechanism for 50 giving a step by step movement to said carriage toward the anvil and for operating the riveting mechanism during the period when the carriage is at rest.

2. A riveting mechanism of the character 55 described including an anvil, riveting mechanism disposed above the anvil, a carriage mounted for longitudinal movement toward and from the anvil, means for giving an intermittent step by step movement of the 60 carriage toward the anvil and for operating said riveting mechanism when the carriage is at rest, said carriage comprising downwardly and outwardly angularly disposed container engaging bars, and hook-shaped 65 members slidingly mounted on and carried

by said bars for engaging an inverted container therewith and means for manually shifting said members to grip a container thereby.

3. A riveting mechanism of the character 70 described including an anvil, riveting mechanism disposed above the anvil, a carriage mounted for longitudinal movement toward and from the anvil, means for giving an intermittent step by step movement of the 75 carriage toward the anvil and for operating said riveting mechanism when the carriage is at rest, said carriage comprising downwardly and outwardly angularly disposed container engaging bars, members carried 80 by said bars for engaging an inverted container therewith, a downwardly and inwardly extending bar supported by one of said angularly disposed bars, and an adjustable member slidably mounted on the 85 last named bar and having a hook adapted to engage a container.

4. A riveting mechanism of the character 90 described including an anvil, riveting mechanism disposed above the anvil, a carriage mounted for longitudinal movement toward and from the anvil, means for giving an intermittent step by step movement of the carriage 95 toward the anvil and for operating said riveting mechanism when the carriage is at rest, said carriage comprising downwardly and outwardly angularly disposed container engaging bars, members carried by said bars for engaging an inverted container therewith, a downwardly and inwardly extending bar supported by one of 100 said angularly disposed bars, an adjustable member slidably mounted on the last named bar and having a hook adapted to engage a container, two members slidably mounted 105 upon said bar in spaced relation to each other, and means for longitudinally adjusting said members, each of said members being provided with a hook adapted to engage the container.

5. A riveting machine including an anvil, riveting mechanism disposed above the anvil, a carriage movable toward and from the riveting mechanism, means for giving a step by step movement to the carriage toward the 115 anvil and operating the riveting mechanism when the carriage is at rest, said carriage comprising downwardly and outwardly divergently related trunk supporting bars, a downwardly and inwardly extending bar 120 carried at the end of one of said trunk supporting bars, a slide mounted upon said bar and having a hook adapted to engage a trunk, and a screw-threaded adjusting rod mounted on the carriage and operatively engaging said slide whereby it may be adjusted.

6. A riveting machine of the character 125 described comprising an anvil, riveting mechanism disposed above the anvil, a carriage 130

movable toward or from the anvil, power operated means engaging the upper end of the carriage for giving the carriage a step by step movement toward the anvil, means 5 for operating the riveting mechanism when the carriage is at rest, said carriage comprising downwardly divergent trunk engaging bars, a vertical support centrally disposed with relation to said bars, a downwardly and inwardly extending bar engaging said support, trunk engaging members mounted upon said downwardly and inwardly extending bar and having hooks adapted to engage a trunk, and a rail supporting the lower end of said centrally disposed member.

7. A trunk riveting machine including an anvil having angularly related faces, a supporting arm for the anvil extending laterally and upward, riveting mechanisms disposed above the faces of the anvil and coacting therewith, a vertically disposed carriage adapted to support one end of a trunk and movable toward or from the anvil, said carriage moving in a plane at right angles to the plane of the supporting arm and having means for supporting the trunk with one of its corners upward and over the anvil, power operated mechanism engaging the upper 20 end of the carriage for giving a step by step movement to the carriage toward the anvil, a bracket supporting the lower end of the carriage, means for manually disengaging the carriage from the power operated 25 means, and means for operating the riveting mechanism during the period when the carriage is at rest and between the step by step forward movements.

8. A trunk riveting machine including an anvil, a riveting mechanism disposed above the anvil and coacting therewith, a carriage adapted to support one end of a trunk and movable toward or from the anvil, means for moving the carriage toward the anvil 40 including a power operated screw-threaded member, and a screw-threaded member mounted on the carriage and engaging the first named screw-threaded member, said carriage supported screw-threaded member being manually movable into or out of engagement with the power operated screw-threaded member.

9. A trunk riveting machine including an anvil, sliding means for supporting one end 55 of the trunk with its corner over the anvil, a carriage for supporting the opposite end of the trunk, and power operated mechanism for shifting said carriage step by step over the face of the anvil.

60 10. A trunk riveting machine including a supporting column, an anvil, a riveting mechanism supported by the column and disposed above the anvil, a bar extending forward from the riveting mechanism, a 65 sleeve sliding on said bar and having a de-

pending hanger formed with means whereby it may engage one end of a trunk, a carriage adapted to support the other end of a trunk and movable toward or from the anvil to feed the trunk over the anvil, power operated means for shifting the carriage step by step toward the anvil and moving the riveting mechanism while the carriage is at rest, and means for releasing the carriage from the power operated means when the carriage has arrived in predetermined proximity to the anvil.

11. A riveting mechanism including a supporting column, an anvil carried thereby and adapted to support a trunk, a carriage engageable with one end of the trunk and movable toward or from the anvil, means for shifting said carriage toward the anvil including a power operated screw-threaded shaft, a screw-threaded member 80 movably mounted upon the carriage and normally engageable with said shaft, and means for automatically shifting the screw-threaded member on the carriage out of engagement with the shaft when the carriage arrives in predetermined proximity to the anvil.

12. A riveting mechanism including a supporting column, an anvil carried thereby and adapted to support a trunk, a carriage 95 engageable with one end of the trunk and movable toward or from the anvil, means for shifting said carriage toward the anvil including a power operated screw-threaded shaft, a screw-threaded member 100 movably mounted upon the carriage and normally engageable with said shaft, means for automatically shifting the screw-threaded member on the carriage out of engagement with the shaft when the carriage arrives in predetermined proximity to the anvil, said means including a spring urging the screw-threaded member away from the shaft, a latch holding the screw-threaded member 105 in engagement with the shaft, and a member engageable with the latch to release it when the carriage has arrived in predetermined proximity to the anvil.

13. A riveting machine including an anvil, a container carriage movable toward or from the anvil, riveting mechanism disposed above the anvil, and means for giving an intermittent step by step forward movement to the carriage toward the anvil comprising a screw-threaded, constantly rotating shaft 115 with which the carriage has threaded engagement, and means for reciprocating said shaft.

14. A riveting machine including an anvil, a container carriage movable toward or from the anvil, riveting mechanism disposed above the anvil, means for giving an intermittent step by step forward movement to the carriage toward the anvil comprising a screw-threaded, constantly rotating shaft 125 130

with which the carriage has threaded engagement, means for reciprocating said shaft including a pivoted lever operatively engaging the shaft at one end, and a power operated cam movably engaging the lever at the other end.

15. A riveting machine including an anvil, a container carriage movable toward or from the anvil, riveting mechanism disposed above the anvil, means for giving an intermittent step by step forward movement to the carriage toward the anvil comprising a screw-threaded, constantly rotating shaft with which the carriage has threaded engagement, means for reciprocating said shaft including a pivoted lever operatively engaging the shaft at one end, a power operated cam movably engaging the lever at the other end, and means for longitudinally shifting the lever relative to the center of motion to thereby control the relative length of the shaft engaging and the cam engaging arms of the lever.

16. A riveting machine including an anvil, a container carriage movable toward or from the anvil, riveting mechanism disposed above the anvil, means for giving an intermittent step by step forward movement to the carriage toward the anvil comprising a screw-threaded, constantly rotating shaft with which the carriage has threaded engagement, means for reciprocating said shaft including a pivoted lever operatively engaging the shaft at one end, a power operated cam movably engaging the lever at the other end, means for longitudinally shifting the lever relative to the center of motion to thereby control the relative length of the shaft engaging and the cam engaging arms of the lever, said means comprising a bifurcated pivoted member within which the lever is disposed, and adjusting screws carried by the lever on each side of said member and engaging the member.

45. 17. A machine for riveting the bottoms to the side walls of trunks comprising a supporting column having a lateral, upwardly turned bracket, an anvil mounted upon the bracket and having oppositely bevelled, 50 downwardly and outwardly extending faces, a bracket extending from the upper portion of the column, a head mounted upon said bracket, oppositely disposed riveting mechanisms mounted upon said head and 55 including means for feeding rivets, means for forcing the rivets into and through the work and against said anvil, a longitudinally extending guide bar mounted upon the head and extending therefrom in one direc-

tion, a sleeve slidably mounted upon said 60 guide bar and having a depending member formed with a trunk engaging pin, a carriage disposed on the other side of the anvil from said sleeve and mounted for movement toward or from the anvil and having means 65 for engaging and supporting the opposite end of the trunk, power operated means for intermittently shifting the carriage forward and permitting it to rest, means for adjusting the extent to which the carriage moves 70 between each rest, power operated means for operating said shaft, and power operated means for operating the riveting mechanism during the period when the carriage is stationary.

75 18. A trunk riveting mechanism including a supporting column having a laterally extending and then upwardly extending bracket, an anvil mounted thereon and having oppositely bevelled faces, a head supported above the anvil and supported by said column and having a vertically reciprocatable presser foot movable toward or from the anvil, oppositely disposed rivet driving 80 mechanisms carried by the head, means for feeding rivets to said rivet driving mechanisms, a guide bar extending forwardly from the head, a sleeve slidably mounted thereon and having means for engaging one end of a trunk, a carriage mounted on the opposite 90 side of the anvil relative to the sleeve and having means thereon for engaging the trunk, a longitudinally extending screw-threaded shaft with which the carriage has operative engagement, the shaft being longitudinally reciprocatable, power operated 95 means for rotating said shaft and intermittently longitudinally reciprocating it to thereby intermittently hold the carriage stationary relative to the anvil, driving mechanism including a driven shaft, a power operated driving member, a clutch normally connecting the driving member with the shaft, operative connections between said driving shaft and the screw-threaded shaft 100 and between the driving shaft and the rivet feeding and rivet driving mechanisms and between said shaft and the presser foot, and means actuated by the arrival of the carriage at the end of its path of travel toward the 110 anvil automatically throwing said clutch to disconnect the driving member from the driving shaft.

In testimony whereof we hereunto affix our signatures.

THOMAS M. HOUSE.
HARRY R. McCONNELL.