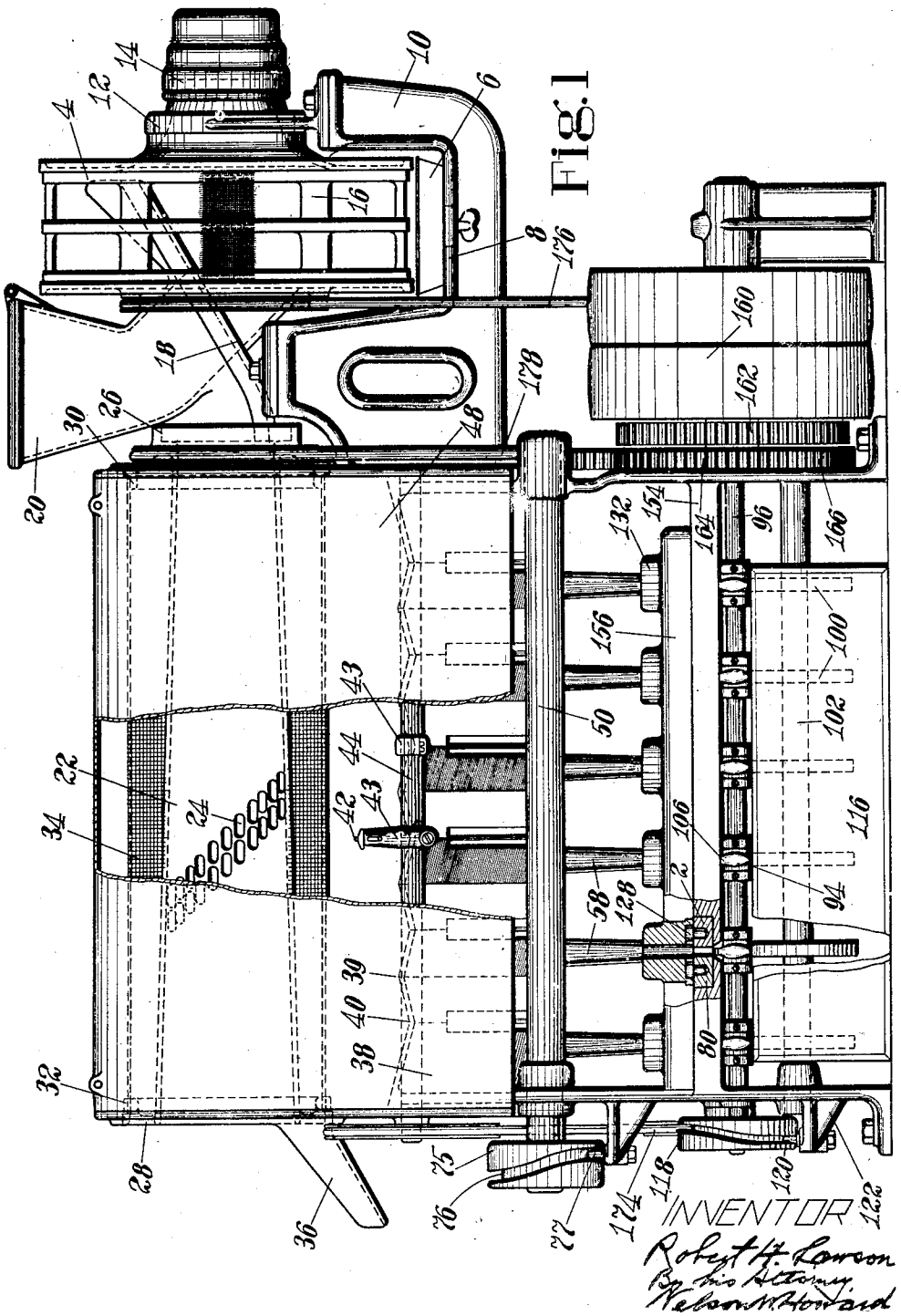
Dec. 16, 1924. 1,519,145

R. H. LAWSON

MACHINE FOR RECLAIMING FASTENINGS

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R. H. LAWSON

MACHINE FOR RECLAIMING FASTENINGS

Filed Aug. 16, 1918 4 Sheets-Sheet 2

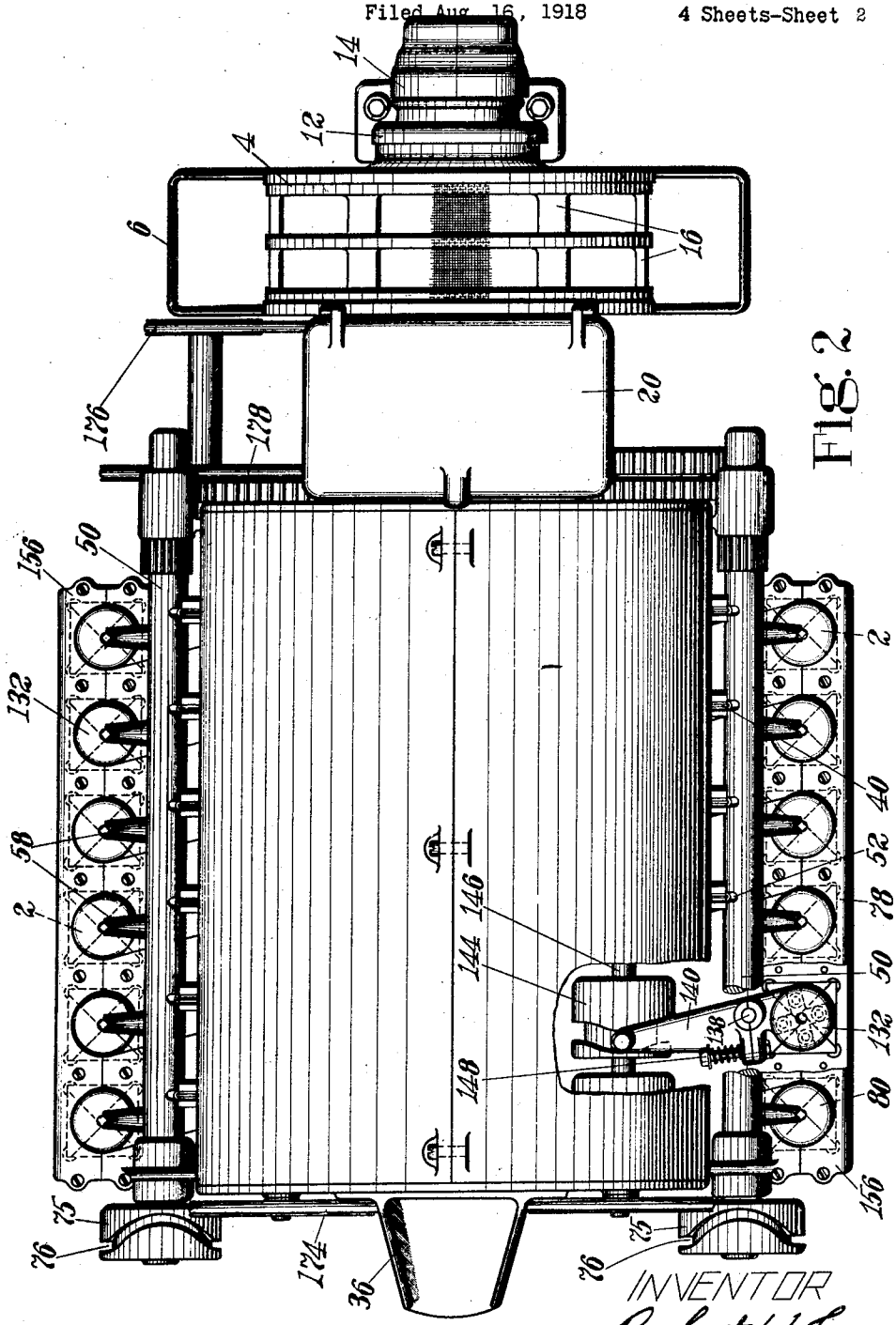


Fig. 2

INVENTOR
Robert H. Lawson
By his Attorney,
Nelson W. Howard

Dec. 16, 1924. 1,519,145

R. H. LAWSON

MACHINE FOR RECLAIMING FASTENINGS

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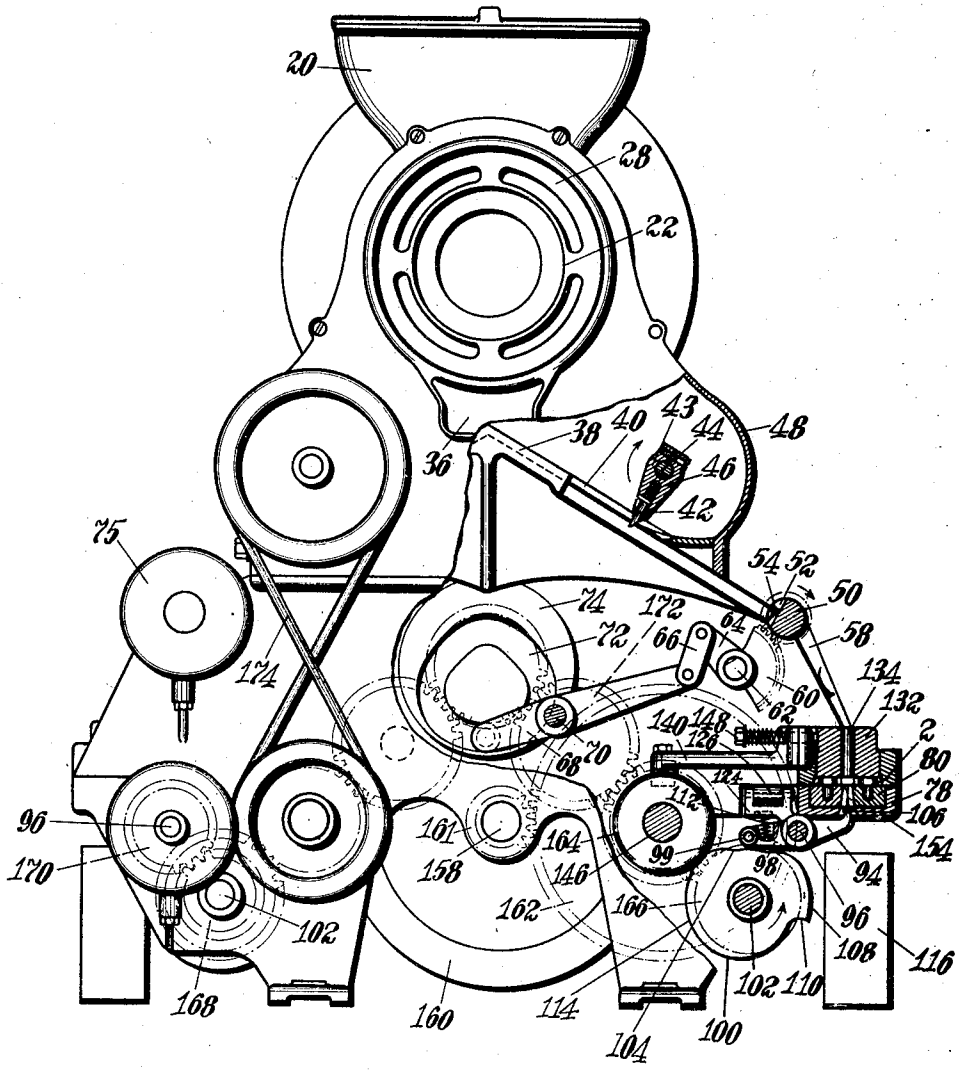


Fig. 3

INVENTOR
Robert H. Lawson
By his Attorney
Nelson M. Howard

Dec. 16, 1924. 1,519,145

R. H. LAWSON

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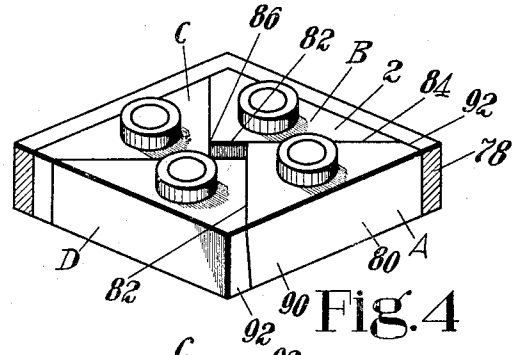


Fig. 4

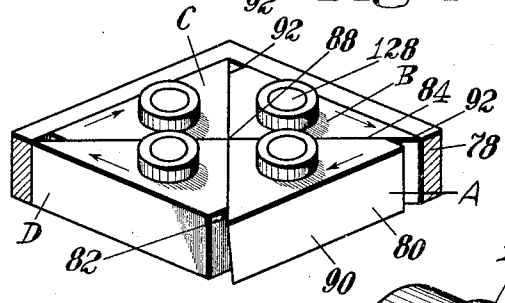


Fig. 5

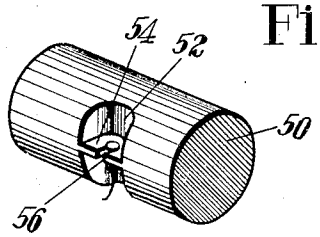


Fig. 8

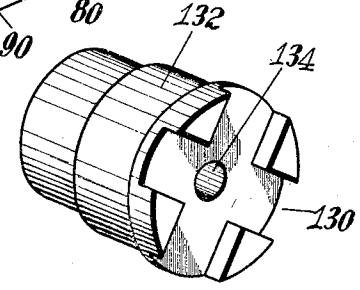


Fig. 7

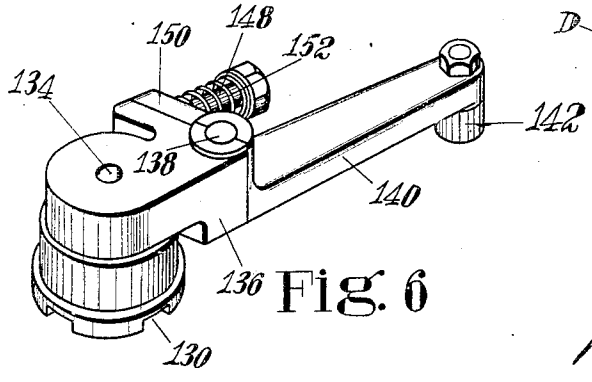


Fig. 6

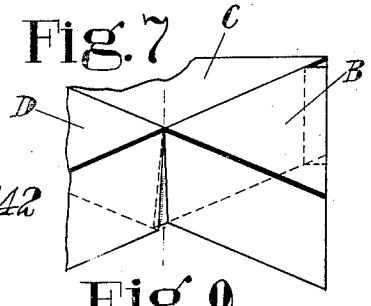


Fig. 9

INVENTOR
Robert H. Lawson
By his Attorney
Nelson W. Stanford

Patented Dec. 16, 1924. 1,519,145

UNITED STATES PATENT OFFICE.

ROBERT H. LAWSON, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR RECLAIMING FASTENINGS.

Application filed August 16, 1918. Serial No. 250,154.

To all whom it may concern:

Be it known that I, ROBERT H. LAWSON, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Reclaiming Fastenings, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for reclaiming metallic fastenings, and the embodiment of the invention herein illustrated and described is designed with particular reference to re-obtaining in a condition fit for further use tacks which have been before used in the process of manufacturing shoes.

In the lasting of Goodyear welt shoes a row of tacks is inserted about the contour edge of the last through the folded over margin of the upper and the insole and into the wooden bottom of the last for retaining the upper in position when it has been pulled or stretched over the last by the grippers of the lasting machine. After the parts of the lasted shoe have had an opportunity to set so that they will retain their shape without the aid of the inserted tacks, the tacks are withdrawn from the shoe and the last generally by tack pulling machines which deposit them in receptacles carried by such machines. Some of the tacks, however, are unavoidably thrown to the floor during the operation of pulling them and there become mixed with dirt, trash and other foreign material. Moreover, the receptacles of the tack pulling machines are necessarily left open to receive the tacks from the tack pulling instrumentalities and a certain amount of dirt and trash accumulates with the tacks in the receptacles. The lasts are made of very hard wood to enable them to endure the severe strains and wear to which they are subjected in the various processes of shoe manufacture, from which it results that by far the larger portion of the tacks when withdrawn from the shoe stock and the last are deflected at the points or otherwise distorted. They are therefore not suitable for further use in the condition in which they are withdrawn from the last and have heretofore been thrown away as useless or junked.

In order that these tacks may be again made capable of use, thus effecting a great saving in the materials from which the tacks are formed and in the manufacture of the tacks generally by reason of the smaller quantity of tacks required, the present invention aims to restore them practically to their original condition. To this end an important feature of the invention resides in the provision of means for separating fastenings from foreign material and straightening them, and the present embodiment of the invention is particularly designed for separating tacks from dirt, trash and the like commingled with them in the receptacles of the tack pulling machines and then straightening the shanks of the tacks. Preferably the machine according to this invention comprises a plurality of independent means for straightening fastenings, a source of fastening supply, and means for distributing the fastenings to the straightening means, and in the illustrated construction such distributing means comprises a rotary drum having openings arranged spirally of its periphery through which tacks may be delivered successively from the inlet end of the drum toward its outlet end in substantially equal amounts to guides by which they are conducted to the straightening devices. A uniform distribution of the tacks to the straightening means is thus assured.

In accordance with another feature of the invention the straightening devices are of such a character as to operate on the tacks one at a time, and I have therefore provided means for delivering the tacks singly to such devices. Moreover, it is found that the shanks of the used tacks are not only usually deflected or distorted, but that sometimes the heads of the tacks are displaced on their shanks. Accordingly, I provide means for righting the heads of the tacks on their shanks or, in other words, assuring that the heads of the tacks shall be arranged on their shanks with the plane surfaces of their heads positioned substantially normal to the shanks of the tacks. Conveniently, the means for righting the heads of the tacks is located on the side of

the straightening devices opposite from that at which the tacks are introduced to the straightening devices, and in order to adapt the machine to such location of the means for righting the heads of the tacks, I provide means for inverting the tacks from the positions in which they are disposed during their movements in the guides which receive them from the rotary drum and for delivering them in inverted relation or, in other words, heads first to the straightening devices. As herein shown, the tack inverter comprises a rotary member extending transversely of the delivery ends of the guides and provided with recesses normally in alignment with the slots of the guides and bridged by notched members each adapted to receive a single tack supported by its head and upon operation of the inverter to deliver it head first to the corresponding straightening device.

Each of the straightening dies comprises a plurality of die members having surfaces arranged at angles of less than 180° to each other for engagement with the shank of a tack and the die members are so operated as to impart equal movements to their engaging surfaces so that the tack in the die is subjected to uniform pressure on all sides. As shown, the die members have sides tapering to edges movable toward and from the central point of the die, the arrangement being such that the tapering sides of the die members are maintained in engagement with each other during their operation both toward and from said central point. When the die members are moved so as to carry their edges away from the central point a portion of one of the tapering sides of each of said members is exposed for engagement with the tack which is introduced into the opening defined by said tack engaging surfaces, whereas when the die members are moved in a direction to carry their edges toward the center of the die, the engaging surfaces of said members are closed on the tack in the die. Preferably, and as in the illustrated construction, the movements imparted to the tack engaging surfaces of the die members are not only equal in degree but are also of like linear character being herein effected in straight lines. As a convenient means for supporting the die members and for guiding them in their operations, they are all movably mounted in a die box and are moved relatively to the walls of the die box and guided thereby.

Although the invention will be herein set forth in its application to operating on lasting tacks, it will be understood that the invention as a whole and certain features thereof are capable of use in other relations such, for example, as the reclaiming of other kinds of metallic fastenings, and it is also recognized that the mechanical structure herein illustrated and described may be extensively modified without departing from the principles of the invention.

Other objects and features of the invention will appear as the description proceeds.

In the drawings,

Figure 1 is a view in side elevation of a machine in accordance with the invention having parts broken away to show portions of the interior of the machine;

Fig. 2 is a plan view with parts broken away to exhibit one of the analogous devices by which the straightening dies are operated;

Fig. 3 shows in elevation the front of the machine, one of the dies, the fastening inverter, and the picker being delineated in cross section;

Fig. 4 shows one of the straightening dies in open position ready to receive a fastening;

Fig. 5 is a like view of the die in closed position;

Fig. 6 is a view in detail of one of the die operating levers;

Fig. 7 shows the formation of the end of the die operating lever;

Fig. 8 shows a section of the fastening inverter, and

Fig. 9 is a view of the central portion of one of the dies with one of the die members removed.

The machine herein illustrated as the preferred embodiment of the invention comprises generally two rows of straightening dies 2 arranged one on each side of the machine and means for separating the tacks from any foreign material which may be commingled therewith and for distributing them to the straightening dies.

The devices for separating the tacks from foreign material and distributing them to the dies comprise a rotary cylindrical magazine 4 having a screened or otherwise reticulated periphery of a mesh small enough to retain the tacks in the magazine but through which fine dust may pass into a receptacle 6 supported on a shelf 8 formed as a part of a bracket 10 extending from the machine frame and providing a bearing 12 in which a hollow boss 14 projecting centrally from one side of the magazine 4 is journaled. The boss 14 is adapted to have applied thereto a blower or other means (not shown) for producing a flow of air through the interior of the magazine 4 to remove from the magazine any light trash which may be intermingled with the tacks. The magazine 4 is formed with flanges or fins 16 extending radially inwards from its periphery and operating upon rotation being imparted to the magazine to elevate the contents of the magazine and deliver them upon a chute 18. The tacks are introduced into the magazine 4 in bulk through a hopper 20 which to-

gether with the magazine 4 constitutes a source of fastening supply for the machine as a whole.

The tacks which, after having the fine dust separated therefrom by the screened periphery of the magazine 4 and the light trash removed by pneumatic means through the hollow boss 14, may still have commingled therewith relatively large and heavy pieces of foreign material, are delivered from the chute 18 into the end of a rotary drum 22 which distributes the tacks uniformly to the straightening dies 2. To this end the drum or distributor 22 is provided with openings 24 elongated in the direction of the axis of the drum and arranged spirally of the periphery of the drum. With this construction, it is apparent that the tacks can escape from the drum only while one or more of the openings 24 is passing through the lower part of the path of movement of the drum beneath the line of tacks advancing from the inlet or receiving end of the drum towards its outlet or delivery end. When, in the continued rotation of the drum, the openings 24 adjacent to the receiving end of the drum have passed from beneath the line of tacks in the drum a solid or imperforate part of the drum is there presented to the tacks in consequence of which they are prevented from escaping from the drum until in their advance movement toward the outlet end of the drum they arrive in alignment with other openings 24 which, by reason of the spiral arrangement of the openings pass through the lower portion of the path of movement of the drum beneath the line of tacks in the drum at a later period of its rotation than did the openings nearer the receiving end of the drum. The size and arrangement of the openings 24, the speed of rotation of the drum, and the delivery of tacks to the chute 18 by the flanges 16 of the magazine may be so regulated as to cause a substantially equal number of tacks to be delivered from the openings 24 of the drum at all points of the drum from its receiving to its delivery end.

The drum 22 is connected at its ends to disks 26 and 28 respectively journaled in the main frame of the machine. The disks are extended radially beyond the periphery of the rotary drum or distributor 22 and are provided with inwardly projecting flanges 30 and 32 to which is connected for rotation with the drum 22 a screen 34 enclosing the drum. The primary function of the screen 34 is to remove from the tacks which pass therethrough any foreign material which may not have been separated therefrom in the magazine 4 in order that the tacks when delivered to the straightening dies shall be free from foreign material which might interfere with the proper functioning of the straightening dies and might perhaps occasion breakage of the dies or their operating means. It may be noted, however, that the rotary drum 22 will separate from the tacks any object so large as not to pass through the comparatively small openings 24, and it is further to be noted that the screen 34 supplements the action of the drum in insuring a uniform distribution of the fastenings to the straightening dies 2. The foreign material separated from the tacks is delivered from the machine by a chute 36 to which it passes from the open delivery ends of the drum 22 and screen 34.

The tacks as they fall from the drum 22 are conducted to the straightening dies 2 by means now to be described. Such means comprises oppositely inclined slides 38 formed to present alternating ridges 39 and channels 40 (Fig. 1), the latter being slotted to an extent greater than the diameter of the shanks of the tacks but less than the diameter of the tack heads so that the tacks as they fall from the drum 22 on the slides group themselves in the channels 40 supported by their heads from the walls of the slots. As clearly appears from the drawings (Fig. 3) the slides 38 are arranged in the form of an inverted V the apex of which is positioned in the vertical plane of the axis of the drum 22. There is thus provided two series of channels extending lengthwise of the drum 22 and arranged one at each side of the vertical plane of the axis of the drum so that not only are the tacks distributed uniformly to the individual channels of each series, but they are also delivered uniformly to the channels of the different series. The slide 38 at the left (Fig. 3) is of like construction to that at the right and the dies and other parts on one side of the machine are similar to those on the other side. Consequently, a description of the parts on one side of the machine will suffice for both.

To counteract the tendency of the tacks to group themselves in the channels 40 of the slides 38 with their heads riding on each other and to arrange the tacks properly in the channels, I provide a picker 42 operatively associated with each of the channels 40 and acting to jog the tacks to prevent the head or other portion of any tack from riding on the head of another tack. The pickers 42 are mounted in collars 43 secured on a rotating shaft 44 extending from one end to the other of the machine and each is permitted to yield in its collar 43 by reason of a spring 46 being interposed between an enlarged portion of the picker 42 and the bottom of the recess in the collar which receives the picker. The frame of the machine is curved outwardly at 48 to provide a space in which the picker may be operated. The channels 40 of the slides 38 constitute raceways which convey the fastenings down-

wardly from the drum 22 toward the straightening dies 2.

Mechanism is preferably associated with the straightening dies 2 for righting on its shank the head of any tack which may be displaced relatively to its shank. It is convenient to provide such mechanism on the sides of the dies opposite those at which the tacks are introduced into the dies. I accordingly further provide, in connection with each of the raceways, means for inverting the tacks from the positions which they occupy in the raceways and delivering them in inverted relation or, in other words, head first, to the straightening dies. As shown, the fastening inverter comprises a shaft or bar 50 extended from end to end of the machine transversely of the raceways and constructed to coact with the delivery end of each of the raceways. To this end the bar 50 is formed with recesses 52 adapted to be aligned with the slots of the raceways at their delivery ends. Bridging each of said recesses 52 is a shelf 54 provided with a notch 56 formed to receive a single tack from the slot of a raceway and to support it by its head. Upon the turning of the bar 50 in the direction of the arrow (Fig. 3), the tack is delivered from the bar 50 to a chute 58 which conveys the tack to the straightening die 2. As shown, such turning movement of the bar 50 is effected by a sector gear 60 mounted on a shaft 62 and having a projecting arm 64 jointed by a link 66 to a lever 68 journaled on a shaft 70 and provided with a cam roll riding in a cam slot 72 formed in a cam 74. From this construction, it will be understood that rotation of the cam 74 effects oscillation of the sector gear 60 and thereby oscillates the bar 50 from the position shown in Fig. 3 in which it receives a tack from the raceway to a position such that the tack will slide from the notch 56 of the shelf 54 of the bar 50 upon the chute 58 for delivery to the straightening die 2. When the bar 50 is oscillated from receiving position (Fig. 3), the shelf 54 is moved upwardly from the delivery end of the raceway. In order at such times to prevent escape of the tacks from the raceway through the recess 52 of the bar, the bar is moved endwise to carry the recess 52 out of alignment with the slot of the raceway simultaneously with the oscillation of the bar. This is effected by a cam disk 75 (Fig. 1) on the end of the bar 50 in which is formed a cam slot 76 which receives a cam roll 77 carried by a bracket secured to the machine frame.

The dies 2 by which the tacks are straightened will now be described. These dies are of like form and each is so constructed as to present tack engaging surfaces at angles to each other of less than 180°, thus insuring that irrespective of the character of the distortion of the shank of the tack or of the arrangement of the shank of the tack to the engaging surfaces of the dies, such surfaces will, upon the operation of the die, be closed upon the shank of the tack in such manner as to straighten it. It is apparent that if a tack having a crooked shank were operated upon by a die having engaging surfaces arranged at angles of 180° to each other or in other words, arranged in direct opposition to each other, the tack might position itself relatively to the surfaces of the die in such a manner that the distortion or bend of the tack shank would lie in a plane parallel with the planes of the surfaces of the die in which case the closing of the die on the shank of the tack would not, of course, straighten it. Moreover, in order to insure the perfect straightening of the shanks of the tacks, the tack engaging surfaces of the die members of the present construction are each moved equally, thus imposing equal pressure on all sides of the shanks of the tacks. It is recognized that the die members might be constructed and operated in various ways to attain the end set forth but I prefer to use the illustrated construction comprising a die box 78 in which a plurality of die members 80, in this case four, are loosely received the die members 80 being confined in their movements by the walls of the die box 78. The die members 80 are formed with sides 82 and 84 illustrated as plane surfaces tapering to edges 86 (Fig. 4) and said die members are so constructed and arranged in the die box that the edges 86 may be brought into substantial contact with each other at the central point 88 (Fig. 5) of the box 78.

Each of the die members 80 has a third side 90 which is arranged for sliding engagement with the inner surface of a wall of the box. The die members are triangular in form and since the walls of the box are substantially equal and are arranged at substantially equal angles to each other and since the sides 82 and 84 of each of the die members 80 are arranged at equal angles with the walls of the box and meet at the center of the box, it follows that the die members are substantially equal and that each of said members occupies a portion of the cavity of the box 78 inversely proportional to the number of sides of the box. It will be understood that if a plurality of die members of the construction and arrangement above described were inserted in a box as illustrated in Fig. 5 and were of exactly triangular form throughout their whole extent, it would not be possible to open a space at the center of the box because no movement of the die members in the box could be effected. To the end that the die members 80 may be moved in the box to open a space at the center to receive the tack to be operated on, the members are cut

off at their corresponding ends as indicated at 92, thus providing surfaces parallel with and normally spaced from the opposed walls of the box toward which it is designed to move the die members and permitting movement of each of the die members in corresponding directions in the box to an extent depending upon the spacing of the surfaces 92 of the die members from said walls, as will clearly appear from an inspection of Fig. 4. If it be assumed that the die member designated A (Figs. 4 and 5) is moved in a direction opposite to that indicated by the arrow (Fig. 5), the edge 86 of such member will move relatively to the opposed surface 82 of the adjacent die member B from the edge 86 of member B toward the other end of said surface, thus exposing a portion of the surface 82 of the die member B extending from its edge 86 to the edge of the first-mentioned die member. Correspondingly, movement of the die member B in advance of member A effects a corresponding movement of its edge 86 from the edge 86 of the adjacent die member C thereby exposing a part of the surface 82 of die member C and so on. Thus it results that upon movement of one of the die members 80, a portion of the tack engaging surface of each of the die members A, B, C and D will be exposed and a regular polygonal opening will be formed determined in its extent by the extent of movement of the first-mentioned die member. Correspondingly, when one of the die members is moved in the direction of the arrows (Fig. 5) to carry its edge 86 toward the central point of the die box, the engaging surfaces of the die members will be closed upon the tack or other object in the die. Thus while each of the die members has a bodily rectilinear movement as indicated by the arrow in Fig. 5, it may be noted that the edges 86 of the dies have a radial movement so that as the dies are simultaneously moved back and forth a polygonal aperture at the center of the group is opened and closed after the fashion of the well-known iris diaphragm.

Although the invention is herein illustrated as embodied in a die having a die box with four walls, it is recognized that the invention is not limited thereto but that the principles of the invention may be carried into effect by the use of a die box having a number of sides other than 4. In such a case, however, the sides of the box will preferably still be of equal length arranged at substantially equal angles to each other, and each of the die members will be formed with sides tapering toward the center of the box from the angles of the box and with a third side movable on the inner surface of a side of the box. The die members will also be cut off at corresponding ends to permit their movement in the box to carry their edges 86 radially away from and toward the central point of the box to open a space in the center of the box to receive an object to be operated upon and to close upon said object. There is imparted to the edges 86 and the tack engaging surfaces of all of the die members like-linear movements toward and from the central point of the box, and inasmuch as in the preferred construction herein illustrated the surfaces 90 of the die members 80 and the inner surfaces of the walls of the box 78 are plane, the edges 86 of the die members have straight-line movements. Whether the die members are carried in a die box or are otherwise mounted for operation, they are moved at angles to each other equal to the angles between their tack engaging surfaces when the die is open in order that there may be no spaces opened up between the edge 86 of any of the die members and the opposed surface of the adjacent die member into which the slender point or shank of a tack might engage and thus preclude the proper straightening of the tack by the die. Since the tapering sides of the die members are plane as, for example, the side designated 84, the angles opened between the surfaces of the adjacent die members will be equal to 180° minus the angle formed between the tapering sides 82 and 84 of the die members.

The die members 80 are of a height preferably a little greater than the length of the tacks being operated upon and their meeting surfaces 82 and 84 are so formed as to come together at the top above the point of the tack and to provide a space at the bottom of the die when closed of a size and shape corresponding to the size and shape of the shanks of the tacks near their heads, the space between the die members when closed tapering from the bottom to the top of the dies similarly to the taper of the shanks of the tacks (Fig. 9).

Positioned at the side of the die opposite that on which the tacks are introduced into the die is a member 94 so placed relatively to the opening of the die as to engage the head of a tack in the die and locate the shank of the tack in proper position for operation thereon by the die members 80. The member 94 is pivoted loosely on a shaft 96 which extends from end to end of the machine, and said member has a rearwardly extending portion 98 carrying a cam roll 99 adapted to ride on the peripheral surface of a cam 100 carried by a shaft 102 extending from end to end of the machine. At the point in the cycle of operations of the machine at which the die 2 is open and the tack is delivered to the die, the cam roll 99 is in engagement with a depressed portion 104 of the cam 100 so that the head 106 of the member 94 is in close proximity to the sides

of the die members in the die box. When, however, the die members have been closed upon the shank of the tack to an extent which will prevent falling of the tack from between the die members, the rotation of the cam 100 brings the raised portion 108 of the cam into engagement with the cam roll 99 and withdraws the head 106 of the the member 94 away from the die members. The continued rotation of the cam 100, however, carries the shoulder 110 of the cam 100, the die members 80 having meanwhile closed further on the shank of the tack, past the cam roll 99 permitting the spring 112 to impart a quick sharp movement to the member 94 to carry the head 106 of said member against the head of the tack held by the die members. The blow thus imparted on the head of the tack, in case the head of the tack is displaced on its shank, rights the head of the tack on the shank or, in other words, properly locates the head of the tack so that its surface occupies a plane substantially normal to the shank.

As the cam 100 continues to rotate, the head 106 of the member 94 is again depressed by the raised portion 114 of the cam to a point below the plane of the bottom surface of the die box 78 after which movement is imparted to the member 94 in a direction transverse to the first-mentioned movement, thus permitting the discharge of the tack from the dies, which are simultaneously opened, into a receptacle 116. The last-mentioned movement, of the member 94 is, in the illustrated construction, effected by a cam disk 118 mounted on the end of the shaft 96 and having a cam slot in its face constructed to receive a stud 120 carried by a bracket 122 secured to the frame of the machine. It will be clear from the foregoing that upon rotation of the shaft 96, the engagement of the stationary stud 120 in the cam slot of the disk 118 will effect endwise movement of the shaft 96 thereby carrying the heads 106 of the members 94 out of alignment with the openings in the die and permitting the discharge of the tacks from the dies.

The cam roll 99 on the member 94 is of sufficient length to remain in operative relation with the face of the cam 100 during the endwise movements of the shaft 96. To the end that the spring 112 may operate efficaciously on the member 94, a bracket 124 carrying an anti-friction roller 126 for engagement with the plane bottom surface of the frame of the machine is arranged to back up the spring 112 and is connected with the shaft 96 for longitudinal movement therewith.

The die members 80 are preferably each provided with studs 128 adapted to be received in the recesses 130 of a member 132 rotatably journaled on the upper side of the die box and provided with a passage 134 in alignment with the delivery end of the chute 58 and with the opening of the die and through which the tacks pass to the die from the chute 58. The members 132 are each connected with an arm 136 which has pivoted thereto at 138 a second arm 140 carrying a cam roll 142 adapted to be received in a cam slot formed in the face of a cam 144 carried by a shaft 146 extending from end to end of the machine. It is conceivable that the shank of a tack may be doubled on itself or otherwise so distorted that it cannot be straightened by the die members or that there may be delivered to the die members a foreign object of a character such that when interposed between the die members, it will prevent the normal approach of the surfaces of the die. To preclude breakage of the parts under such conditions, a yielding connection is provided between the arms 136 and 140. Such connection comprises the pivot 138 and a stud 148 connected to the arm 136 and having interposed between a nut thereon and the flanged portion 150 of the arm 140 a spring 152 of a strength such as normally to keep the arms 136 and 140 from movement relatively to each other but to permit such movement of the arms in case the die members are for one reason or anther prevented from partaking of their normal movements.

As shown, the die boxes 78 are comprised by cavities formed in a single plate 154 at the side of the machine, and the operating members 132 for the dies are journaled in bearings formed in cap plates 156 secured by screws or the like to the plate 154.

The operating means for the machine comprises a drive shaft 158 carrying tight and loose pulleys together designated 160. The drive shaft 158 carries a gear 161 meshing with a gear 162 on the shaft 146 from which the straightening dies are operated. Carried by the shaft 146 is a gear 164 meshing with a gear 166 on the shaft 102 which carries the cams 100 which position the heads 106 of the members 94 so as to locate the shanks of the tacks in the dies and actuate the members 94 to right the heads of the tacks on their shanks and to depress the heads 106 of the members 94 below the plane of the bottom of the die box to permit longitudinal movement of the members 94 and shaft 96 by the cam 118 to facilitate the discharge of the tacks from the dies. The shaft 96 (Fig. 3) is rotated by a gear 168 on the shaft 102 which meshes with a gear 170 on the shaft 96. The shaft 146 is also geared to an idler gear 172 which is in turn geared to the shaft of the cam 74 which operates the fastening inverter 50. Movement is transmitted to the pickers 42 by endless belts 174 which pass over pulleys on the shafts 146 and other pulleys on the

shafts 44 which carry the pickers 42. The magazine 4 and the drum 22 and screen 34 are actuated by endless belts 176 and 178 respectively.

The means herein disclosed for separating the tacks from foreign material and for distributing them uniformly to the dies is not claimed per se in this application but constitutes the basis of claims made in applicant's co-pending application Serial No. 250,153 filed of even date herewith.

Having described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described, a source of fastening supply, means for separating the fastenings from foreign material, a plurality of independent means for straightening the shanks of the fastenings, and means for distributing the fastenings from said source of fastening supply to said straightening means.

2. In a machine of the class described, a source of fastening supply, a group of straightening dies arranged for radial movement to straighten the shanks of the fastenings, and means for delivering the fastenings substantially uniformly from said source of fastening supply to said straightening means.

3. In a machine of the class described, a source of fastening supply, a plurality of independent means for straightening the shanks of the fastenings, and means for distributing the fastenings substantially uniformly from said source of fastening supply to the straightening means comprising a rotating drum operating to receive the fastenings from the source of fastening supply and having a spiral row of apertures therein to deliver the fastenings uniformly to the straightening means.

4. In a machine of the class described, a source of fastening supply, means for separating the fastenings from foreign material, a plurality of independent means for straightening the shanks of the fastenings, a raceway for conducting fastenings independently from the source of supply to each of said straightening means, and means for distributing the fastenings substantially uniformly from said source of fastening supply to said raceways.

5. In a machine of the class described, a source of fastening supply, a plurality of independent means for operating on the fastenings, and means for distributing the fastenings substantially uniformly from said source of fastening supply to said operating means comprising a drum having a row of openings through which the fastenings may pass arranged spirally of the circumference of the drum and means for turning said drum about its axis.

6. In a machine of the class described, a source of fastening supply, a plurality of independent means for straightening the shanks of the fastenings, a raceway for conducting fastenings to each of said straightening means, and means for distributing the fastenings substantially uniformly from said source of fastening supply to said raceways, said means comprising a drum having a row of openings through which the fastenings may pass arranged spirally of the circumference of the drum and means for rotating the drum.

7. In a machine of the class described, a source of fastening supply, a plurality of independent means for straightening the shanks of the fastenings, a raceway for conducting fastenings to each of said straightening means, and means for distributing the fastenings substantially uniformly from said source of fastening supply to said raceways, said means comprising a drum having a row of openings through which the fastenings may pass arranged spirally of the circumference of the drum, a screen outside of and concentric with the drum and connected thereto for movement therewith, and means for rotating the drum.

8. In a machine for reclaiming fastenings, a plurality of independent means for operating on fastenings, and means for separating the fastenings from foreign material and distributing them in a plurality of streams to the different operating means.

9. In a machine for reclaiming fastenings, means for straightening the shanks of the fastenings, and means for separating the fastenings from foreign material and distributing them to the straightening means.

10. In a machine for reclaiming fastenings, a plurality of independent means for straightening the shanks of the fastenings, and means for separating the fastenings from foreign material and distributing them substantially uniformly to the straightening means.

11. In a machine of the class described, means for straightening the shanks of fastenings constructed to operate on one fastening at a time, and to straighten all portions of the shank of the fastening simultaneously, and means for delivering fastenings from bulk singly to said straightening means.

12. In a machine of the class described, mechanism for straightening the heads of headed fastenings and means for conducting fastenings to said mechanism comprising a raceway constructed to guide the fastenings supported by their heads and means for delivering the fastenings from the raceway to said mechanism in inverted relation.

13. In a machine of the class described, means for straightening the shanks of headed fastenings, and means for conducting fastenings to the straightening means compris-

ing a raceway constructed to guide the fastenings in contact with each other and supported by their heads and means for delivering fastenings from the raceway singly and in inverted relation to the straightening means.

14. In a machine of the class described, means for straightening the shanks of headed fastenings constructed to operate on one fastening at a time and means for conducting fastenings to the straightening means comprising a raceway adapted to guide the fastenings supported by their heads, a rotary member for receiving the fastenings from the raceway, and means for turning said member about its axis to deliver the fastenings in inverted relation to the straightening means.

15. In a machine of the class described, mechanism for straightening headed fastenings and means for conducting the fastenings to said mechanism comprising a raceway constructed to support the fastenings by their heads and a fastening inverter for receiving the fastenings from the end of the raceway and delivering them heads first to said mechanism.

16. In a machine of the class described, means for straightening the shanks of headed fastenings and means for conducting the fastenings to the straightening means comprising a raceway adapted to guide the fastenings supported by their heads and a fastening inverter for receiving the fastenings singly from the raceway and delivering them head end first to the straightening means.

17. In a machine of the class described, means for straightening the shanks of headed fastenings and means for conducting the fastenings to said straightening means comprising a slotted raceway adapted to guide the fastenings supported by their heads, a rotary member at the lower end of the raceway formed with a recess normally in alignment with the slot of the raceway, a shelf bridging said recess and having a notch formed therein constructed to receive a single fastening from the raceway supported by its head on said shelf, and means for turning said member about its axis to deliver the fastening head end first to the straightening means.

18. In a machine of the class described, means for operating on headed fastenings, and means for conducting the fastenings to the operating means comprising a slotted raceway adapted to guide the fastenings supported by their heads, a fastening inverter at the delivery end of the raceway having a recess formed therein normally in alignment with the slot of the raceway and having a member extending across said recess provided with a notch constructed to receive a single fastening from the raceway, means for turning the fastening inverter about its axis to deliver the fastening to the operating means, and means for moving the inverter axially upon turning movement of the inverter to carry the recess out of alignment with the slot of the raceway to preclude escape of other fastenings from the raceway through said recess upon movement of said notched member away from the end of the raceway.

19. In a machine of the class described, a raceway, an angularly movable member for delivering fastenings from the raceway in inverted relation, and means for moving said member endwise to prevent the escape of fastenings from the raceway during the delivery of a fastening therefrom by said member.

20. In a machine of the class described, means for straightening the shank of a fastening comprising relatively movable die members constructed to engage the shank throughout substantially its entire length and means for moving said members toward and from each other, and means for delivering fastenings singly to said straightening means.

21. In a machine of the class described, means for straightening the shanks of fastenings comprising relatively movable members having opposing surfaces for engagement with a fastening and operable to change the configuration of the fastening, means for delivering fastenings singly between said relatively movable members, and a stop arranged adjacent to said members for positioning the fastenings relatively to said members.

22. In a machine of the class described, means for straightening the shanks of fastenings comprising relatively movable members having surfaces to engage the shank of a fastening, means for delivering fastenings singly between said members, and a stop located on the side of said members opposite from said delivering means and arranged for engagement with the end of the fastening to position the fastening relatively to said members, means for closing said members upon the shank of the fastening to straighten the same, and means for effecting relative movement of said stop and said members to permit the discharge of the fastening from said members upon subsequent separation of said members.

23. In a machine of the class described, means for straightening the shanks of fastenings comprising relatively movable members having surfaces to engage the shank of a fastening, means for delivering fastenings singly between said members, and a stop located on the side of said members opposite from said delivering means and arranged for engagement with the end of the fastening to position the fastening relatively

to said members, means for closing said members upon the shank of the fastening to straighten the same, and means for moving said stop away from said members to permit the discharge of the fastening from said members upon subsequent separation of said members.

24. In a machine of the class described, means for straightening the shanks of fastenings comprising relatively movable members having surfaces to engage the shank of a fastening, means for delivering fastenings singly between said members, a stop located on the side of said members opposite from said delivering means for positioning the fastening relatively to said members for operation thereon by said members to straighten the shank of the same, means for moving said stop away from said members in a plane substantially parallel to said fastening engaging surfaces, and means for thereafter moving said stop in a direction transverse to said first-mentioned movement of said stop to permit the discharge of the fastening from said members.

25. In a machine of the class described, means for straightening the shanks of fastenings comprising relatively movable members having surfaces for engagement with the shank of a fastening, means for delivering fastenings singly between said members, a movable stop located on the side of said members opposite said delivering means for positioning the fastening relatively to said members, and a cam for controlling said stop having a surface constructed to position said stop in proper relation to said movable members for locating the fastening for operation thereon by said movable members and having a raised portion constructed to move said stop away from said members to permit the discharge of the fastening from said members.

26. In a machine of the class described, means for straightening the shanks of headed fastenings comprising relatively movable members having surfaces for engagement with the shank of the fastening, means for delivering the fastening head first between said members, a stop arranged for engagement with the head end of the fastening to locate the fastening relatively to said members, means for closing said members on the shank of the fastening to straighten the same, and operating means for said stop constructed to move the stop away from said members subsequently to the closing of said members on the shank of the fastening and to cause said stop to strike a blow against the head of the fastening subsequently to the closing of the members upon the shank of the same to right the head of the fastening on its shank.

27. In a machine of the class described, means for straightening the shanks of headed fastenings comprising relatively movable members having surfaces for engagement with the shank of the fastening, means for delivering the fastening head first between said members, a stop arranged for engagement with the head end of the fastening to locate the fastening relatively to said members, means for closing said members on the shank of the fastening to straighten the same, means for operating the stop to impart a blow on the head of the fastening to right the head of the fastening on the shank, and means for moving the stop away from the fastening in a direction transverse to the fastening engaging surfaces of said members to permit the discharge of the fastening from said members.

28. In a machine of the class described, means for applying pressure to the head of a fastening arranged to restore a misplaced head to position at right angles to the shank of the fastening, and means for supporting the fastening in position for operation thereon by said means.

29. In a machine of the class described, a plurality of members movable from and toward each other to receive the shank of a fastening between them and to grip the fastening, and means for righting the head of the fastening while it is gripped by said members.

30. In a machine of the class described, means for straightening the shank of a fastening, and means for applying pressure to the head of the fastening arranged to restore a misplaced head to position at right angles to the shank of the fastening.

31. In a machine of the class described, means for straightening the shank of a fastening, and means for imparting a blow to the head of the fastening to restore a misplaced head to position at right angles to the shank of the fastening while the fastening is held by the shank-straightening means.

32. In a machine of the class described, means for straightening the shank of a fastening comprising relatively movable members having surfaces for engagement with the shank of the fastening, means for delivering fastenings between said surfaces, and means for closing said members upon the shank of the fastening comprising a yielding connection to prevent breakage of the parts.

33. In a machine of the class described, a die comprising a die box, a plurality of die members movable in said die box and having surfaces at angles of less than 180° to each other for engagement with the shank of a fastening to straighten the same, means for automatically operating said members to close said engaging surfaces upon the fas-

tening, and means for supplying fastenings to said die intermediate between successive operations of said members.

34. In a machine of the class described, a die comprising a die box, a plurality of die members in said box and guided by the walls of the box for movement parallel thereto and having surfaces at angles of less than 180° to each other for engagement with the shank of a fastening to straighten the same, means for moving said members to close said engaging surfaces upon the fastening, and means for supplying fastenings to said die intermediate between successive closing movements of said members.

35. In a machine of the class described, a die comprising a die box, a plurality of die members contained in said box each having substantially plane sides contacting with the sides of adjacent members and tapering to a central point and a third side arranged in guiding relation with said box, and means for operating said movable members in a direction to move their tapering sides toward and away from said central point.

36. In a machine of the class described, a die comprising a die box, a plurality of die members contained in said box each having sides tapering uninterruptedly to an edge and in engagement with the sides of adjacent members and one of such sides spaced from the adjacent wall of the box to permit movement of said members in said box to carry their edges away from and toward a central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work.

37. In a machine of the class described, a die comprising a die box having four substantially equal sides arranged at substantially equal angles to each other and four triangular shaped die members movably mounted in said box each having two of its sides tapering uninterruptedly to an edge normally positioned at the center of the box and in engagement with the sides of adjacent die members and its other side arranged for guiding engagement with a wall of said box and each of said die members being spaced from the opposed wall of the box at their corresponding sides to permit movement of said die members in the box to carry their edges away from and toward the center of the box.

38. In a machine of the class described, a die for changing the configuration of fastenings and comprising a plurality of die members having surfaces at angles of less than 180° to each other for engagement with a fastening, means for automatically imparting equal movements to said die members to close said engaging surfaces on the fastening with uniform pressure, and means for supplying fastenings to said die intermediate between successive closing movements of said members.

39. In a machine of the class described, a die comprising a plurality of die members having surfaces at angles of less than 180° to each other for engagement with the shank of a fastening to straighten the same, means for automatically moving said members in directions at angles to each other equal to the angles formed by said engaging surfaces to close the engaging surfaces upon the fastening, and means for supplying fastenings to said die intermediate between successive closing movements of said members.

40. In a machine of the class described, a die comprising die members having work engaging surfaces movable toward and from a central point, means operated by movement of one of said die members toward or from said central point to effect corresponding movement of the other of said die members, means for operating said die member, and means for supplying pieces of work to said die intermediate between successive operations of said members.

41. In a machine of the class described, a die comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members, means for automatically operating said members constructed to impart substantially equal movements to their edges away from and toward a central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members with uniform pressure on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement, and means for supplying pieces of work to said die intermediate between successive operations of said members.

42. In a machine of the class described, a die comprising a plurality of die members each having substantially plane sides tapering to an edge and in engagement with the sides of adjacent members, and means for mounting said members for movement of their edges of like linear character away from and toward a central point in directions at angles to each other so as to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement.

43. In a machine of the class described, a die comprising a plurality of die members

each having sides tapering to an edge and in engagement with the sides of adjacent members, means for automatically operating said members constructed to impart movements to their edges of like linear character and extent away from and toward a central point in directions at substantially equal angles to each other so as to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement, and means for supplying pieces of work to said die intermediate between successive operations of said members.

44. In a machine of the class described, a die comprising a plurality of die members each having substantially plane sides tapering to an edge and in engagement with the sides of adjacent members, and means for mounting said members for movement of their edges in straight lines away from and toward a central point in directions at angles to each other so as to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement.

45. In a machine of the class described, a die comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members, means for automatically operating said members constructed to impart substantially equal movements to their edges in straight lines away from and toward a central point in directions at substantially equal angles to each other so as to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement, and means for supplying pieces of work to said die intermediate between successive operations of said members.

46. In a machine of the class described, a die comprising a plurality of die members having their sides in engagement with each other and each having substantially plane sides tapering to an edge at substantially equal angles of less than 180°, and means for mounting said die members for movement of said edges away from and toward a central point at angles to each other substantially equal to 180° minus the degree of the angle at the edges of said die members to expose a portion of one side of each of said members thereby providing a space to receive the work to be operated on and to close said die members on the work.

47. In a machine of the class described, a die comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members, means for positively controlling said members for movement each in a fixed path to carry their edges away from and toward a central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement, means for operating said members, and means for supplying pieces of work to said die intermediate between successive operations of said members.

48. In a machine of the class described, a die comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members, means for maintaining said die members against the pressure of the work thereon and for guiding said members positively for movement each in a fixed path to carry their edges away from and toward a central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, said means being constructed to maintain engagement of the sides of said die members with each other during such movement, means for operating said members, and means for supplying pieces of work to said die between successive operations of said members.

49. In a machine of the class described, a die comprising a die box, a plurality of movable die members contained in said box each having sides tapering toward a central point and in engagement with the sides of adjacent members, means for mounting said members for movement of their tapering sides away from and toward said central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, and operating means for said members having operative connection to each of said members.

50. In a machine of the class described, a die comprising a die box, a plurality of movable die members contained in said box each having sides tapering toward a central point and in engagement with the sides of adjacent members, means for mounting said members for movement of their taper-

ing sides away from and toward said central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, and operating means for said members comprising a rotary member journaled at one side of said die and having an opening arranged in substantial alignment with the opening of the die to guide the work to the opening of the die.

51. In a machine of the class described, a die comprising a die box, a plurality of movable die members contained in said box each having sides tapering toward a central point and in engagement with the sides of adjacent members, means for mounting said members for movement of their tapering sides away from and toward said central point to expose a portion of one side of each of said members thereby providing an opening between said die members to receive the work to be operated upon and to close said members on the work, and operating means for said members comprising bosses projecting from corresponding sides of a plurality of said members and a rotary member journaled at one side of said die and having substantially radial recesses in its end constructed and arranged to receive said bosses.

52. In a machine of the class described, a die for straightening a nail and comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members and means for operating said members away from and toward a central point to expose a portion of one side of each of said members for engagement with the work, said members being constructed to provide between them when in closed position a space similar in form to the shank of a nail.

53. In a machine of the class described, a die comprising a plurality of die members each having sides tapering to an edge and in engagement with the sides of adjacent members and means for operating said members away from and toward a central point to expose a portion of one side of each of said members for engagement with the work and to close said members on the work, said members having their work engaging surfaces inclined outwardly from said central point so as to provide a space between said die members when in closed position tapering from one side of said die to the other.

54. In a machine of the class described, a group of straightening dies comprising more than two similar co-operating die members each having a pair of intersecting plane surfaces contacting with the surfaces of adjacent dies, and means for simultaneously moving said die members back and forth each in a path at right angles to the bisector of the angle between its two said intersecting surfaces to form an opening at the region of the intersections of said surfaces and to close said dies upon an article to be straightened.

55. In a machine of the class described, a plurality of straightening dies arranged in the fashion of an iris diaphragm to form in all positions of the dies an opening between the dies in the form of a closed polygon, and means to close said dies upon an article to be straightened to exert pressure thereon symmetrically from more than two directions.

56. In a machine of the class described, a group of similar straightening dies arranged in certain positions thereof to form a regular polygonal opening at the center of the group, the respective sides of the opening being formed each by a single side of one of the dies, and means for moving said dies back and forth each in a direction parallel to the bisector of one of the angles of said polygonal opening to exert and release pressure on an article to be straightened inserted within said polygonal opening.

57. In a machine of the class described, a group of straightening dies each provided with a pair of intersecting plane surfaces contacting with the similar surfaces of two adjacent dies of the group, and means to give each of said dies bodily rectilinear movement back and forth such that the line of intersection of said intersecting surfaces of each die moves in a path radially of the group, whereby to form a regular polygonal opening at the center of the group and to close said opening to exert pressure symmetrically upon an article to be straightened located in said opening.

In testimony whereof I have signed my name to this specification.

ROBERT H. LAWSON.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,519,145, granted December 16, 1924, upon the application of Robert H. Lawson, of Beverly, Massachusetts, for an improvement in "Machines for Reclaiming Fastenings," an error appears in the printed specification requiring correction as follows: Page 10, line 21, claim 35, strike out the word "central"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D. 1925.

[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.