J. P. REMINGTON, JR.

BOXING MECHANISM FOR CARTRIDGES OR SHELLS.

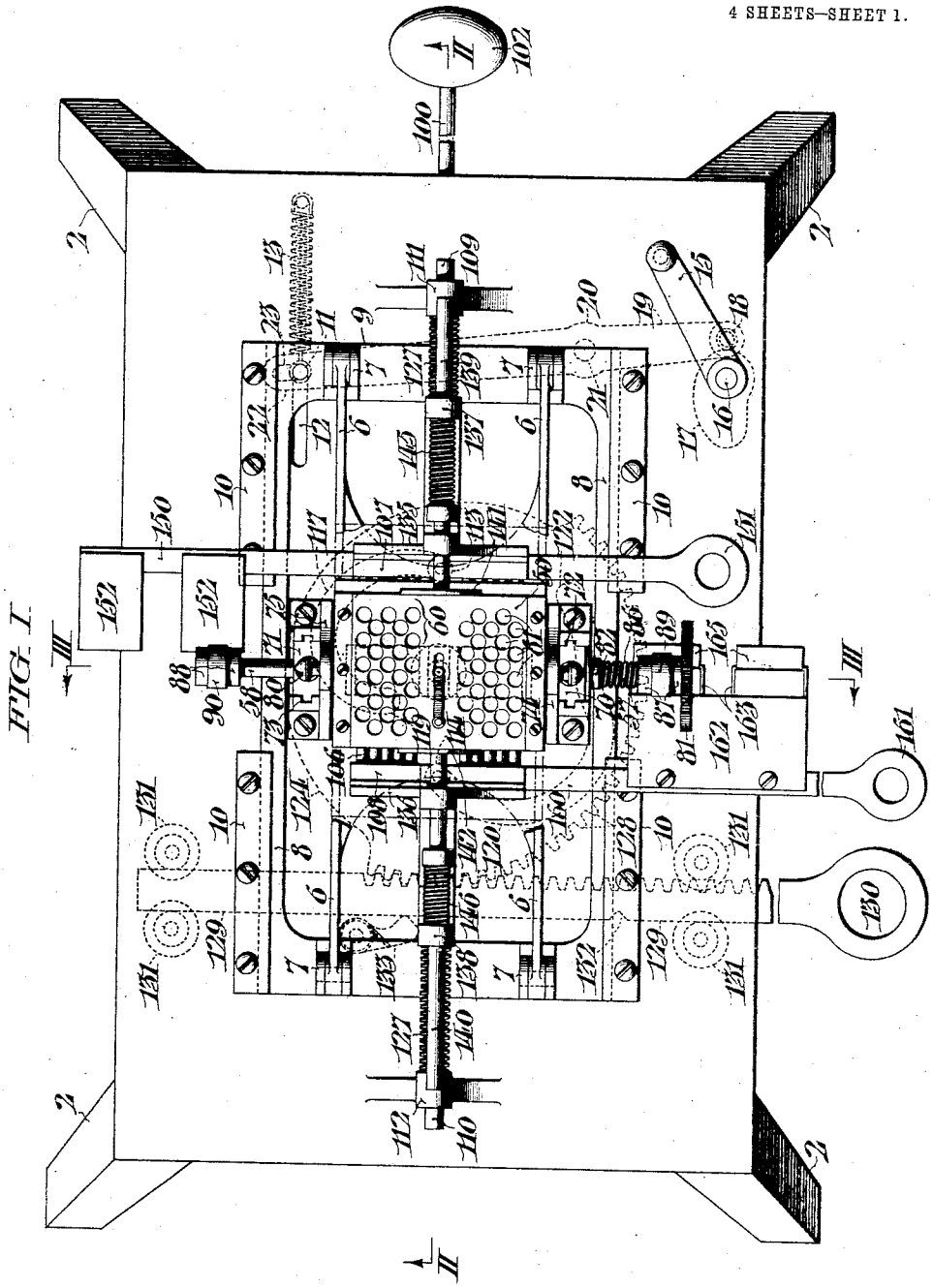
APPLICATION FILED MAR. 2, 1910.

**987,914.**

Patented Mar. 28, 1911.

4 SHEETS—SHEET 1.

FIG. 1



Witnesses

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4 SHEETS—SHEET 2.

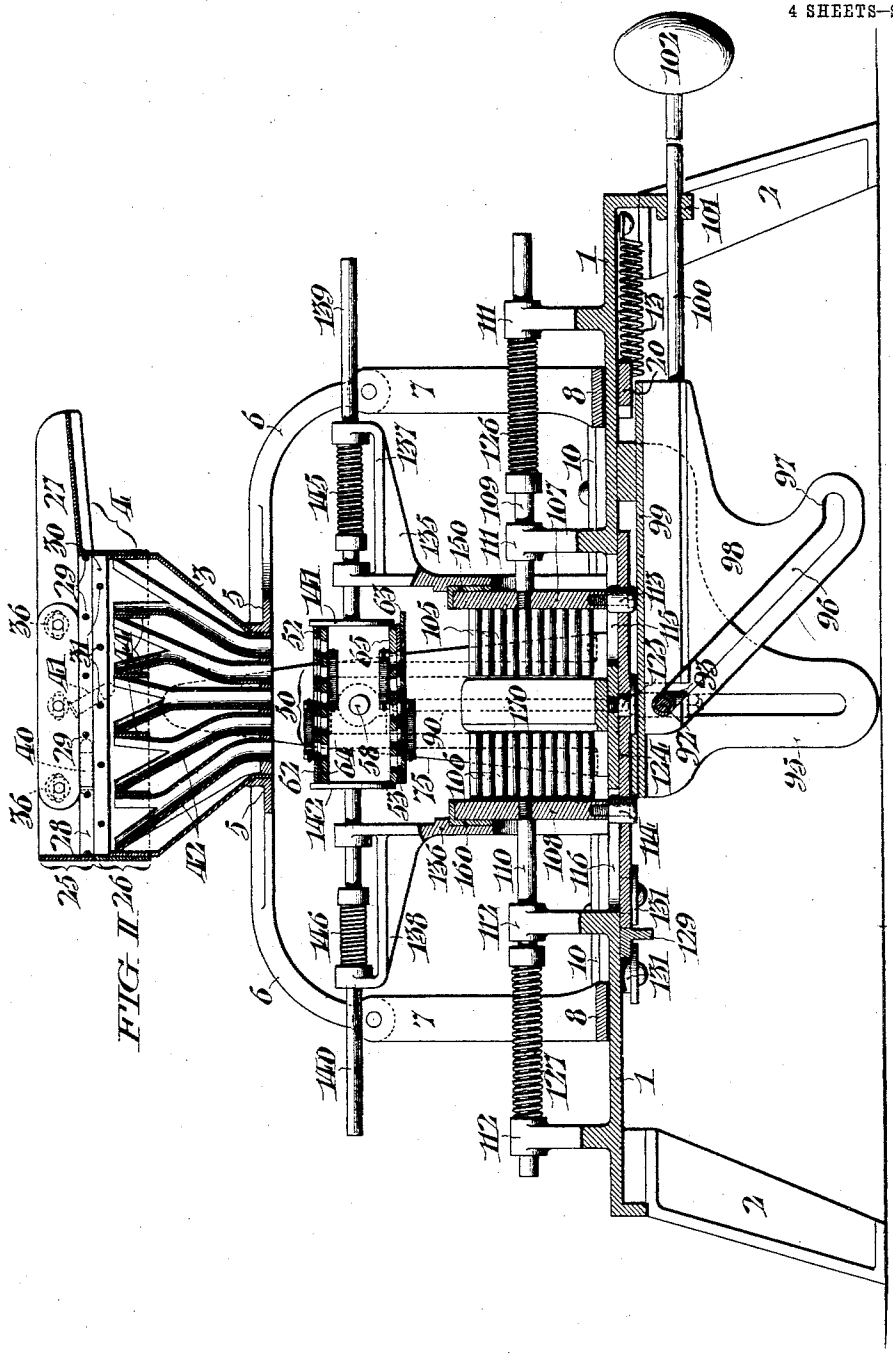

FIG. II.

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4 SHEETS—SHEET 3.

FIG. III.

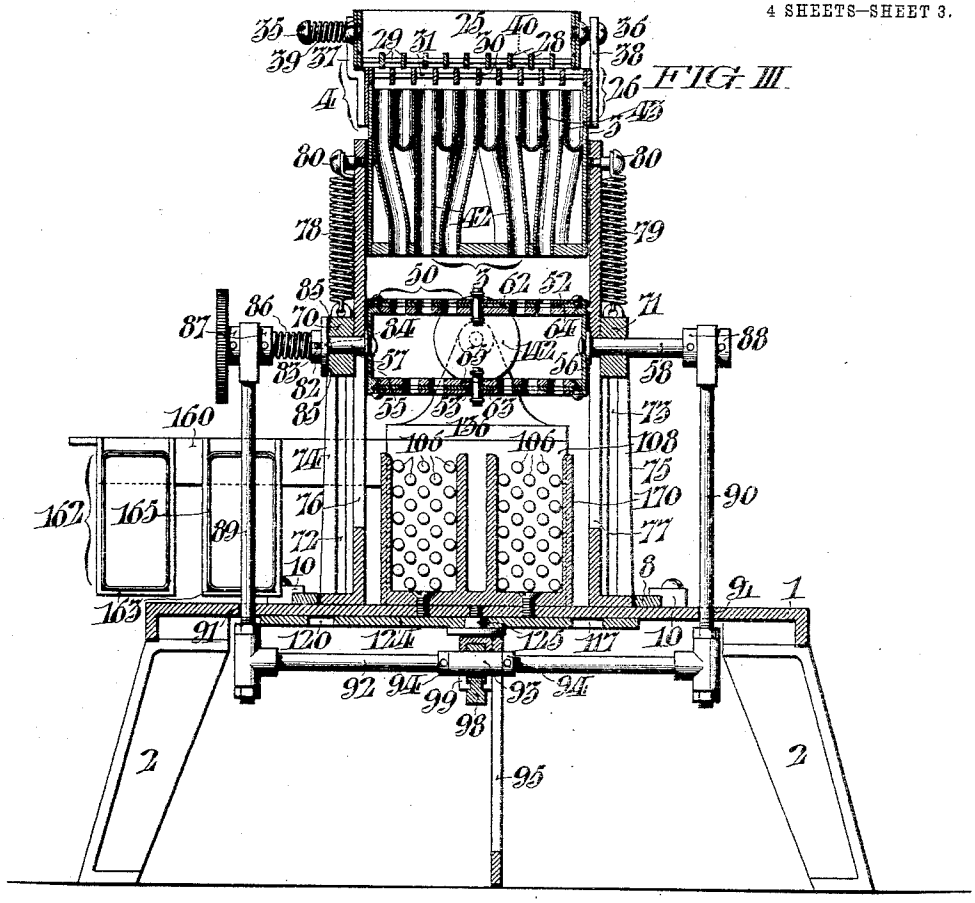
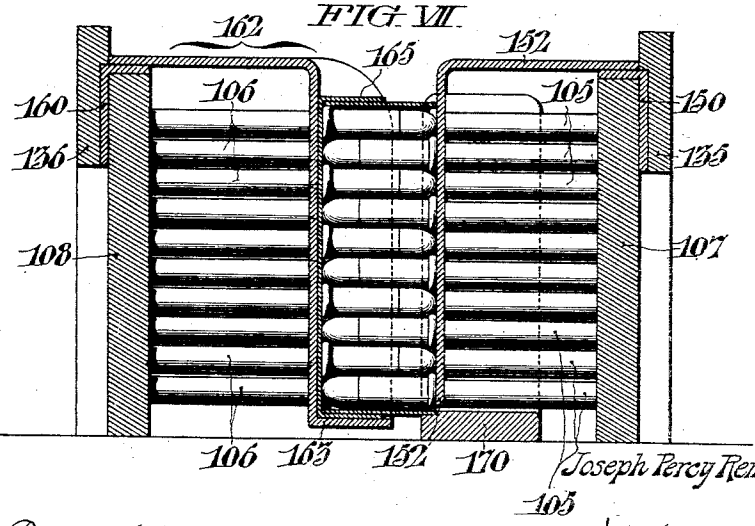


FIG. VII.



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4 SHEETS—SHEET 4.

FIG. IV.

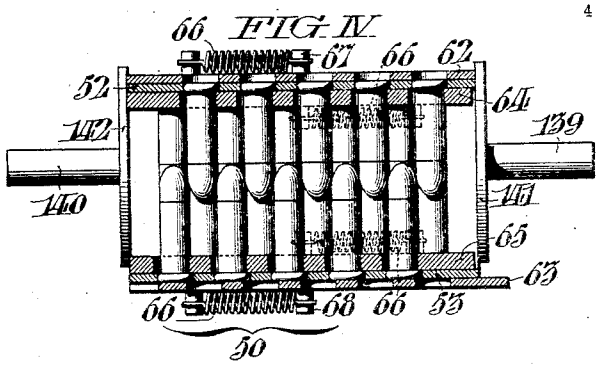



FIG. V.

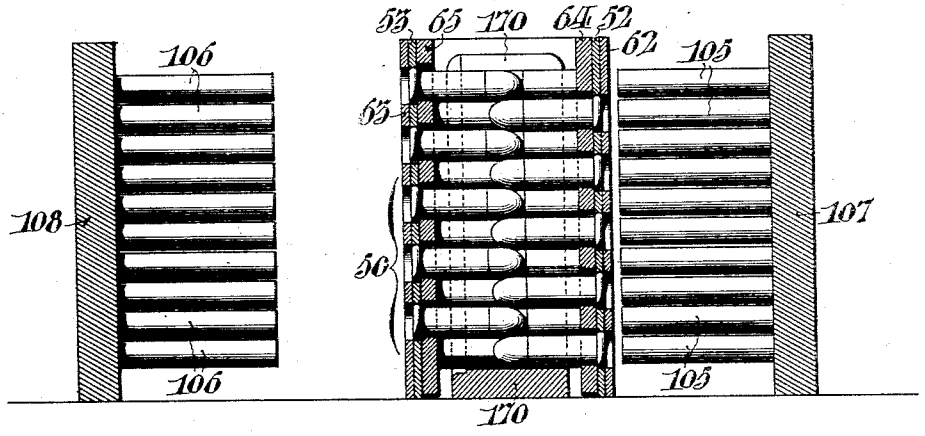
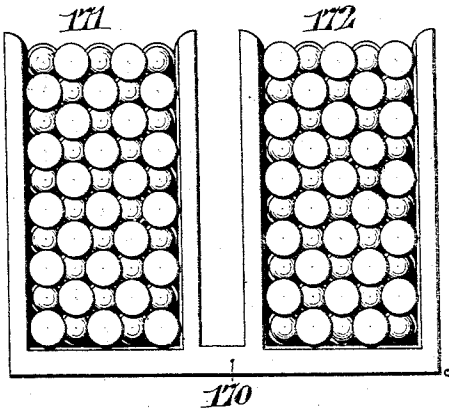



FIG. VI.

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# UNITED STATES PATENT OFFICE.

JOSEPH P. REMINGTON, JR., OF PHILADELPHIA, PENNSYLVANIA.

## BOXING MECHANISM FOR CARTRIDGES OR SHELLS.

987,914. Specification of Letters Patent. Patented Mar. 28, 1911.

Application filed March 2, 1910. Serial No. 546,837.

*To all whom it may concern:*

Be it known that I, JOSEPH P. REMINGTON, JR., of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Boxing Mechanism for Cartridges or Shells, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to a machine comprising various groups of organized mechanism all coöperating to perform the functions necessary to properly stack and pack a number of cartridges in the ordinary cartridge box in such relation that every cartridge is inverted in relation to those on either side of it in either direction. To this end the mechanism which I have devised includes means whereby half the number of cartridges required to fill a box, shall be alined in the same direction, and held in proper relation to each other, until a similar number of cartridges have been alined in the opposite direction, properly spaced, and inserted in position to fill the interstices between the first mentioned set. The stack of cartridges in the particular relation to each other thus described, are then inserted without alteration of their relations into the box, in which they are to be packed.

It will therefore be understood that my device includes various groups of mechanisms each performing the successive functions necessary to effect this end, and that my invention relates not only to the organized machine as a whole, but also to such independent groups of mechanism, any one of which might be used to accomplish the end for which I use it, but in connection with differing mechanisms to perform the other functions of the machine. It will also be understood that while I have described the invention specifically with relation to the packaging of cartridges, it is equally applicable to other objects, which require to be packed in alternating relation to each other. It is especially applicable to elongated objects of which one end is heavier than the other, this feature being one which I take advantage of in order to bring about the proper alinement of said objects.

More specifically my machine includes four more or less distinct groups of mechanisms, all properly coöperating together to perform the functions as I have described them. These groups are:—

(1) An alinement chute whereby a predetermined number of cartridges (half the contents of a box) placed promiscuously within a receptacle, may all be delivered in alined parallel relation to each other, that is, for example, with their bullet ends downward, and in this position be delivered to the succeeding mechanism.

(2) A carrier mechanism, which in the device as I have illustrated it, takes the form of a carrier box, with holding devices on two opposite sides. This carrier box has two functions, which will be described successively, namely, it is first presented so that half the number of cartridges required to fill a cartridge box may be fed to one side of the carrier, in proper mutual relation and then inverted so that the other side of the carrier may be presented to the feeding mechanism and a similar number similarly alined and spaced be fed to this latter side so that the entire number of cartridges for a box are all held by the carrier in proper relation for the proper packing of a box. Subsequent to this operation, the carrier performs a further function of delivering the entire body of cartridges which it thus holds to a temporary stack holder, and for this latter function, in the device as I have illustrated it, the carrier box is moved in vertical relation so as to thus carry and deliver the cartridges which it holds to the stack holder.

(3) A third group of mechanism relates to the ejecting mechanism, whereby the cartridges having been thus carried by the carrier box are ejected from the latter and deposited in the stack holder without change of relative position.

(4) A fourth group of devices consists of a box holder and accompanying mechanism, whereby packaging boxes are successively placed in such relation to the stack holder as to permit the mechanism provided to transfer the entire group of cartridges to a box without change in relative position.

When cartridges are packed in lines in a box with every other cartridge inverted (whether the lines be taken lengthwise or crosswise to the box), the rims overlap the bullets of the four nearest cartridges. If in such arrangement one considers only the set

of cartridges which lie in the same direction it will be found that such set has its members spaced as a quincunx (or five spot of the die). It is by fitting together two such quincuncial sets that the proper packing of the box is obtained. I mention this to explain the meaning of the unusual word "quincunx" which I am compelled to use for lack of a better word.

In the accompanying drawings, Figure I, is a plan view of a cartridge packing machine constructed according to my invention. For convenience of illustration, the feeding element has been omitted in this figure, thereby showing more clearly the parts beneath. Fig. II, is a longitudinal sectional view of the device taken on the line II, II, of Fig. I. Fig. III, is a vertical transverse section as indicated by the arrows III, III, in Fig. I. Figs. IV, V, VI, and VII, are detail views illustrating successively the several steps in the process of transferring the cartridges from the machine to the packing boxes for marketing purposes.

Referring more particularly to Figs. I, II, and III, my device is mounted upon a plate or table 1, supported upon legs 2, which support the various groups of mechanism to be described in order.

*1. The alinement chute.*—This consists of a compound chute 3, which is surmounted by a tray 4, and is supported upon a carriage 5, having laterally extending arms 6, which are secured at their free ends to a series of vertical standards 7, projecting from a frame 8, which is slidably secured to the table 1, by means of guide plates 10. A pin 11 (Fig. I), secured to the cross piece 9, of frame 8, depends through a slot 12, in plate 1, and is subjected to the pull of a spiral spring 13, which serves to normally maintain the chute 3, in proper central relation to the machine.

In order to impart a shifting motion to the frame 8, for a reason to be described later, I provide a crank handle 15, which is secured to a vertical shaft 16, rotatably mounted in plate 1, and carrying at its lower end a cam 17, which engages a roller 18, on the free end 19, of a lever 20, fulcrumed at 21, and provided at its other end 22, with a slot 23, which engages the pin 11, already described. Thus rotation of the cam 17, coacting with spring 13, shifts the frame 8, and the parts carried thereby.

Referring now to Figs. II, and III, the tray element indicated at 4, comprises an upper grid 25, and a lower grid 26, the former being provided with an inclined extension or scoop 27. The bottom or vertical portion of the upper grid is divided off laterally by means of a plurality of bars 28, having the vertical cross section shown in Fig. III, and longitudinally spaced by means of a series of wires 29. The cells thus formed are just large enough to each readily receive a cartridge. The number capable of being thus handled by the mechanism shown in the drawings is fifty, or one-half the number to fill two boxes, this machine being designed to fill two boxes at a time. The lower grid is similarly spaced laterally by bars 30, but its corresponding wire spacers 31, alternate with those of the grid 25, as best seen in Fig. II. The upper and lower grids 25, and 26, are normally out of lateral registry to the extent of one-half of a space (see Fig. III), so that the dividing bars 30, of the latter, are directly under the longitudinal centers of the cells in the former. Secured in the side walls of the upper grid 25, are pins 35, and 36, which are guided within brackets 37, and 38, extending from the lower grid 26. The brackets 37, are offset and determine the lateral position of the upper grid which is normally maintained as shown in Fig. III, by springs 39, compressed between the heads of pins 35, and the outer faces of the brackets 37. The cartridges lying in the cells of the upper grid as indicated in dotted lines at 40, in Figs. II, and III, are thus prevented from falling into the chute 3, until desired by the operator, who then manually shifts the said grids into registry with each other. The proper number of cartridges are placed within the tray 4, and thereupon the hand crank is turned a few turns thereby shifting and agitating the chute. This causes the cartridges to drop into the cells of the upper grid 25, the agitation being continued until one cartridge occupies each cell. The operator then shifts the said grid into registry with the grid 26, whereupon the cartridges drop until each cartridge encounters a central wire spacer 31, of the lower grid, the heavy end thus causing each to turn and drop bullet end first as indicated in dotted lines at 41, in Fig. II, into the chute tubes 42, which correspond in number to the cells in the tray 4. As best seen in Fig. II, these tubes are split at their tops and are soldered to longitudinal and cross strips 43, and 44, respectively. The enlarged upper ends of the tubes thus formed, correspond in size and register with the cells of the grids. Said tubes converge toward each other as they descend and occupy a more concentrated area at the bottom of the chute, so as to be in line with the apertures in the carrier box about to be described, which is a quincuncial arrangement as shown in Fig. I, spaced so as to permit the insertion of a corresponding number of cartridges headed in the opposite direction.

*2. The carrier box.*—The carrier box 50, consists of two similar parallel apertured plates 52, and 53, spaced and united at their ends by vertical plates 55, and 56, to the center of which are respectively secured a

pair of laterally extending trunnions 57, and 58. Plates 52, and 53, of the carrier-box are perforated with two groups of apertures 60, and 61, spaced quincuncially and symmetrically with respect to the main axis of the machine as best seen in Fig. I. These apertures are just large enough to permit the passage of the rim of the cartridge. The apertures of the two plates alternate in relation to each other. Plates 52, and 53, are on their outer faces supplemented by locking plates 62, and 63, and upon their inner faces by stop plates 64, and 65, respectively. The said supplemental plates 62, 63, 64, and 65, are beveled at their edges which are received in correspondingly shaped grooves or slide ways formed integrally with the end pieces 55, and 56, of the carrier box 50, as best illustrated in Fig. III. The locking plates 62, and 63, and the stop plates 64, and 65, are perforated similarly to the plates 52, and 53, but are normally out of registry with them (see Figs. II, and III), for reasons which will be described. The normal position of these plates with the locking plate out of registry and the stop plate in position to intercept and support the rim of a cartridge is maintained by the springs 66, secured to them at one end and at the other to pins 67, and 68, respectively secured at the centers of the relatively stationary plates 52, and 53.

The trunnions 57, and 58, of the carrier box are rotatably supported in the slide blocks 70, and 71, which are adapted to traverse the vertical grooves 72, and 73, formed in the uprights 74, and 75, respectively bolted to the plate 1. The said trunnions 57, and 58, extend respectively through slots 76, and 77, in the standards 74, and 75, and are normally retained in the raised position shown in Figs. II, and III, by a pair of springs 78, and 79, secured at one of their ends to the slide blocks 70, and 71, and at their other ends to the screws 80, at the tops of the said standards. At its outer end the trunnion 57, is provided with a thumb disk 81, by means of which the carrier box 50, may be rotated.

In the process of handling the cartridges it is necessary for the carrier box to assume both horizontal and vertical positions, which are determined by a spring pressed collar 82, slidably secured to the trunnion 57, by means of a pin 83, and provided with cam projections 84, which are adapted to engage horizontal and vertical notches in the slide block 70, a pair of which are shown at 85, in Fig. III. The spring 86, serves to keep projections 84, in engagement with these grooves, in consequence of which the box 50, is temporarily maintained in any one desired position. Disengagement between the projections 84, and notches 85, is however, readily effected when the pressure of spring 86, is overcome by the manipulation of the thumb disk 81, whereupon the carrier box may be turned as desired.

Between collars 87, and 88, on trunnions 57, and 58, are received the ends of the respective connecting rods 89, and 90, which extend through slots 91, in the table 1, and are adjustably secured to heads at the extremities of a horizontal shaft 92, provided at its center with a roller 93, which is held in place thereon between two collars 94, and guided for vertical reciprocation in a slotted standard 95, depending from plate 1. The said roller 93, is engaged by an inclined slot 96, in the cam 98, which is adapted to be moved horizontally in a slideway 99, by means of a rod 100, which is guided in a boss 101, depending from table 1, and provided at its free end with a hand knob 102. Examination of Fig. II, will show that the motion of the knob 102, from right to left will cause the depression of roller 93, and also that of the carrier box 50. The horizontal portion 97, of the cam slot 96, serves to maintain the roller 93, in its lowermost position against the pull of the springs 78, and 79, which operate upon the trunnions of the said carrier-box. The said springs also serve to restore the carrier-box 50, to the position illustrated in the drawings when the roller 93, is again released from the horizontal portion 97, of the cam slot 96.

Secured to the backs of a pair of vertical plates 107, and 108, are the yoke pieces 135, and 136, which respectively support integral brackets 137, and 138, wherein are guided the slide rods 139, and 140, having disks 141, and 142, at their inner ends. The said rods 139, and 140, are pressed inward by means of springs 145, and 146, respectively which maintain the disks 141, and 142, in contact with the upper edge of the carrier box 50, when in its raised horizontal position as illustrated in Figs. I, II, and III.

The vertical plates 107, and 108, are provided with rods 109, 110, which are adapted to slide in the brackets 111, and 112, projecting from the plate 1, at the median line of the machine. Plates 107, and 108, are also provided at the centers of their lower edges with rollers 113, and 114, which play in cam slots 115, and 116, respectively in the bed plate 1. The said rollers 113, and 114, extend a considerable distance below the bottom of plate 1, so as to be engaged by the slots 117, and 120, of the rotary cam disk 124, which is adapted to rotate about a stud 125, at the center of plate 1. (See Figs. I, II, and III). Springs 126, and 127, which respectively encircle the rods 109, and 110, constantly maintain the rollers 113, and 114, on the vertical plates in contact with the active edges of the slots 117, and 120, of the cam disk 124. A portion of

the periphery of the cam disk 124, is provided with gear teeth 128, which mesh with those of a rack 129, mounted to slide transversely with respect to the main axis of the machine under the guidance of flanged rollers 131, and provided with a handle 130, for manual operation. The said rack 129, is furnished on its rear edge with a cam notch 132, which is engaged by a spring pressed catch 133, pivoted to the table 1, and which acts as a temporary stop therefor when the disk 124, is at the center of its motion. This position of the said disk 124, corresponds to the maximum separation of plates 107, and 108, to permit the depression of the carrier box 50.

The successive movements of the carrier box are as follows:—If we assume the said carrier box to be in its horizontal position with its plate 52, uppermost and the handle 130, in its extreme outward position, the plates 107, and 108, will be in the position shown in Figs. I, and II, so that the disks 141, and 142, on the rods 139, and 140, carried respectively by the yokes 135, and 136, are forced into contact with the edges of the said carrier box by means of their springs 145, and 146, (see Figs. II, and IV). The pressure of the spring 145, is sufficient to overcome that of spring 66, which operates upon the locking plate 62, and said plate is therefore moved to coincide with the relative stationary plate 52, thereby effecting the registry of their respective apertures.

As will be seen by reference to Figs. II, and III, the disks 141, and 142, have absolutely no effect upon either of the stop plates 64, and 65, which are still in their normal position at this point. The offset of the stop plate 64, (determined by a slot therein surrounding the pin 67), is very slight, just sufficient to permit the ready reception of the smaller diameter of the cartridges, as they drop from the tubes of the chute 3, in a manner already described. This slight offset of plate 64, is however effective in supporting the rims of the cartridges, which are thus suspended as best seen in Fig. IV.

After plate 52, of the carrier box 50, is charged with cartridges, the handle 130, is moved upwardly with respect to Fig. I, until the cam notch 132, on the back of rack 129, is engaged by the catch 133. When this position is reached, the said rack has moved the cam disk 124, so that the rollers 113, and 114, of the plates 107, and 108, are moved to their extreme outer positions, by the respective cam grooves 117, and 120. The disks 141, and 142, are thereby withdrawn from contact with the carrier box 50, whereupon the locking plate 62, again assumes its normal position under the influence of its respective spring 66, locking the cartridges in the plate beneath it. Box 50, is now free to be inverted by the manipulation of the thumb disk 81, so that its plate 53, is uppermost. Handle 130, is thereupon again drawn to the position shown in Fig. I, thereby bringing disks 141, and 142, again into contact with the then upper edge of the carrier box 50. Disk 142, then becomes effective in causing the registry of the locking plate 63, with plate 53, whose apertures are charged in a manner similar to that previously described in connection with plate 52.

By reference to Fig. IV, it will be seen that the function of the locking plates is that of supporting the cartridges in the carrier box after its filling. Their offset with relation to their respective table plates 52, and 53, as allowed by the proportions of their slots within which the pins 67, and 68, project is such that the cross sections between their apertures are directly beneath the centers of the apertures of the said plates 52, and 53. Owing to the quincuncial relation of the apertures of the said plates the cartridges occupy the positions shown in Fig. IV, with their bullet ends toward each other. The handle 130, is then again moved to withdraw disks 141, and 142, from contact with the carrier box 50, which is thereupon turned by means of the thumb disk 81, to its vertical position with the projecting ends of plates 62, and 63, lowermost, in which position the cartridges are firmly held in place. The hand knob 102, is consequently moved to the left in Fig. II, thereby causing the roller 93, to be depressed by the cam slot 96, until it is received and held in the horizontal portion of the said slot against the tension of the springs 78, and 79, which operate upon the trunnions 57, and 58, of the box 50. When thus depressed, the locking plates 62, and 63, of the said carrier box come in contact with the top of the table 1, whereby they are both brought into registry with plates 52, and 53, respectively, as shown in Fig. V, when the extreme position is reached. The cartridges now lie partly within a stack holder 170, secured to the table 1, their rims however still retained in the carrier box 50. The holder 170, will be more fully explained in the succeeding division of the specification.

*3. The ejecting mechanism.*—For the purpose of ejecting the cartridges from the carrier box 50, I provide two sets of plungers 105, and 106, grouped and alternating with each other to correspond to the apertures 60, 61, in the plates of the said carrier box, and respectively secured in the vertical plates 107, and 108, already described. After the depression of the carrier box 50, in a manner previously explained handle 130, is then again drawn downward in Fig. I, to its limit in that direction, which rotates cam disk 124, whereby the plates 107,

and 108, are caused to advance toward each other and thus force their plungers through the apertures of the plates of the carrier 50, thereby ejecting the cartridge therefrom and advancing them into the stack holder 170, which is secured at the center of the machine to the bed plate 1. The stack holders are two in number, 171, and 172, to correspond to the groups of apertures in the carrier box 50, and also to the groups of plungers on the plates 107, and 108, in order to fill two boxes at a time. The slight resistance of the springs 66, which operate upon the stop plates 64, and 65, of the carrier box 50, is readily overcome by the action of the rims of the cartridges which engage the edges of the apertures of the said plates and thereby move them into registry with their fellows to permit the ejection. The present position of the cartridges is clearly illustrated in Fig. VI. Plunger plates 107, and 108, are then again withdrawn by the manipulation of the handle 130, and the carrier box again raised and turned to its horizontal position by means of the hand knob 102, and thumb disk 81, respectively, so as to be out of the way for the succeeding operations.

*4. Means for transferring cartridges from stack holder into the packing boxes.*—The plunger disk 107, carries a slide 150, having a finger grip 151, and provided with a pair of push plates 152, which extend laterally and downwardly therefrom so as to be in front of and include the plungers 105, as shown in Fig. VII, when the said slide is drawn to its active position. When inoperative, the push plates 152, are withdrawn to the position shown in Fig. I. Plunger plate 108, is also provided with a slide 160, having a finger grip 161, and supporting a box holder 162, comprising receptacles 163, wherein are inserted the boxes 165. The holder 162, is adapted to be moved bodily in front of the plungers 106, to receive the cartridges as will be explained in connection with the operation of the machine. When not in use the slide 160, may be withdrawn in a similar manner to slide 150, as shown in Fig. I.

After the separating of the plunger plates as described at the end of the last division of the specification, the box holder 162, and the push plates 152, are moved to their operative positions in front of the plungers 105, and 106, by means of the finger grips 151, and 161, at the ends of their respective slides 150, and 160. Handle 130, is thereupon moved to its extreme position in an upward direction in Fig. I. This causes the rotation of cam disk 124, so that when the limit of its motion in this direction has been reached, the rollers 113, and 114, of the plunger plates 107, and 108, will respectively lie in the portions 119, and 122, of the slots 117, and 120, of the said cam disk. At this point the plunger plates will assume the position shown in Fig. VII, where it will be seen that the push plates 152, have moved the cartridges from the temporary holder 170, into the packing boxes 165. The plunger plates 107, and 108, are then again separated by means of the handle 130, and the slides 150, and 160, withdrawn to permit the removal of the filled boxes. The machine is then ready for another cycle of operations similar to those just described.

Although I have shown my apparatus adapted to fill two boxes in one operation, it is obvious that this number may be varied without departing from the scope of my invention.

Having thus described my invention, I claim:—

1. In a cartridge boxing mechanism, the combination of a receptacle for containing promiscuously a number of cartridges; means for causing cartridges to occupy the bottom of said receptacle in parallel rows; and means whereby said cartridges are each simultaneously ejected, bullet end downward, to further handling devices.

2. In a boxing mechanism for cartridges or the like, the combination of mechanism for alining a predetermined number of cartridges and delivering them in quincuncial relation bullet end downward; mechanism for holding and inverting the series of cartridges thus delivered, whereby the first mentioned mechanism may deliver to said holding mechanism, another series of cartridges in similar relation, in position to fill the spaces between the first series, with the bullet end of every cartridge inverted in relation to the four bullets next to it; means for removing said cartridges from said holding mechanism, and arranging the same in a closed stack, and mechanism for transferring said stacked body of cartridges without change of relation to a box.

3. A boxing mechanism for cartridges including a receptacle, means for temporarily holding the cartridges in a horizontal position, a separate chute beneath said receptacle for each cartridge, an overbalancing edge disposed intermediate the ends of each cartridge, whereby when the cartridges are released from said temporarily holding means each cartridge will engage said overbalancing edge and be turned and fed into its respective chute heavy end first, and means for handling and packing the cartridges delivered from said chute.

4. In a boxing mechanism for cartridges, a carrier box, provided with spaced apertured plates, apertured stop plates sliding in parallel relation to the first named plates, and yieldingly held with the apertures therein slightly out of register with the apertures in the first named plate, whereby shoulders are provided to engage the rims

of the cartridges resting in the apertures of the first named plates, a stack holder and means whereby the cartridges may be ejected from the seats in the apertured plates, and stacked in said stack holder.

5. In a boxing mechanism for cartridges, a carrier box provided with seats for cartridges on opposite sides thereof, means for mounting said box whereby the same may be inverted, means for feeding cartridges by gravity with the bullet ends downward into seats on the upper side of said box, means for holding said cartridges in said seats whereby said box may be inverted and the seats on the opposite side thereof filled with cartridges, a stack holder and means for forcing said cartridges from said carrier box into said stack holder.

6. In a boxing mechanism for cartridges, a carrier box provided with seats for cartridges on opposite sides thereof, means for filling the seats of the carrier box with cartridges, means for ejecting the cartridges from the carrier box, in stacked relation, and means for packing said stacked cartridges into a box.

7. In a boxing mechanism for cartridges, the combination with means for depositing the proper number of cartridges in a stack holder in proper stacked relation, means for supporting a box at one side of said stack holder, and means for forcing the stacked cartridges from said stack-holder without disarrangement into said box.

8. In a boxing mechanism, a carrier box having cartridge holding seats on the opposite sides thereof, means for feeding cartridges bullet end downward into the seats at one side of said box, means whereby said box may be inverted so that the seats on the opposite side thereof, may be filled by cartridges fed thereto bullet end downward, a stack holder, means whereby said carrier box may be swung so as to position the cartridges substantially horizontally, whereby the cartridges may be lowered into the stack holder, means for forcing said cartridges from said carrier box into stacked relation in the stack holder.

9. In a boxing mechanism, a carrier box having cartridge holding seats on the opposite sides thereof, means for feeding cartridges bullet end downward into the seats at one side of said box, means whereby said box may be inverted so that the seats on the opposite side thereof, may be filled by cartridges fed thereto bullet end downward, a stack holder, means whereby said carrier box may be swung so as to position the cartridges substantially horizontally whereby the cartridges may be lowered into the stack holder, means for forcing said cartridges from said carrier box into stacked relation in the stack holder, means for supporting a box adjacent the stack holder, and means for moving the cartridges from the stack holder without disarrangement, into the box.

In testimony whereof, I have hereunto signed my name, at Indianapolis, county of Marion, State of Indiana, this twenty-eighth day of February, 1910.

JOSEPH P. REMINGTON, JR.

Witnesses:
C. H. MCCARTY,
EDWARD W. FELT.