June 3, 1924. 1,496,714

A. H. KYLER

BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 1

Fig. 1a.

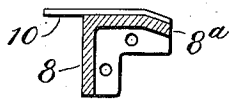


Fig. 1.

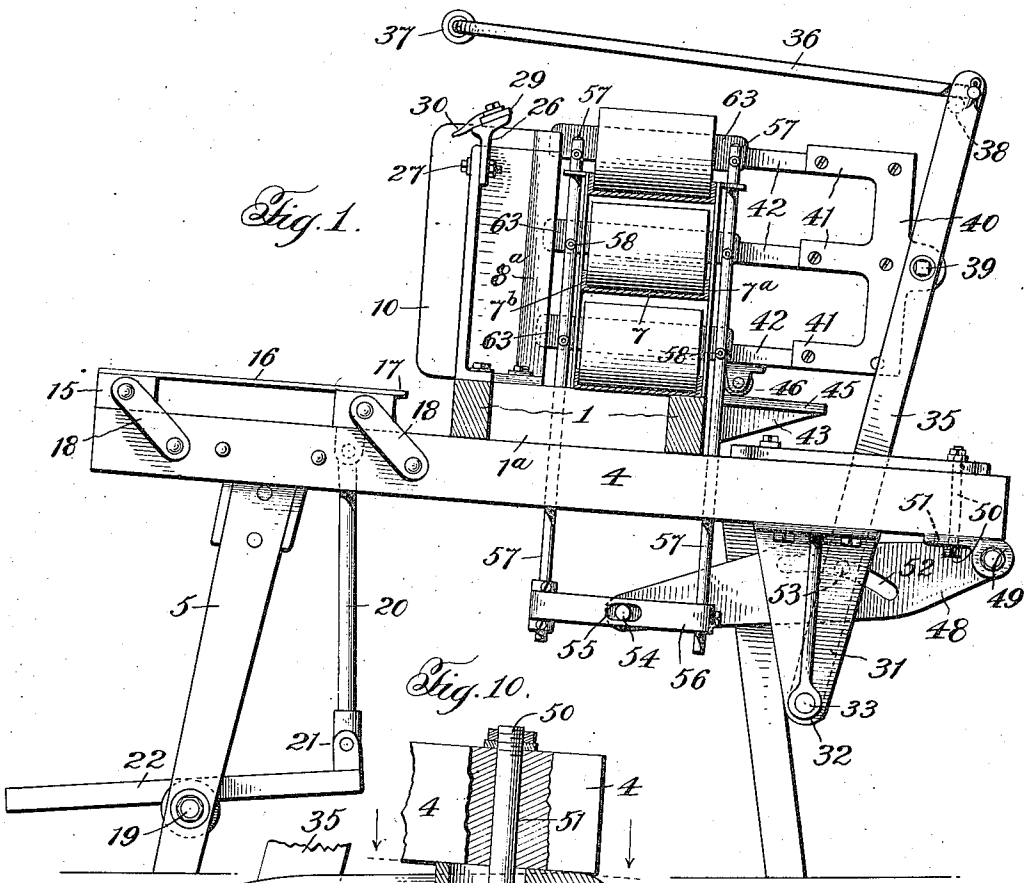
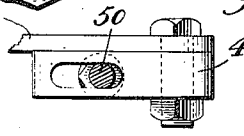


Fig. 10.

Fig. 11.



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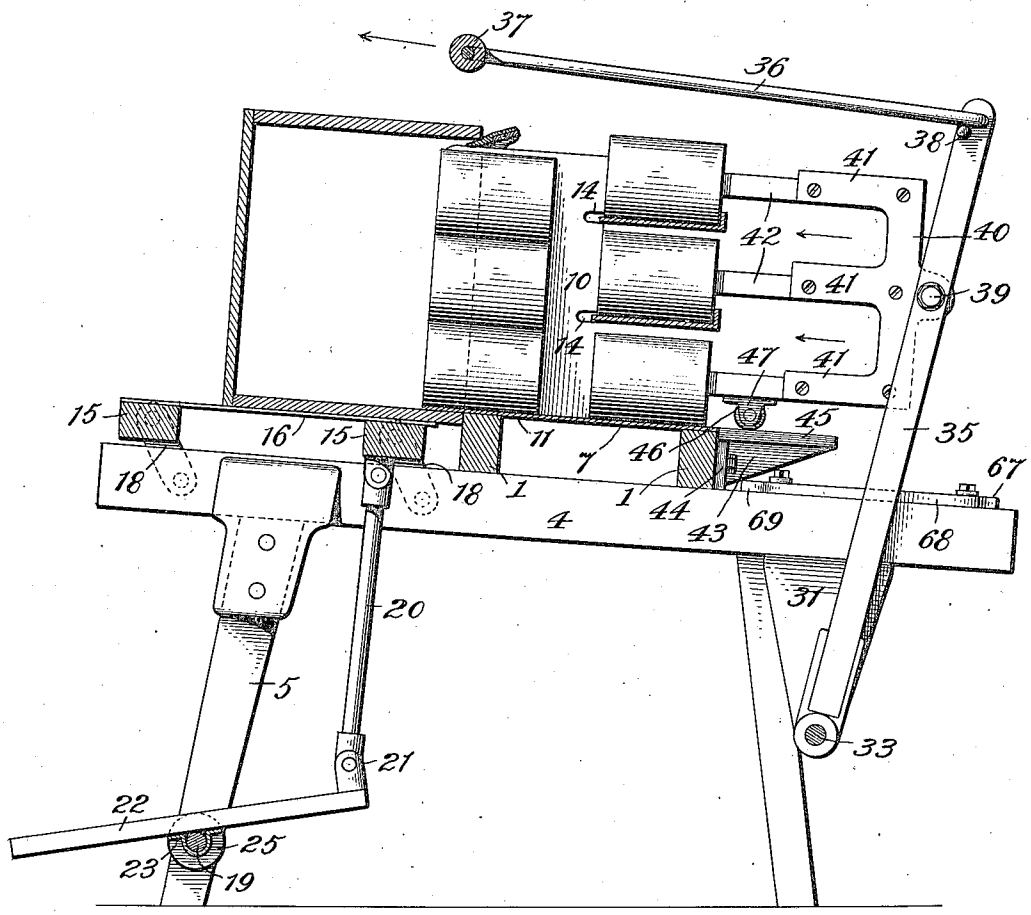
June 3, 1924. 1,496,714

A. H. KYLER

BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 2

Fig. 2.



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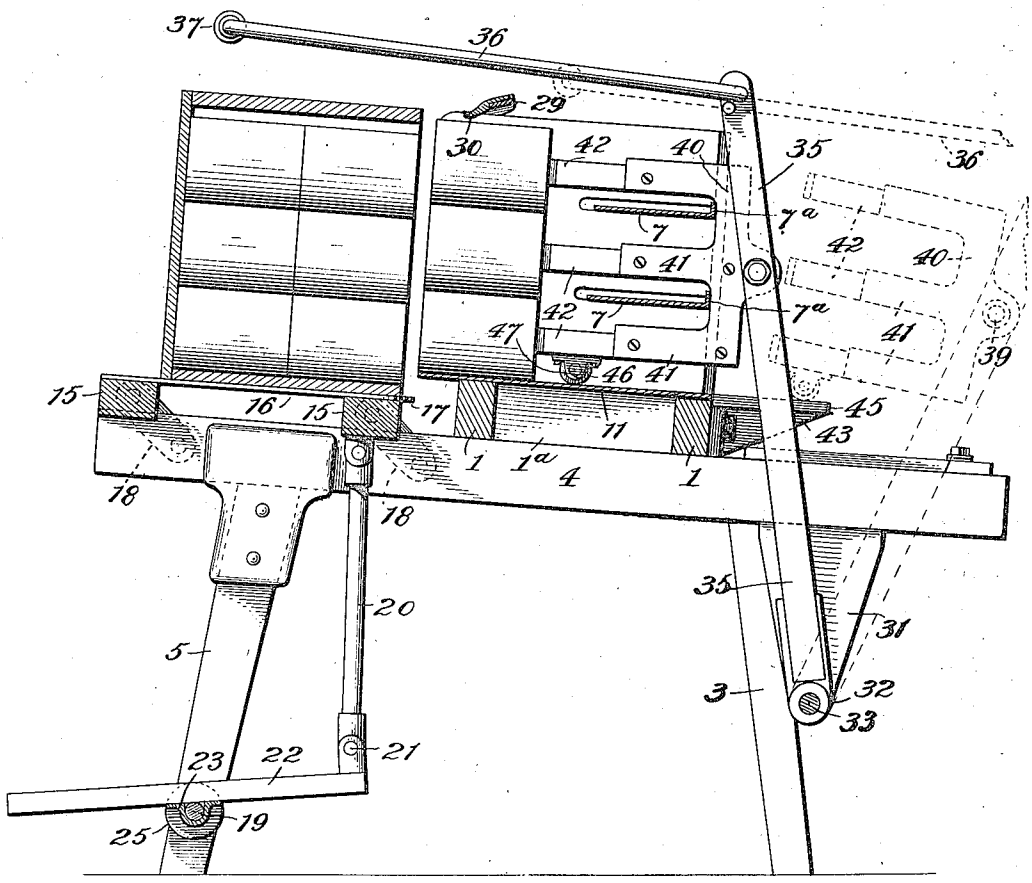
BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 3

Fig. 3.



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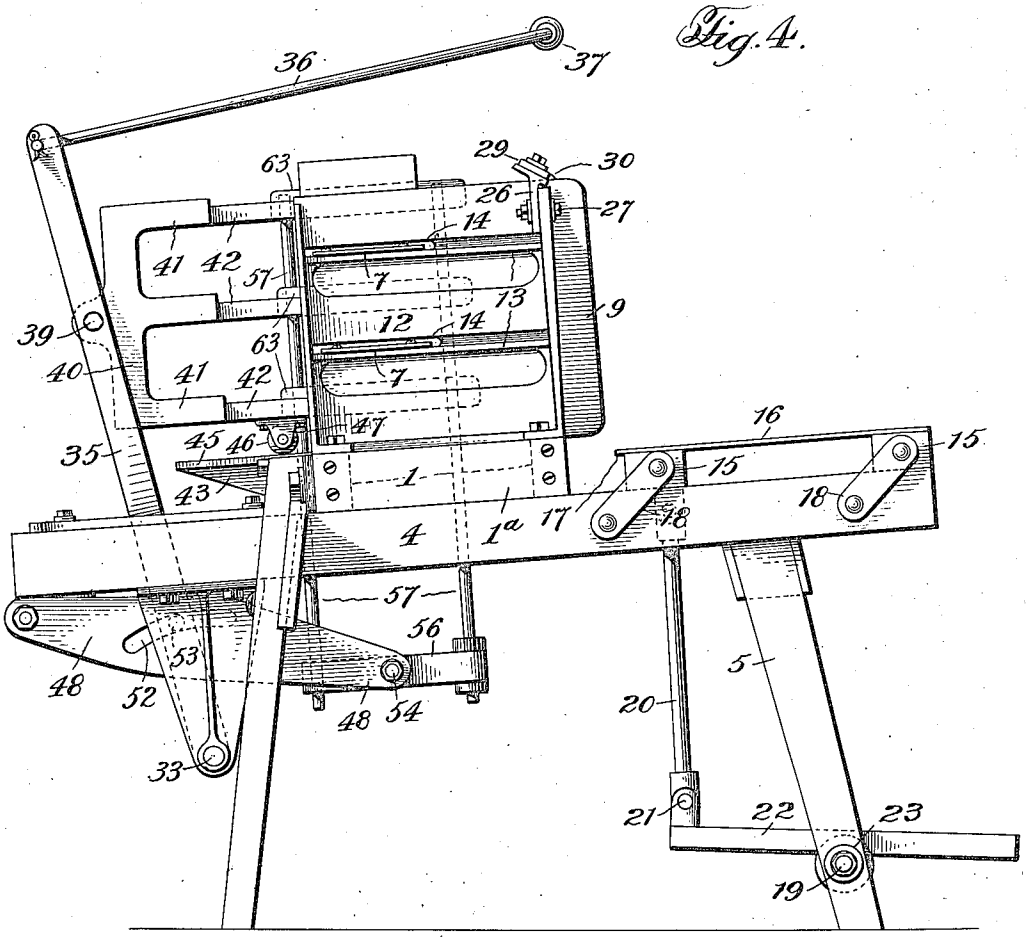
BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 4

Fig. 4.



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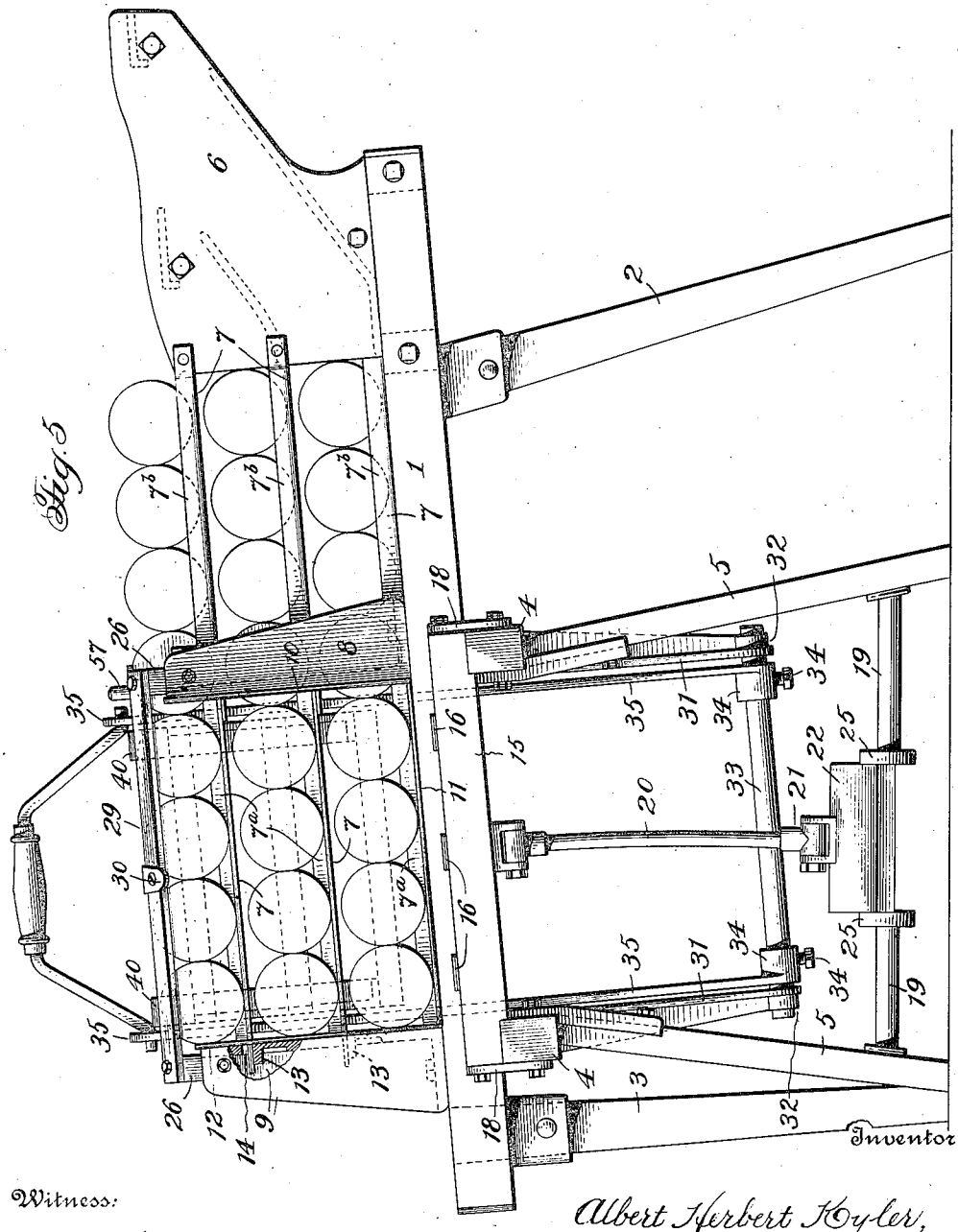
A. H. KYLER

BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 5

Fig. 5



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June 3, 1924. 1,496,714

A. H. KYLER

BOXING MACHINE

Filed April 27, 1920 6 Sheets-Sheet 6

Fig. 7.

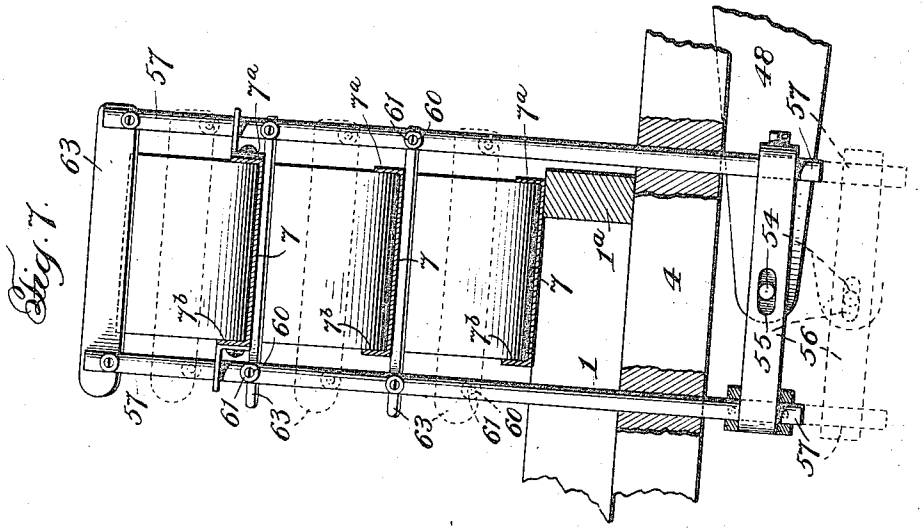


Fig. 6.

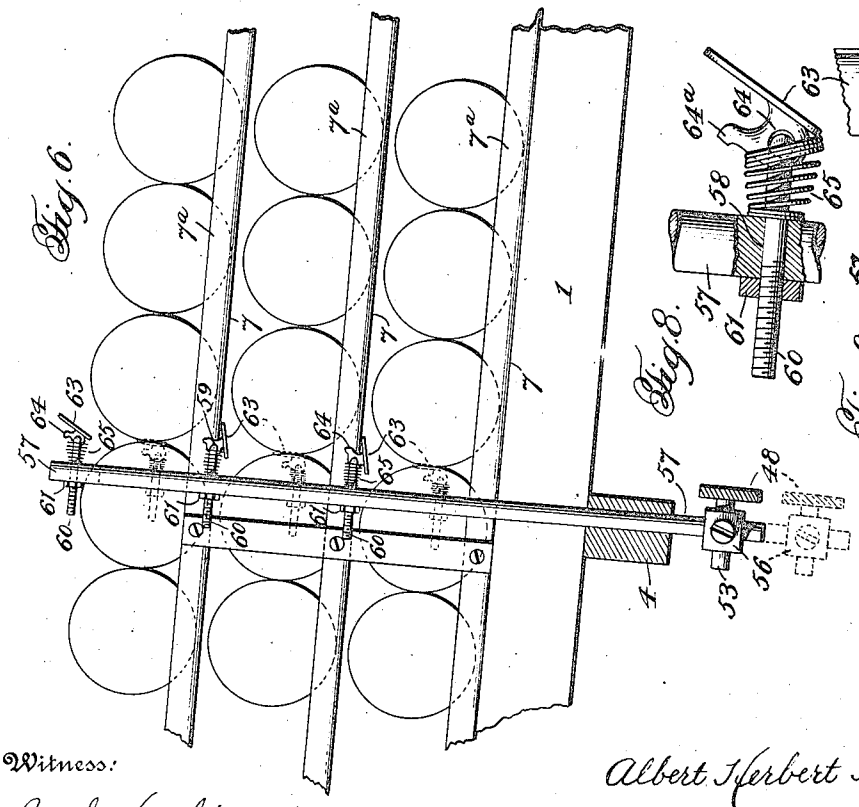
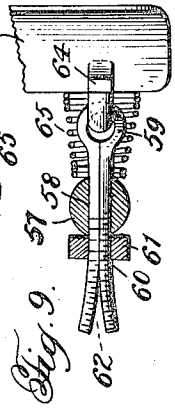


Fig. 8.

Fig. 9.



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Patented June 3, 1924. 1,496,714

UNITED STATES PATENT OFFICE.

ALBERT HERBERT KYLER, OF WESTMINSTER, MARYLAND, ASSIGNOR TO THE FRED H. KNAPP COMPANY, OF WESTMINSTER, MARYLAND, A CORPORATION OF MARYLAND.

BOXING MACHINE.

Application filed April 27, 1920. Serial No. 377,001.

To all whom it may concern:

Be it known that ALBERT HERBERT KYLER, citizen of the United States, residing at Westminster, in the county of Carroll and State of Maryland, has invented certain new and useful Improvements in Boxing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to boxing machines for cans, cartons, and the like, and more particularly to machines of the character wherein the articles to be boxed travel along a runway and when properly positioned with respect to the box, said cans through the medium of plunger mechanism, are adapted to be forced into position within the box.

It is the primary object of the invention to provide a machine of the above character, simple in design and construction, and therefore comparatively inexpensive, as well as to generally improve upon various features of the machine, thereby rendering the same highly efficient and satisfactory in use.

In carrying out the invention, it is one of the foremost objects to generally improve upon the means for separating the forward series of cans from the supply of cans on the runway, or the runways, as the case may be, to the end that the succeeding cans of the supply will be maintained in a relative stationary position while the forward series are moved under the action of plunger or plungers laterally with respect to the runway in the boxing operation.

In many of the machines now on the market wherein can-separating means are provided for the above purpose, it has been ascertained that, owing to possible defects and slight variation in sizes of cans, the can-separating means at times will not accurately engage at the proper point between the cans to be separated, with the result that the labels upon the cans become damaged, and in exaggerated cases stoppage and damage to the parts of the machine proper have resulted owing to the can becoming wedged between the can-separating means and the runway. In order to avoid any such possibility, it is contemplated herein to provide novel and efficient can-separating means, which may be said to be self-centering, in that the said means is not only mounted for bodily movement, but is constructed of such material that it is yieldable of itself, and while of sufficient strength and rigidity to properly perform the can-separating and retaining function, will at the same time readily assume a proper position between the cans to be separated and in a manner not defacing or otherwise injuring the labelled can or parts of the machine.

It is a further object of the invention to provide simple, novel, and improved means for properly positioning the box to receive the cans, and to maintain the box in a fixed or stationary position during the boxing operation.

It is contemplated by the invention to provide a means useful in connection with boxes of various types; that is to say boxes constructed of either wood, paper, metal, wire, or composition, etc., and since in many instances the material is of such character that when in position to receive the cans, the sides of the box have a tendency to droop or sag, it is proposed to provide means for effectively supporting the sides of the box and to provide means to engage under that side of the box uppermost whereby to prevent any decided drooping, which, as has been experienced in prior constructions, oftentimes results in breakage of the box and interferes with proper assembling of the cans therein, owing to the tendency of the cans to engage at their ends the edges of the sagging portion of the box in the operation of the plungers.

It is a further object of the invention to provide novel means for supporting and operating the plunger or can-ejecting mechanism, and to provide means operatively associated with the last-mentioned means for operating the can-separating mechanism.

More particularly the invention includes foot-operated means for properly positioning and maintaining the box in position during the operation of the plunger or ejecting mechanism, and to provide novel and improved hand-operating means for performing the said ejecting operation, together with means operatively associated with the latter whereby to operate in proper timed relation to perform the can-separating function.

Other improvements and novel details in the construction and arrangement of parts will be appreciated from the description to follow, which for a clear understanding of

the invention, is to be considered in connection with the accompanying drawings forming a part hereof, and wherein is disclosed for the purpose of illustration a convenient and satisfactory embodiment of the invention, though it is to be understood that minor changes may be resorted to and still be within the contemplation of the invention.

In the drawings,

Fig. 1 is a side elevation of the machine, parts of the runway and adjacent parts being shown in section;

Fig. 1ª is a detail section of a part of the framework supporting the can-assembling frame, one side of which latter is shown in elevation;

Fig. 2 is a transverse section of the boxing mechanism;

Fig. 3 is a view similar to Fig. 1, with the plunger mechanism, however, in a forward position as distinguished from its initial position as in said Fig. 1;

Fig. 4 is a side elevation taken from the opposite side of the machine from Fig. 1;

Fig. 5 is a front elevation of the machine;

Fig. 6 is a detail enlarged of a section of the runways shown in elevation, together with the associated can-spacing mechanism;

Fig. 7 is a transverse section;

Figs. 8 and 9 are detail views enlarged, of can-separating means;

Fig. 10 is a detail view enlarged, of a portion of the lever mechanism for the plungers; and

Fig. 11 is a sectional view looking in the direction of the arrows, Fig. 10.

With more particular reference to the drawings wherein like reference numerals refer to corresponding parts throughout the several views, a suitable framework is provided, conveniently of wood and comprising elongated sections 1, and supported at the can feed end of the machine by legs or standards 2 and at the can delivery end of the machine by legs or standards 3, the height of which is somewhat reduced with respect to that of the legs 2, whereby the frame will assume a general inclination downwardly towards the delivery or boxing end of the machine.

Any suitable means may be provided for adjusting the degree of inclination, it being the object to so arrange the runways' position on said framework sections 1 that the cans will readily roll by gravity along the runway into can-boxing position. The frame sections 1 may be connected by any suitable number and construction of brace bars 1ª. Supported from and projecting transversely with respect to the frame sections 1 are the frame sections 4, extending from the front to the back of the machine. Suitable means or standards 5 project from the forward portions of the frame sections 4 adapted to rest upon the surface. Mounted upon the frame sections 1 is a receiving receptacle 6 having therein can-distributing means of any approved type, such for instance as illustrated in the patent to C. W. Blackstone, No. 1,286,212, and not necessary to show or descibe in detail herein, the purpose of the distributing members being to guide the cans from the receptacle 6 onto the superimposed runway sections 7. These runway sections have upright rear flanges 7ª which extend substantially throughout the length of said runways, and forward flanges 7ᵇ, which terminate at a point opposite the can-ejecting mechanism to be presently described, whereby the cans as they roll along the runways will be adequately supported by said flanges and whereas after assuming a can-ejecting position, the forward edge of the runway will be substantially free from any obstruction, so that the cans may readily pass from the runways in the can-filling operation. Suitable upright supports or castings 8 and 9 project upwardly from the framework, the casting 8 having an outwardly inclined portion 8ª which terminates at a point in advance of the front edge of the runways. Secured to the said casting 8 is a suitable side wall, conveniently of metal, 10 which constitutes one side of what may be termed a can-assembling frame. The bottom 11 of this frame is conveniently formed by a forward integral extension of the bottom of the runway member 7.

The opposite side of the can-assembling receptacle is likewise conveniently formed of sheet metal as illustrated at 12, the same being secured to the upright casting 9, which latter as well as the side 12 extends from a point adjacent the rear end of the runways to a point considerably in advance thereof. The castings 9 have suitable level laterally-extending integral ledges 13 on the outer surface thereof, and both the castings 9 and the side 12 have slotted ways 14 registering with said flanges or ledges 13 which latter are in substantial alinement with the lower ends of the runways, which latter project, one through each of the slots 14 and rests upon an adjacent ledge 13 to which latter the runways are secured in any desired manner. It is thus appreciated that the upright supports 8 and 9 provide a substantial frame for the can-assembling receptacle, and also a substantial support for the runway sections. The sheet metal sections 10, 11, and 12 of the can-assembling receptacle or cage project forwardly beyond the frame section 1 of the machine and by reason of the relatively thin sheet metal construction thereof these sections are adapted to readily engage within and form a lining for the forward portion of the sides and bottom sections of the box as positioned on the can-assembling receptacle, and by reason of the inclination of the rear edge of the side the cans will

readily pass over the walls of the can-assembling frame. A movable support for the box is provided, the same taking the form of transverse bars 15 and adapted when in normal position to extend between and rest upon the frame sections 4. Projecting between and secured to the upper surface of the transverse bars 15 are suitable metal plates or slide ways 16 the rear ends of which project beyond the rear transverse bars 15, as illustrated at 17. The box support just described is mounted for oscillating movement by means of link connections 18 pivotally connected respectively at one end to the frame section 4 and at the other end to the transverse bars 15. Extending between the legs 5 at a point adjacent the base thereof is a suitable supporting rod 19 pivotally connected to the rear transverse bar 15 midway of the ends of the latter and depending therefrom is a suitable lever arm 20 pivoted at its lower end in any suitable manner as indicated at 21 to the upper surface of the rear end of a foot-operating treadle 22 which latter is in turn pivoted midway its ends as at 23 upon the supporting rod 19 intermediate the ends of the latter. Suitable guides 25 taking the form of collars affixed to the rod 19 retain the treadle in position against unnecessary lateral play. From the above it will be appreciated that the box-supporting frame under the action of the foot-operating mechanism, while normally resting on the frame sections 4, will move rearwardly and upwardly, and assuming that the box is in proper position on said box support the latter, moving with its support, will engage over the projecting forward edges of the can-assembling receptacle, and under the pressure of the foot at the forward end of the treadle 22 the bottom side of the box on the support will be tightly wedged between the bottom side 11 of the assembly frame and the guides 16 of the box support. This affords a very substantial and rigid support and retaining means for the box during the boxing operation, or until pressure by the foot on the treadle is relieved, when, of course, the box with the cans carried thereby will under the weight of the latter cause the box support to move in a reverse direction into contact with the frame sections 4, and the box will be spaced, when in this latter position, away from the can-assembling cage or receptacle.

In order to prevent the cans in the operation of the can-ejecting mechanism, to be presently described, from contacting with the upper edge of the box as positioned on the support, just described, assuming there is a tendency for this edge to droop or sag, means is provided for engaging beneath the upper edge of the box substantially midway of the ends of the latter whereby to maintain this portion of said edge in normal position or in horizontal alinement with other portions of said edge. In carrying out this feature of the invention, it is proposed to employ upright brackets or supports 26 on the forward portions of the castings 8 and 12 respectively, secured to the latter as at 27. These brackets have an offset inclined upper terminal 28, and projecting between said brackets and resting upon said inclined portions thereof is a transversely-extending bar 29, which by reason of the inclination thereof may engage within and constitute an abutment cooperating with the movable box support to limit and assist in retaining the box in rigid position. Projecting forwardly from said bar 29 at a point substantially midway of its ends is a suitable inclined lip or tang 30 which at its forward end is designed to assume a position within the box, and by reason of the inclination thereof, in the movement of the box, under the action of its movable support, gradually straighten out and support the upper side of the box.

The can-ejecting or plunger mechanism will now be described. Projecting downwardly from the rear end of the frame sections 4 are suitable brackets 31 forming bearings 32 for a transversely extending rotatable rod 33. Affixed to said rod as at 34 for movement therewith, though capable of relative adjustment at will, are operating arms 35 projecting upwardly to a point above the runways, and pivotally connected to the upper ends of said arms are the arms 36 of a hand-engaging bar or part 37. Suitable stops 38 on the arms 35 are adapted to be contacted by the arms 36 on the operating handle whereby to limit the downward movement of the latter at a point spaced above the other parts of the machine to the end that the operator may grasp the handle part 37 and impart the necessary movement back and forth thereof, without interference of any other parts of the machine. Pivotally connected to the arms 35, through the medium of pintles 39 are suitable brackets 40 having arms 41, the number of which latter depending upon the number of can runways, and said arms being adapted to assume a position one above each runway. Secured to, for movement with, the arms 41 of the bracket 40 are the plungers or ejectors proper 42, the latter being attached to the arms 41 of the respective brackets and adapted to engage in the space above the runways a series of cans, the number depending upon the size of the box into which the cans are to be projected. A suitable trackway is provided, the same taking the form of a bracket 43 conveniently secured to the rear of frame section 1 as at 44 and having an elongated horizontal surface 45 adapted to be engaged by a suitable roller

bearing 46 mounted in suitable bearings on hangers 47 depending from the lowermost plungers 42. It will be observed that the plungers normally assume a position to the rear of the ends of the cans supported on the runways, and assuming that the supply of cans has been fed along the runways until the foremost ones engage the side 12 of the can-assembling receptacle, the operator by imparting a forward movement to the handle part 27 will move the arms 35 about their pivotal supports with the result that the plungers will be moved forwardly, the roller 46 and trackway 45 guiding this movement, and in said forward movement the plungers will force the cans out of the runways into a position in the can-assembling receptacle. A reverse movement of the handle part 37 will of course, again position the plungers at a point rearwardly of and out of contact with a succeeding series of cans in said runways.

It is highly desirable to provide an efficient means to separate the forward series of cans in each of the runways, that is the cans to be ejected, from the remaining cans in the runways, whereby to facilitate the ejecting operation, and to this end novel can-separating means is provided, substantially as follows:—A swinging arm 48 is pivoted at one end to a bracket 49 secured to the under surface of one of the frame sections 4 as by means of a bolt 50 projecting through a slotted way 51 in said bracket and engaging said frame section 4. Intermediate the ends of the arm 48 there is provided an extended curved slotted way 52 forming a cam way for the reception of a pintle 53 projecting from one side of the lever 35. Projecting laterally from one side of the arm 48 is a pin or lug 54 adapted to engage in a slot 55 in a cross-bar 56 which constitutes the base of the can-separator carriage or support. Projecting upwardly from the cross-bar 56 are rods 57 separated from one another by a space somewhat greater than the width of the runways, and these rods 57 are conveniently connected to the cross-arm whereby to permit of vertical adjustment, in any desired manner. Projecting through the bars 57 at a point above the horizontal plane of the upper surface of the adjacent cans on the runways are suitable separator-blade supporting members which, in the illustrative embodiment of the invention, take the form of cotter-pins or bolts comprising a stem or shank portion 58 terminating at one end in an eye 59 and split at its opposite end as indicated at 60. A retaining nut 61 is adapted to be threaded to the terminal pin, which latter when in proper position, determined by the position of the nut 61, may have its split ends spread as illustrated at 62 thereby locking the nut in its adjusted position. The separating blades take the form of a relatively thin sheet of metal 63, adapted to yield upon itself at substantially any point throughout the length thereof, the said blades having upon the rear surface thereof an eye portion 64 adapted to loosely engage the eye portion 59 of the supporting pins 58, and interposed between the blade 63 and the bars 57 are spiral spring members 65. The spring members 65 are positioned on the bolts or pins 58, and are adapted to engage at one end the bars 57 and at their opposite end an integral offset upward extension 64ª of the eyes 64 whereby to normally exert pressure on the separating blades 63 to tilt the upper edge of the same substantially as illustrated in Fig. 6. From this construction, it will be noted that as the separating blades 63 are lowered, a relatively flat surface thereof will engage upon the periphery of the rearmost cans of the series to be separated, and a continued lowering movement of the blades will tend to straighten the same by the engagement of the latter between the rearmost cans of the forward series and the foremost cans of the succeeding series, the blades in this connection acting as self-centering devices, and because of the yieldable characteristic of the blades, themselves, as well as the yieldable character of their supports, the engagement of the blades between the adjacent cans will be a smooth, easy-riding one, with the result that neither the labels nor the cans will be injured, and with the further result that the operation of the machine will not be interfered with nor interrupted by a possible engagement of the separating means with the periphery of the cans at a point to one side or the other of its normally operative position between the cans to be separated.

A brief general review of the operation will now be given. The operator, or operators, place within the can-receiving receptacle 6 a supply of cans which will automatically separate by reason of the distributing means within the receptacle 6, so as to first fill the lowermost runway, the cans automatically rolling to the lower end thereof, then to fill the next adjacent runway thereabove, and finally to fill the uppermost runway, the cans being continuously supplied to the receptacle 6 until the respective runways are filled, as illustrated in Fig. 5. The operator thereupon places a box in position on the movable box support, the box being slid along the guide bar 16 until it assumes a position adjacent or even in contact with the projecting forward portion of the can-assembling receptacle. Thereupon the operator places his foot upon the treadle 22, and by exerting pressure upon the lower end thereof, the box support is simultaneously moved upwardly and rearwardly until wedged into a rigid

position in engagement between the box support and the cooperating parts of the can-assembling receptacle. The box will be maintained so long as the foot is applied to the treadle in a stationary or rigid position. At this time the arms 35 will assume a rearmost position, which is determined by the rear abutments 67 on guideway plates 68, which said guideway plates also have forward abutments 69 to limit the forward movement of said arms. The box having been properly positioned, and the foot pressure maintained, the hand-engaging part 37 is grasped and moved forwardly until the arms 35 contact with the abutments or stops 69 just referred to. This operation tends to, through the medium of the pin and cam way engagement 52—53, cause the arm 48 to swing downwardly about its pivot 49, thereby bringing the separating blades which normally assume a position above the cans to a position between adjacent cans, thereby separating a forward series of cans in each runway from the succeeding main supply of cans. By the time the separating blades are in engagement with the cans to perform the separating function, the plungers 42 are in engagement with the rear ends of the cans of each of the separating series and these cans in the continued forward movement of the plungers are moved from off the runways into contact with one another in the can-assembling receptacle. The operator, without releasing his foot from the treadle, thereupon reverses the movement of the arms 35 through the handle part 37, which reverse movement tends to simultaneously return the plungers to a point in the rear of the runways, and likewise simultaneously moves the arm 48 in an upward operation about its pivotal support 49 whereby to position the separating blades 63 at a point above the plane of the cans whereby the succeeding series of cans in each runway is released and will automatically assume the position previously occupied by the foremost series of cans which have just been ejected into the can-assembling receptacle. A subsequent forward movement of the handle 37 and associated parts tends to position the next series of separated cans into the can-assembling receptacle, those cans at this time in the receptacle being forced into the receiving box by the cans which take their place. A subsequent operation will fill the box, whereupon the operator relieves the treadle of pressure, when the can support will of its own weight assisted by the weight of the box of cans automatically return into a position in contact with the frame sections 4, which likewise frees the box from engagement with the projecting portions of the can-assembling frame.

It will be observed that while the foot of the operator maintains the box in position, both hands of the operator are free, with the result that either or both hands may be utilized in the operation of the plunger and can-separating mechanism.

An important feature of the invention resides in the fact that the can-separating blades are fixed against relative lengthwise movement with respect to the cans. While these blades are so associated with the plunger mechanism that they operate in proper timed relation with respect to the latter, at the same time the blades do not, as in certain prior constructions, move lengthwise with the plungers, which sometimes has a tendency to engage edges of the labels on the cans with a resultant tearing action. In the present instance, the blades normally occupy a position a safe distance above the cans, and the blades are supported at opposite ends with the result that as the supports are moved vertically, likewise the blades are moved vertically and maintained against any longitudinal rubbing action against the labelled cans.

At times it may be desirable to adjust the throw of the plungers and the vertical movement of the separating blades, and to this end the bracket 49 by reason of the pin-and-slot connection with the frame sections 4 may be adjusted lengthwise of the frame sections 4 until the parts are properly and accurately positioned.

What I claim is:

1. In a machine of the character described, the combination of a runway for cans, to properly position the same for boxing or the like, and can-separating means comprising a member extending transversely across the runway and thereabove, said separating member being of yieldable material, and means supporting said separating member adjacent opposite ends and for moving the same from a position normally above the cans into a position between the peripheries of adjacent cans.

2. In a machine of the character described, the combination of a runway for cans, to properly position the same for boxing or the like, and can-separating means comprising a member extending transversely across the runway and thereabove, said separating member being of yieldable material, means supporting said separating member adjacent opposite ends and for moving the same from a position normally above the cans into a position between the peripheries of adjacent cans, and yieldable supporting means for the can-separating means.

3. In a machine of the character described, the combination of ejecting mechanism for moving cans into boxing position, a can runway to deliver cans into position with respect to the ejecting mechanism, and means for separating a forward series of so-posi-

tioned cans from the supply of cans in the runway, comprising a thin flat blade projecting across the runway normally occupying a position above the runway, means for maintaining the blade against lengthwise movement, and means for moving the blade downwardly into a position between the cans.

4. In a machine of the character described, the combination of ejecting mechanism for moving cans into boxing position, a can runway to deliver cans into position with respect to the ejecting mechanism, and means for separating a forward series of so-positioned cans from the supply of cans in the runway, comprising a blade projecting across the runway normally occupying a position above the runway, means for maintaining the blade against lengthwise movement, and means for moving the blade downwardly into a position between the cans, said blade being of yieldable material whereby it may give throughout its length and assume a proper position between the cans.

5. In a machine of the character described, the combination of ejecting mechanism for moving cans into boxing position, a can runway to deliver cans into position with respect to the ejecting mechanism, means for separating a forward series of so-positioned cans from the supply of cans in the runway, comprising a blade of flexible material projecting across the runway normally occupying a position above the runway, means for maintaining the blade against lengthwise movement, and means for moving the blade downwardly into a position between the cans, and means for operatively connecting the can-ejecting mechanism with the can-separating means whereby the latter is controlled by the former, but may have independent relative movement.

6. In a can boxing machine, the combination of can-ejecting mechanism, a runway for positioning cans in operative position with respect to the ejecting mechanism, and can-separating means for separating a forward series of so-positioned cans from a supply of cans on the runway comprising a member projecting transversely across the runway at a point normally above the cans, said member having a relatively flat surface and being mounted for oscillating movement.

7. In a can boxing machine, the combination of can-ejecting mechanism, a runway for positioning cans in operative position with respect to the ejecting mechanism, and can-separating means for separating a forward series of so-positioned cans from a supply of cans on the runway comprising an elongated relatively thin flat member of flexible material projecting across the runway above the cans, movable supporting means for the member, said separating member being movable relative to its supporting member, and means for moving said supporting means whereby to permit the flat surface of said member to first engage the periphery of a can and in a continued movement to engage the edge of said member between the peripheries of adjacent cans.

8. In a can boxing machine, the combination of can-ejecting mechanism, a runway for positioning cans in operative position with respect to the ejecting mechanism, and can-separating means for separating a forward series of so-positioned cans from a supply of cans on the runway comprising a sheet metal blade supported at opposite ends and projecting across the runway, said blade being mounted for oscillating movement, and means for moving the blade bodily vertically.

9. In a can boxing machine, the combination of can ejecting-mechanism, a runway for positioning the cans in operative position with respect to the ejecting mechanism, and can-separating means for separating a forward series of so-positioned cans from a supply of cans on the runway comprising upright supports, and a blade pivotally mounted at its ends upon said supports and projecting across the runway, and means for moving the supports with the connected blade vertically.

10. In a can boxing machine, the combination of can-ejecting mechanism, a runway for positioning the cans in operative position with respect to the ejecting mechanism, and can-separating means for separating a forward series of so-positioned cans from a supply of cans in the runway comprising upright supports, a blade pivotally mounted at its ends upon said supports and projecting across the runway, spring supports for the blade normally positioning the same whereby as the same are lowered they will engage the periphery of a can on the runway and whereby the edge thereof will thereafter engage between adjacent cans, and means for moving the supports vertically.

11. In a can boxing machine, the combination of can ejecting mechanism, vertically-movable can-separating mechanism, including a separating member of yieldable material to engage between adjacent cans, means for supporting said separating member whereby the same is fixed against lengthwise movement with respect to the cans, and operatively associated means for operating the ejector mechanism and the can-separating mechanism.

12. In a can boxing machine, the combination of can-ejector mechanism, and can-separating mechanism, a plurality of superimposed runways for cans to position the latter with respect to the ejector mechanism, said can separating means including sepa-

rating blades of yieldable metal extending transversely of and above each runway, means for maintaining said blades fixed against lengthwise movement with respect to the cans, and operatively associated means for simultaneously operating the ejector mechanism to eject a series of cans from each of the runways and simultaneously separate said cans from the succeeding supply of cans on the runways.

13. In a can boxing machine, the combination of a plurality of superimposed runways, can-ejector mechanism having plungers to engage a series of cans and eject the same from the runways, and means operatively associated with the ejecting mechanism but fixed against lengthwise movement therewith for separating the forward series of cans in each runway from the succeeding cans in the runways, comprising yieldable blades projecting transversely across the runway, one above each runway, and means for moving the blades bodily in a vertical direction.

14. In a can boxing machine, the combination of a plurality of superimposed runways, can-ejector mechanism having plungers to engage a series of cans and eject the same from the runways, and means operatively associated with the ejecting mechanism for separating the forward series of cans in each runway from the succeeding cans in the runways comprising blades of yieldable material projecting transversely across the runways, one above each of said runways, and supporting means for opposite ends of said blades adapted to move vertically whereby to position the blades between adjacent cans.

15. In a can boxing machine, the combination of a plurality of superimposed runways for cans to be boxed, a box support arranged in front of the runway, means for ejecting a series of cans from each runway into boxing position comprising a plunger support, plungers projecting from said support, one to engage one end of the cans of each series to be ejected, an upwardly-extending operating arm pivotally supported at its lower end and pivoted intermediate its ends to said plunger support, a forwardly-projecting operating handle connected to said arm adjacent its upper end, can-separating means mounted for vertical movement and fixed against lengthwise movement whereby to engage between and separate the forward series of cans in each runway to be ejected, and operative connection between said can-separating means and said pivoted arm.

16. In a can boxing machine, the combination of a runway for cans to be boxed, a box support, a horizontally movable plunger to engage one end of a series of cans on said runway to eject the same into boxing position, a thin, flat, flexible can-separating member fixed against lengthwise movement but mounted for vertical movement and adapted to move from a position above the cans into a position between adjacent cans whereby to separate the series of cans to be ejected, means for moving the plunger horizontally, and connected mechanism for simultaneously moving the can-separating means vertically.

17. In a can boxing machine, the combination of a can support, horizontally movable can-ejecting means, a vertically movable flexible can-separating means fixed against horizontal movement, and connected mechanism whereby to impart a horizontal movement of the ejecting means and a vertical movement of the can-separating means, the can separating means being adapted to yield independently.

18. In a can boxing machine, the combination of a can support, horizontally movable can-ejecting means, a vertically movable flexible can-separating means fixed against horizontal movement, connected mechanism whereby to impart a horizontal movement of the ejecting means and a vertical movement of the can-separating means, and associated means whereby the movement of said parts may be adjusted.

19. In a machine of the character described, the combination of a runway for cans to properly position the same for boxing or the like, and can-separating means comprising a thin flat flexible strip of metal extending transversely across the runway, and means for supporting said separating member adjacent opposite ends and for moving the same vertically into and out of position between the peripheries of adjacent cans.

20. In a can boxing machine, the combination of a box support, means for supporting a series of cans, ejector mechanism for the cans, and can-separating means comprising a member adapted to move vertically from a position above the cans into a position between adjacent cans while fixed against horizontal movement, a support for the member, and a pivoted operating arm for said last-mentioned support.

21. In a can boxing machine, the combination of a runway for cans, a substantially horizontally movable plunger to engage one end of the cans to eject the same from their support into boxing position, an operating arm pivotally supported at one end and having pivotal connection intermediate its ends with the plunger, operating means for said arm adjacent its opposite end, a can-separating member to be moved into a position between adjacent cans to separate a series of cans to be ejected by said plunger, a vertically movable support for the can-separating member, a transversely disposed arm

pivotally supported at one end and having pivotal connection with the support for the can-separating member, and a pin-and-slot connection between said pivotally mounted arms.

22. In a can boxing machine, the combination of a runway for cans, a substantially horizontally movable plunger to engage one end of the cans to eject the same from their support into boxing position, an operating arm pivotally supported at one end and having pivotal connection intermediate its ends with the plunger, operating means for said arm adjacent its opposite end, a can-separating member to be moved into a position between adjacent cans to separate a series of cans to be ejected by said plunger, a vertically movable support for the can-separating member, a transversely disposed arm pivotally supported at one end and having pivotal connection with the support for the can-separating member, and a pin-and-slot connection between said pivotally mounted arms, the pivotal support for the transverse arm being adjustable.

23. In a can boxing machine, the combination of a box support, means for supporting a series of cans, can-ejector mechanism, and can-separating means comprising a vertically movable support, a can-separating blade, and a pivotal connection between said blade and its support.

24. In a can boxing machine, the combination of a box support, means for supporting a series of cans, can-ejector mechanism, can-separating means comprising a vertically movable support, a can-separating blade and a pivotal connection between said blade and its support, and a spring member interposed between the blade and its support.

25. In a can boxing machine, the combination of a support for a plurality of cans to be boxed, a box support, can-ejector mechanism, and means for separating a series of cans to be ejected into boxing position from the supply of cans on said supporting means, comprising a vertically movable blade of yieldable material, a support for the blade, said blade having movable connection with its support, and an interposed spring between the blade and its support.

26. In a can boxing machine, the combination of means for supporting a plurality of cans, can-ejector mechanism, a can assembling frame, and treadle-actuated means for locking the box with its open end in position to receive the cans from the assembling frame.

27. In a can boxing machine, the combination of a support for a plurality of cans to be boxed, can-ejector mechanism, an assembling frame for the ejected cans, means on the latter to engage within the inner surface of the top and bottom of a box to receive the can, and means for maintaining the box in fixed position with respect to the assembling receptacle.

28. In a can boxing machine, the combination of means for supporting cans to be boxed, a can assembling receptacle, can ejecting mechanism, said receptacle having sides and a bottom, a box support adapted to support a box in position with its sides overlying projecting portions of the sides and bottom of the receptacle, and means for moving the box support whereby the box will be wedged into engagement between the support and bottom of the receptacle.

29. In a can boxing machine, the combination of means for supporting cans to be boxed, a can assembling receptacle, can-ejecting mechanism, said receptacle having sides and a bottom, a box support adapted to support a box in position with its sides overlying projecting portions of the sides and bottom of the receptacle, and an inclined member adjacent the top of the receptacle adapted to engage under that side of the box disposed uppermost whereby to prevent drooping of the latter in the can boxing operation.

30. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, can-ejecter mechanism, a box support adapted to position a box with the open side in position to receive the ejected cans, and an elongated incline member to engage beneath the upper side of the open end of the box to prevent contact of the cans therewith in the boxing operation.

31. In a can boxing machine, the combination of means for supporting a plurality of cans to be boxed, means for supporting a box with the open end in position to receive cans ejected from said support, can-ejecting mechanism, and box supporting means adapted to engage within the box at a point adjacent the upper side thereof as positioned on its support.

32. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, means engaging one end of the series of cans to eject the same into can boxing position, means for supporting a box with an open side to receive the cans, and a box support having a part to engage the inner surface of that side of the box disposed uppermost, said last-mentioned means having an elongated central incline projection to engage said upper side of the box at a point intermediate its ends.

33. In a can boxing machine, the combination of means for supporting a plurality of cans to be boxed, can-ejector mechanism, a box support adapted to receive a box with the open end in position to receive the cans, and a can assembling support interposed between the box support and means for supporting the cans, said box support being

movable whereby to wedge the bottom side of the supported box between its support and the can assembling support.

34. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans laterally from said support, a can assembling frame, a box support mounted for oscillating movement, and means independent of the ejector mechanism for actuating said box support.

35. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans laterally from said support, a can assembling frame, and means for supporting the box with an open end in position to receive the cans from the assembling frame, said last-mentioned means being movable whereby to move the box upwardly and rearwardly.

36. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans laterally from said support, a can assembling frame, means for supporting the box with an open end in position to receive the cans from the assembling frame, said last-mentioned means being movable whereby to move the box upwardly and rearwardly into tight engagement with the can assembling frame, and lever operating means for the latter.

37. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans laterally from said support, a can assembling frame, a box support for positioning the box with an open end to receive the cans from the assembling frame, said assembling frame having a base, and means for moving the box support whereby to wedge the bottom side of the positioned box between said base of the assembling frame and the box support.

38. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans lateraly from said support, a can assembling frame, a box support, and link supports for the box support whereby the latter may be subjected to oscillating movement.

39. In a can boxing machine, the combination of means for supporting a series of cans to be boxed, ejector mechanism for moving the cans laterally from said support, a can assembling frame, a box support mounted for oscillating movement, and treadle actuated means to directly engage the box support, and actuating the same independently of the movement of the ejector mechanism.

40. In a can boxing machine, the combination of a runway for cans, means to engage one end of the cans on the runway to eject the same laterally, a box support, and a can assembling frame interposed between the runway and the box support, said frame comprising sides and a bottom, and said box support being mounted for movement whereby to position the bottom side of the box in holding engagement with said bottom of the assembling frame and the box support, and means independent of the ejecting means for actuating the box support.

41. In a can boxing machine, the combination of a plurality of superimposed runways for cans to be boxed, can ejecting mechanism arranged rearwardly of the runway and adapted to engage one end of a series of cans on each runway to eject the same laterally from the runway into assembling position, a box support, and a can assembling frame interposed between the runway and box support comprising upward supports, sheet-metal sides secured to said supports and a bottom, said sides and bottom projecting forwardly beyond the sides of the runway and said upright supports, an inclined bar projecting between the supports at the top, and a forwardly projecting inclined tongue intermediate the ends of the said bar.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ALBERT HERBERT KYLER.

Witnesses:

FRED H. KNAPP,

MARY ANN MILLER.