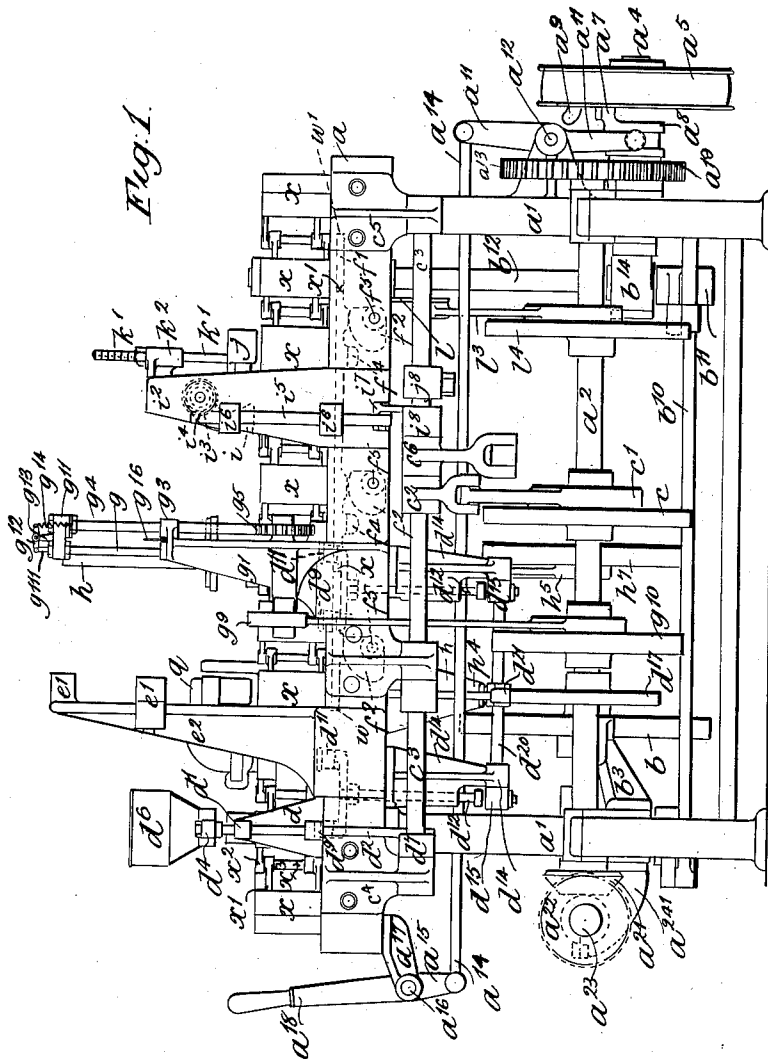


E. C. LOVELL.
MACHINE FOR PACKING TEA OR OTHER GOODS.
APPLICATION FILED SEPT. 17, 1910.

998,362.

Patented July 18, 1911.

11 SHEETS—SHEET 1.



Witnesses:
L. O. Badeau.
H. D. Penney

Inventor:
Edward Colston Lovell,
By his Attorney, *J. A. Richards*

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11 SHEETS—SHEET 2.

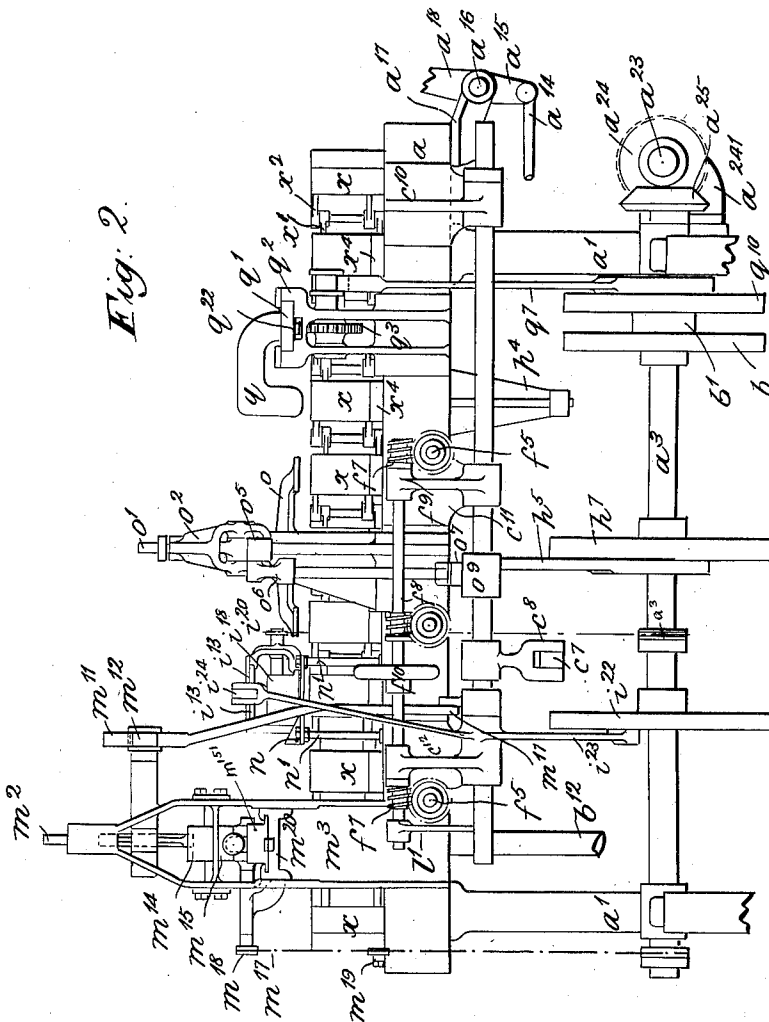


Fig. 2.

Witnesses:

L. D. Badaeu.
H. J. Penney

Inventor:

Edward Colston Lovell,
By his Attorney, J. H. Richards.

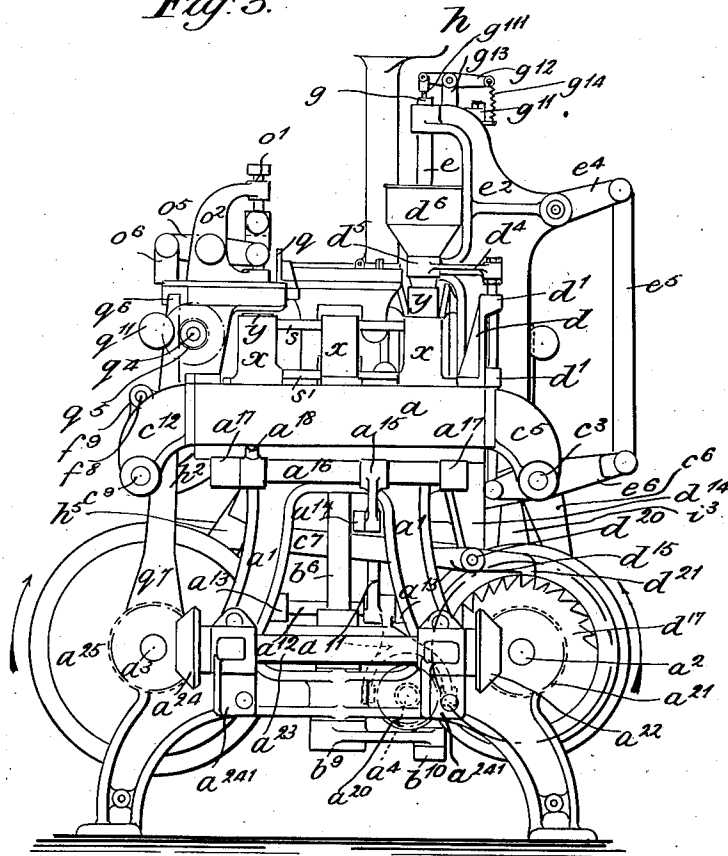
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11 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

L. C. Badeau.
H. D. Penney

Inventor:

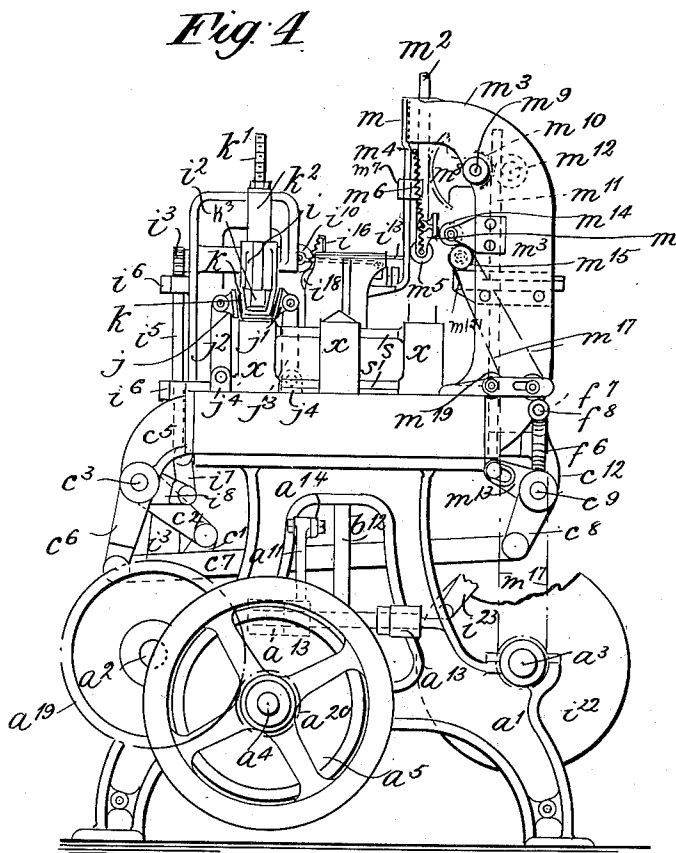
Edward Colston Lovell,
By his Attorney, J. H. Richard.

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11 SHEETS—SHEET 4.



Witnesses:

L. O. Badaeu.
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11 SHEETS—SHEET 5.

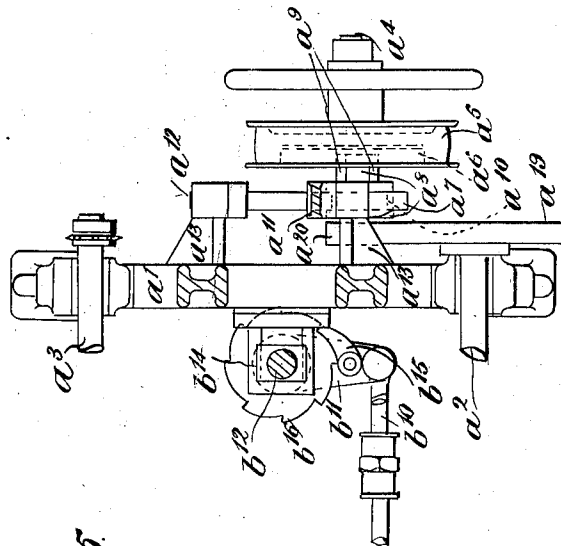
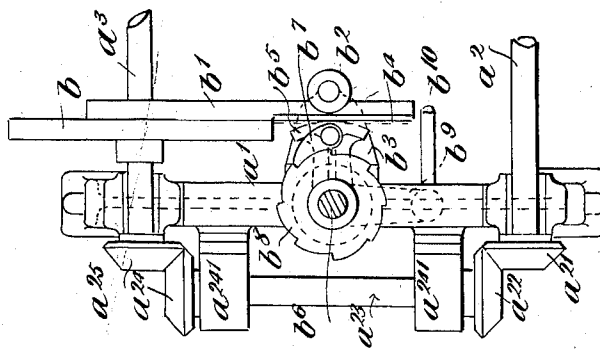


Fig. 5.



Witnesses:

L. C. Badian.
H. J. Penney.

Inventor:

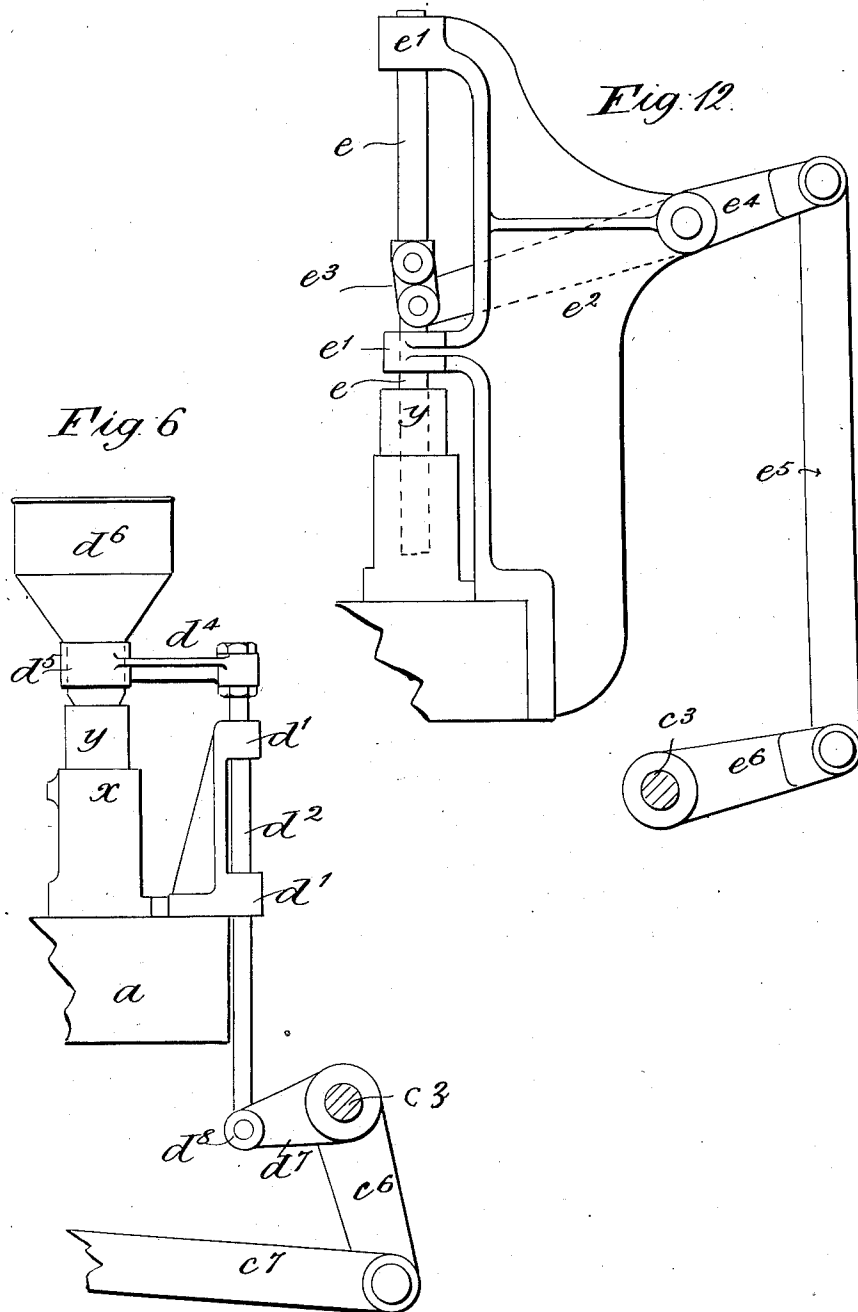
Edward Colston Lovell,
By his Attorney, Wm. H. Richards.

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998,362.

Patented July 18, 1911.

11 SHEETS—SHEET 6.



Witnesses:

L. C. Badeau.
H. D. Penney

Inventor:

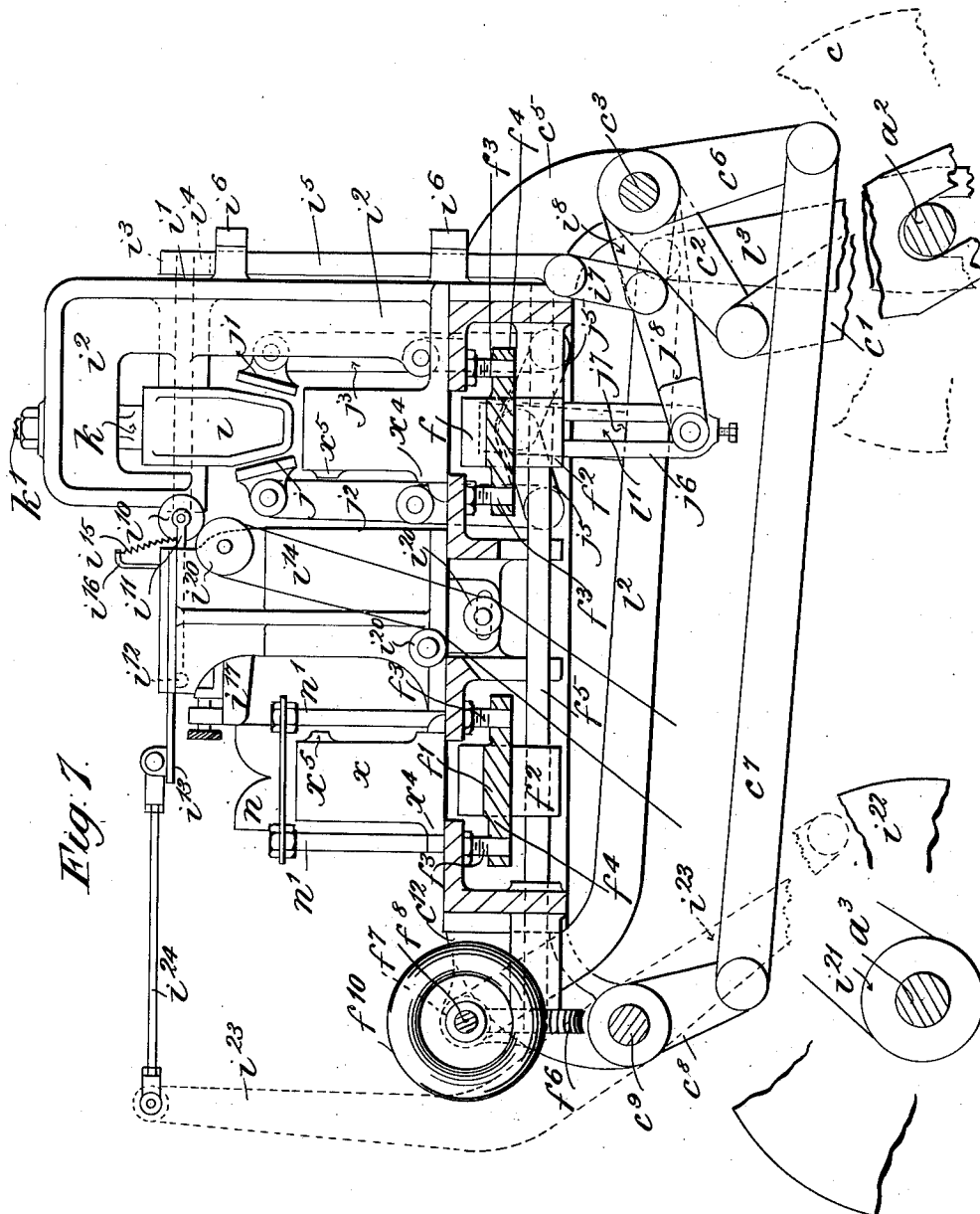
Edward Colston Lovell,
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E. C. LOVELL.
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998,362.

Patented July 18, 1911.

11 SHEETS—SHEET 7.



Witnesses:
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11 SHEETS—SHEET 8.

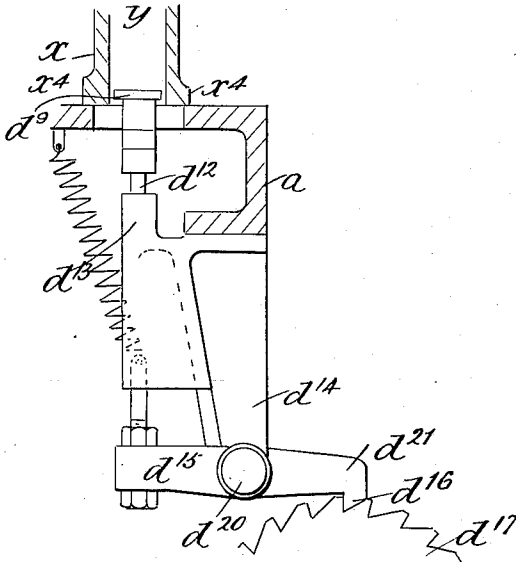


Fig. 10

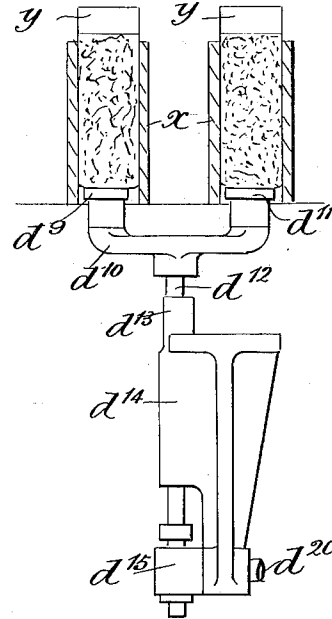


Fig. 11

Fig. 8.

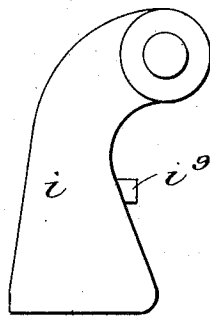
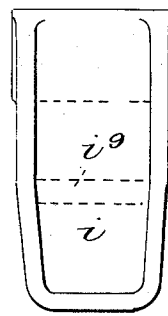


Fig. 9.



Witnesses:

L. C. Badaeu.

H. O. Penney

Inventor:

Edward Colston Lovell,

By his Attorney,

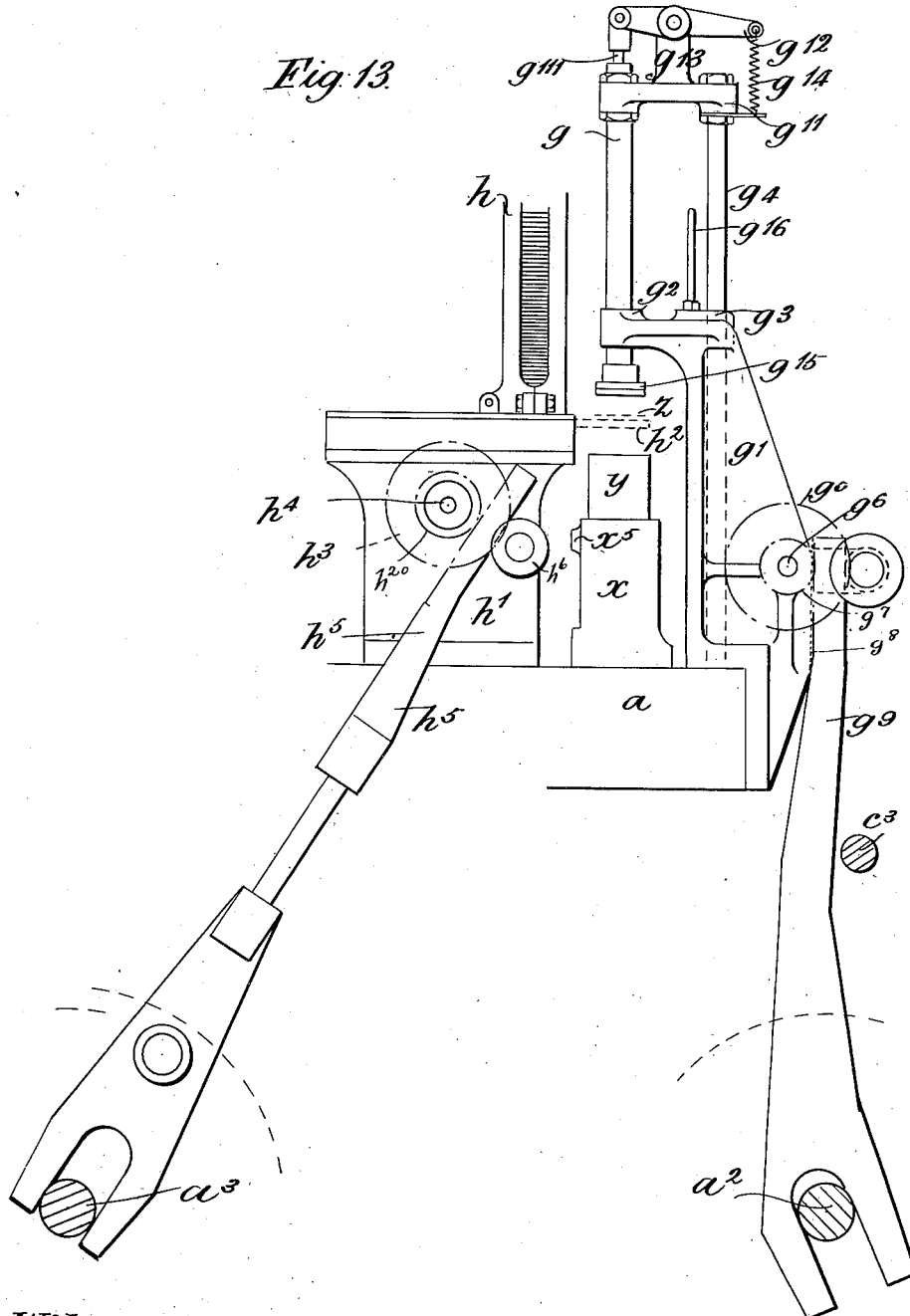
J. H. Richards

E. C. LOVELL.
MACHINE FOR PACKING TEA OR OTHER GOODS.
APPLICATION FILED SEPT. 17, 1910.

998,362.

Patented July 18, 1911.

11 SHEETS—SHEET 9.



Witnesses:

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H. D. Penny.

Inventor:

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E. C. LOVELL.
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Patented July 18, 1911.

11 SHEETS—SHEET 10.

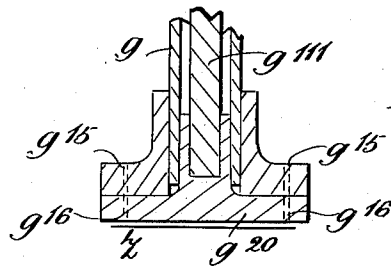


Fig. 14.

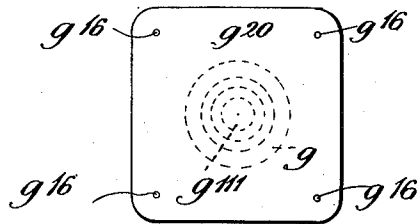


Fig. 15.

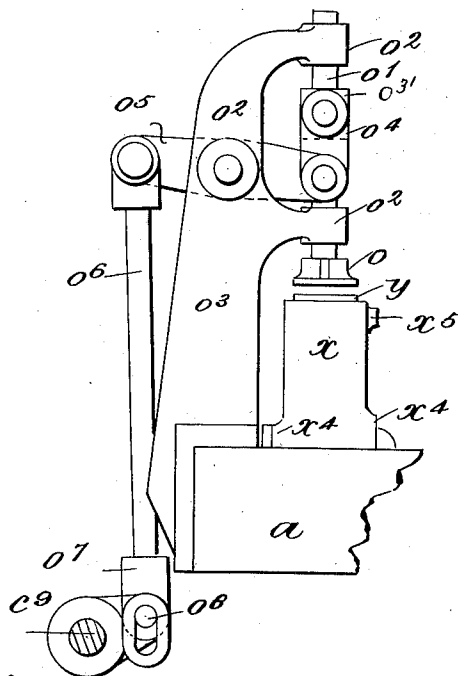


Fig. 16.

Witnesses:

L. F. Badeau.
H. D. Penney

Inventor:

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998,362.

11 SHEETS—SHEET 11.

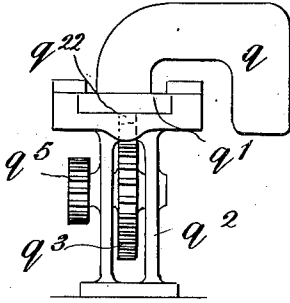


Fig. 18.

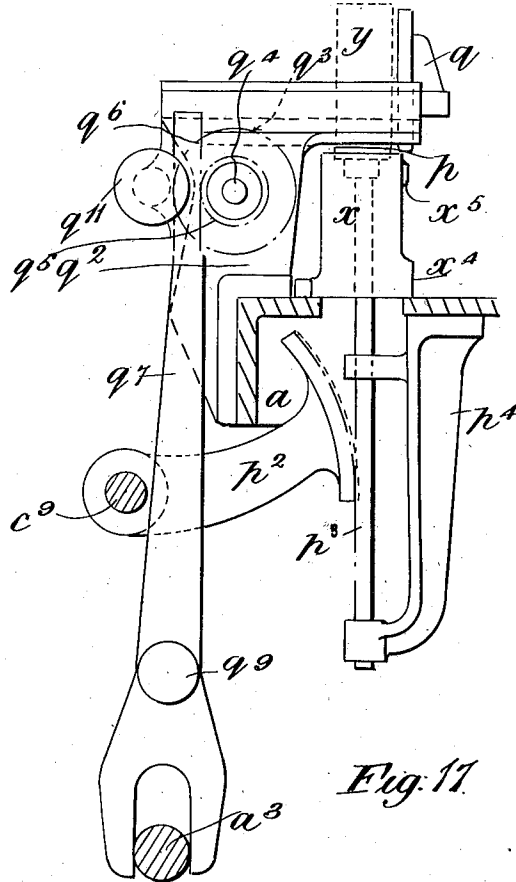


Fig: 17.

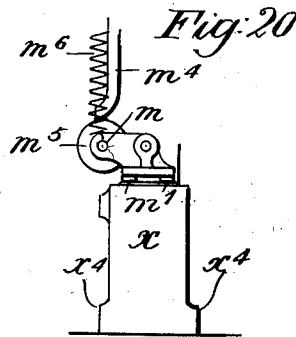
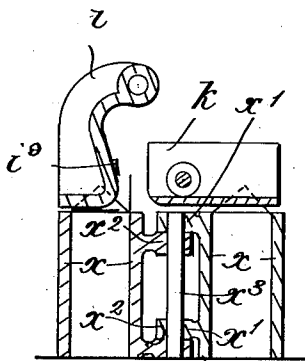


Fig: 20

Witnesses:

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H. D. Periney

Inventor:

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UNITED STATES PATENT OFFICE.

EDWARD COLSTON LOVELL, OF BRISTOL, ENGLAND.

MACHINE FOR PACKING TEA OR OTHER GOODS.

998,362.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed September 17, 1910. Serial No. 582,441.

To all whom it may concern:

Be it known that I, EDWARD COLSTON LOVELL, a subject of the King of Great Britain, residing in Bristol, England, have invented certain new and useful Improvements in Machines for Packing Tea or other Goods, of which the following is a specification.

This invention relates to an improved machine for packing tea or other goods, and it relates to machines of the class in which a number of open ended pockets or receptacles for the packets are connected together so as to form an endless chain, the intermittent movement of the said chain presenting the pockets with the packets therein to the various mechanism for effecting the filling and other operations incidental to the packing of the goods.

The present invention has for its object to produce an improved machine of the class above referred to in which in place of as heretofore arranging the runs of the chain respectively above and below the supporting table with the supporting wheels in the vertical plane, both runs of the said chain are arranged in the horizontal plane whereby it is possible to considerably reduce the length of the chain and arrange the machine as a whole in a much more compact form.

The invention further provides various improvements hereafter described and claimed in the mechanism for effecting the individual operations incidental to the packing of the goods.

A machine according to the present invention comprises a suitable table or support upon the upper surface of which is arranged an endless chain comprising a series of pivotally connected vertically disposed receptacles open at each end and of a cross sectional outline corresponding to the shape of the packets it is desired to fill, and which packets are placed by hand, or they may be discharged directly from the bag making machine into the aforesaid receptacles. The chain passes around intermittently actuated wheels resting upon the upper surface of the table aforesaid, and apertures are formed in the table beneath which is arranged a plate designed to support the packets, and which plate is adjustable relatively to the upper surface of the table so as to allow for packets of different heights. Provision is made for lifting the packets at the desired portion of their travel so that they do not foul the ends of the aforesaid openings in

the table, and means are provided for subjecting the packets to a vibrating motion in the vertical plane in order to shake down the contents. With the object of assisting the settling of the contents within the packets prior to the closing, a plunger is provided which is caused to enter the packet and compress the contents prior to the closing of the said packet. I may in some instances provide for the introduction of a card or the like prior to the closing of the packet. The closing of the packet is effected by first folding one side of the packet by means of a suitably shaped block arranged to swing in the vertical plane, and which block is provided with a gum bearing surface so that simultaneously with the folding of the first fold an adhesive is applied thereto so that when the next fold, upon the opposite side of the packet, is made, it is secured by the gum previously applied by the first folder. The second fold is effected by means of a fixed body mounted in the line of movement and clear of the receptacle, the folding being effected as the packet is drawn thereunder. Means are provided to prevent injury to the upstanding side portions of the mouth of the packet during the first folding operation. After the second fold is effected the packet is provided upon the upper surface of this fold with a gummed surface, after which the folding of the sides is effected by means of a plate disposed above the receptacles and bifurcated at one end, the said ends being suitably shaped so that they engage the aforesaid upstanding sides and gradually turn them over one after another until the packet is finally closed. After the folding is completed the packet is subjected to a series of pressing operations to insure the proper closing and securing of the folds and finally raised clear of the receptacle and discharged in a chute or the like.

In order that the invention may be the better understood, drawings are appended in which:—

Figure 1 is a side elevation of a machine constructed in accordance with the present invention. Fig. 2 is a similar view of the opposite side of the machine. Fig. 3 is an end view. Fig. 4 is a view of the opposite end of the machine to that shown in Fig. 3. Fig. 5 is a plan showing the operating mechanism for the receptacles. Fig. 6 is a side elevation of the funnel through which

the tea or other goods is discharged into the packet. Fig. 7 is a cross section of the machine showing the means for effecting the first, second, and final folds in the ends of the packet. Fig. 8 is a side view, and Fig. 9 is a back view of the device for forming the first fold and applying gum thereto. Fig. 10 is a sectional view showing the vibrator for shaking down the contents of the packet. Fig. 11 is a side view of the vibrator. Fig. 12 is a side elevation of the device for pressing the contents of the packet. Fig. 13 is a side view of a device whereby a card or the like may be inserted in the open packet after it has received its contents. Fig. 14 is a sectional view to an enlarged scale of the foot whereby the card or the like is picked up and placed in the packet. Fig. 15 is a plan of the underside of the foot shown in Fig. 14. Fig. 16 is a side elevation of the device for pressing packets when closed. Fig. 17 is a side elevation of the device for raising the closed packet and for removing it from the machine. Fig. 18 is a front elevation of the ejector shown in Fig. 17. Figs. 19 and 20 are views illustrating various stages in the closing of the packet.

Referring to the accompanying drawings 30 a indicates a table supported at each end upon the frames a^1 which are provided upon each side with bearings for shafts a^2 , a^3 upon which are mounted the various cams operating the mechanism mounted 35 upon the table a . The shafts a^2 , a^3 are operated by means of a pulley a^5 for a belt, such pulley upon one face being hollowed and containing an expansible annular body a^6 , mounted upon a sleeve on the pin a^4 , and by means of which the sleeve and the 40 pulley may be coupled for the purpose of driving the machine. The expansion of the annular body a^6 is effected by means of a projection a^7 carried upon the bobbin a^8 secured to the sleeve aforesaid and capable of sliding longitudinally thereof. The projection a^7 enters between the ears a^9 on the body a^6 . Engaging the bobbin a^8 are rollers a^{10} upon the bifurcated end of a lever 45 a^{11} , Figs. 1, 3 and 5 pivotally mounted upon a spindle a^{12} supported in brackets a^{13} upon the frame a^1 . The lower end of the lever straddles the aforesaid bobbin and the upper end has connected to it one end of a rod 50 a^{14} which passes along beneath the table a and is connected to a lever a^{15} mounted upon a spindle a^{16} supported in brackets such as a^{17} secured to the end of table a . A hand lever a^{18} is provided upon the spindle 55 a^{16} whereby the operation of the clutch may be effected. The sleeve before referred to is supported upon the pin a^4 secured to one of the frames a^1 . Also mounted upon and secured to the sleeve is a pinion a^{20} engaging 65 a second pinion a^{19} upon the end of the shaft

a^2 . The shaft a^2 at its opposite end has secured to it a bevel wheel a^{21} engaging a second bevel wheel a^{22} mounted upon a short shaft a^{23} running transversely across one end of the machine and supported in bearings 70 formed in brackets a^{24} bolted to the outer surface of the frame a^1 . The opposite end of the shaft a^{23} is also provided with a bevel wheel a^{24} which in its turn engages a similar wheel a^{25} mounted upon the 75 end of shaft a^3 . The arrangement of the parts just described will be readily understood on reference to Figs. 1, 2, 3 and 4 of the drawings.

As aforesaid the shafts a^2 , a^3 support the 80 various cams for operating the mechanism for effecting the various operations incidental to the closing of the packet and in addition to this the shaft a^3 supports a cam 85 b whereby an intermittent movement is imparted to the chain of receptacles containing the packets. The cam b operates a rod b^1 which at one end straddles the shaft a^3 and at the other is supported upon one side 90 by means of a roller b^2 mounted upon a bracket b^3 shown in dotted lines Fig. 5, and bolted to the inner surface of the frame a^1 . The inner face of the rod b^1 is provided with a series of teeth indicated by the dotted 95 line b^4 , such teeth engaging a toothed sector b^5 mounted upon a sleeve freely supported upon a vertical shaft b^6 , which shaft is supported at its upper and lower ends respectively in bearings formed in the frame 100 a^1 and table a . Pivotaly mounted upon the sector b^5 is a pawl b^7 adapted to engage a ratchet wheel b^8 secured to the shaft b^6 . Also secured to the aforesaid sleeve carrying the sector b^5 is an arm b^9 having connected to its outer end a rod b^{10} , which rod at its 105 opposite end is connected to an arm b^{11} mounted upon a sleeve upon a second vertical shaft b^{12} . The shaft b^{12} at its lower end is supported by a bracket b^{14} attached to the frame a^1 and at its upper end it is supported in a bearing on table a . Secured to the arm b^{11} is a pawl b^{15} engaging a ratchet wheel b^{16} upon shaft b^{12} . By this means an equal intermittent movement is imparted to 110 the shafts b^6 and b^{12} , which shafts at their upper ends have attached to them suitable wheels composed of disks having flat facets designed to engage the sides of the receptacles, the aforesaid chain running around 120 the said wheels and from end to end of the table, both runs of the said chain being supported upon the upper surface of the said table. Mounted on the shaft a^2 is a cam c engaging a roller upon a rod c^1 , see Fig. 7, straddling shaft a^2 at its lower end, and 125 at its upper end connected to an arm c^2 upon shaft c^3 running longitudinally of the table a and supported at each end in brackets c^4 , c^5 secured to the side of the table, 130 Fig. 1. Also mounted upon the shaft c^3 is

a second arm c^6 to which is connected one end of a rod c^7 passing transversely of the table a beneath same and at its opposite end connected to an arm c^8 secured to a shaft c^9 running longitudinally of and at the side of table a and supported in bearings in brackets c^{10} , c^{11} , c^{12} secured to the side of the said table a . By this means a rocking motion is imparted to the shaft c^3 and c^9 and is transmitted therefrom by suitable connections, which will be hereafter described in detail to such portions of the operating mechanism as is not operated directly from the shafts a^2 , a^3 .

The receptacles, which as already stated are connected together to form an endless chain, comprise open ended bodies x of rectangular cross section provided upon one side with lugs x^1 and upon the other side with lugs x^2 . Both series of the lugs are perforated and they are arranged so that the lugs x^1 upon one side of the receptacle are below the lugs x^2 upon the other side, a pin x^3 being passed through them to connect the said receptacles.

The arrangement of the lugs and pins can be clearly seen on reference to Figs. 1 and 2. The receptacles at their lower ends are provided upon their inner and outer exterior surfaces with projections x^4 which run between guides formed upon the table and by means of which guides the deviation of the chain from a straight line between the chain wheels is prevented. The inner face of the receptacle is also provided near the upper end with a projection x^5 which together with the inner projection x^4 at the lower end, Figs. 6, 12, 13, 16 and 17, comes into contact with the flattened surfaces upon the two disks s s^1 , Figs. 3 and 4, forming the chain wheel. Mounted at one end of the table a is a bracket d , see Figs. 1, 3, and 6 provided with bosses d^1 through which passes a rod d^2 having at its upper end an arm d^4 having a rectangular frame d^5 adapted to support a funnel d^6 through which the tea or the like is discharged from the weighing or other machine, not shown, and falls in the packet y . The funnel is arranged to reciprocate in the vertical plane and its movement is effected by means of an arm d^7 secured to the rocking shaft c^3 , and which arm at its outer end is provided with a pin d^8 engaging a slot formed in an eye at the lower end of rod d^2 . The slot, not shown, is arranged transversely of the line of the rod and is provided to permit the slight lateral displacement of the pin upon the arm due to the radial movement of said arm. The packet during the filling operation is supported upon a surface level with the upper surface of the table and during the filling and at its next period of rest and again later it is subjected to a vibratory movement designed to insure the settling

down of the contents in the packets. This vibration is effected by means of a plate d^9 which forms part of an arm d^{10} provided at its opposite end with a second plate d^{11} .

Both the plates d^9 and d^{11} are disposed within openings formed in the table a , said openings being of approximately the same dimensions as the lower end of the packets, which packets it may here be remarked are closed at one end prior to their introduction into the machine. The arm d^{10} , Figs. 1, 10 and 11 is secured to a rod d^{12} passing through a guide d^{13} formed upon the bracket d^{14} secured to the underside of table a . The rod d^{12} at its lower end rests upon one end of a lever a^{15} mounted on a spindle d^{20} in bracket d^{14} . The spindle d^{20} is supported in bearings formed in the brackets d^{14} , see Fig. 1, secured to the under surface of the table and which brackets carry guides which serve in one instance for the aforesaid rod d^{12} and a second similar rod for a second pair of plates, see Fig. 1, such as those whereby the packet is first subjected to vibration. Secured to the spindle d^{20} is an arm d^{21} at its outer end provided with a projection d^{16} which rests upon the periphery of a disk d^{17} upon shaft a^2 and which disk is provided with a number of teeth over which the aforesaid projection rides during the rotation of the shaft thereby imparting a vibrating motion to the packet under which the contents are caused to settle down. In order to assist the aforesaid settling down of the contents of the packet after the shaking aforesaid, I provide a plunger e , Figs. 3 and 12, which preferably comprises a circular rod supported in guides e^1 upon the bracket e^2 , which bracket is also shown in Fig. 1, the plunger and its operative parts being omitted. The plunger e has secured to it a boss, to which are connected short links e^3 connected to one end of a lever e^4 pivoted on bracket e^2 and connected at its outer end by means of a link e^5 with an arm e^6 upon the rock shaft c^3 .

As it may sometimes be required to deal with packets of different heights, I provide means whereby the packets may be allowed to drop a sufficient distance in the receptacles so as to bring the upper end in a proper position for the closing operations. This lowering of the packet is effected by forming openings in the table and providing plates f f^1 adapted to more or less fit such openings. The plates are supported beneath the openings by means of the cams f^2 . The opening extends upon one side from the point w , Fig. 1, to point w^1 , and upon the other side from the point x to the point x^1 also shown in Fig. 1. The transverse movement of the plate is prevented by means of studs f^3 tapped into the underside of table a as shown in Fig. 7 and passing through projection f^4 upon the sides of the plates.

The vertical adjustment of the plate is effected by the aforesaid cams f^2 which are mounted upon spindles f^5 running transversely of the table a and for which spindles, bearings are formed in the sides of said table a . Secured to one of each of the spindles f^5 is a worm wheel f^6 with which engage worms f^7 mounted upon a spindle f^8 , Figs. 2; 3, 4 and 7 supported in bearings f^9 formed upon the brackets c^{11} c^{12} for the shaft c^9 . A handwheel f^{10} is provided whereby the shaft may be rotated and in this manner a simultaneous adjustment may be made of both the plates f and f^1 . As aforesaid provision may be made for the introduction of a card or the like into the open packet after it has received its contents, and this is effected by the known means comprising a vertically reciprocating rod g , Figs. 1, 3, 13, 14 and 15, which rod is supported by a bracket g^1 mounted upon table a and provided in addition to a guide g^2 for the rod g with guides g^3 for a second rod g^4 , the lower end of which is provided with teeth adapted to engage a pinion g^5 mounted upon a spindle g^6 supported by the bracket g^1 upon which spindle is secured a second pinion g^7 which gears with a rack g^8 Fig. 13 formed at its upper end of a rod g^9 actuated by means of a cam g^{10} , Fig. 1 upon shaft a^2 . The rod g^4 at its upper end has secured to it an arm g^{11} to which is attached the upper end of the aforesaid rod g . The rod g is hollow and contained within it is a second rod g^{111} which at its upper end is attached to a lever g^{12} pivoted in a bracket g^{13} formed upon the upper surface of the arm g^{11} to the outer end of which is attached one end of a spring g^{14} . The rod g at its lower end has secured to it a plate g^{15} from the undersurface of which project pins g^{16} , which pins pass through and normally project somewhat beyond the outer surface of a second plate g^{20} carried by the lower end of rod g^{111} .

The cards or the like are stacked with a magazine h mounted upon a bracket h^1 secured to table a . Passing through the lower end of the magazine is a slide h^2 carried in guides upon bracket h^1 actuated by means of a pinion h^3 mounted upon a spindle h^4 , said pinion engaging teeth formed upon the underside of the slide. The reciprocation of the slide is effected by means of a rack upon the upper end of a rod h^5 supported upon a roller h^6 engaging a pinion h^{20} on spindle h^4 and receiving motion from a cam h^7 mounted on shaft a^3 , Figs. 2 and 13. The magazine at its lower end is pivotally mounted as shown in Fig. 13 upon bracket h^1 so that it may automatically adjust itself to any difference in the thickness of the cards or the like so as to avoid any of such cards fouling the discharge aperture. The plates g^{15} and g^{20} are lowered until they press upon the slide h^2 upon which lies the

card or the like and the protruding points of the pins g^{16} enter the card and enable it to be lifted as the plates are moved upward and the slide, which is shown extended in dotted lines in Fig. 13 with the card z thereon is drawn back clear of the path of the plates. The separation of the plates g^{15} , g^{20} in order to release the card from the pins is effected by means of the stud g^{10} upon bracket g^1 and which stud as the rods g and g^4 reach their lowest position comes into contact with the underside of lever g^{12} and raises its outer end against the action of spring g^{14} . By this means the rod g^{111} is depressed independently of rod g and the plate upon said rod g^{11} pushes or strips the card from the pins g^{16} depositing it on the top of the contents of the packet in the known manner. The packet while the above operations are being performed is again subjected to a vibrating action by means of the second plate on the second vibrator before referred to and shown in dotted lines in Fig. 1.

The packet having been filled is ready for closing and this is effected by means of the block i , Figs. 1, 4, 7, 8, 9 and 19. The block i is supported upon a spindle i^1 carried in bearings formed upon a bracket i^2 . The spindle is arranged transversely of the line of movement of the receptacles and at its outer end it is provided with a pinion i^3 with which engages a rack i^4 formed upon the upper end of the rod i^5 , for which rod, guides i^6 , are formed on the back of the bracket i^2 . The rod i^5 at its lower end is connected by means of a link i^7 with an arm i^8 secured to the rock shaft c^3 . By this means an intermittent reciprocating rotary motion is given to the block i under which when the packet comes to rest, the block encounters the rear upstanding side of the upper end of the packet and turns or folds same down on to the contents. In order to secure the next fold upon the opposite side of the packet I provide the block i with a surface i^9 , Figs. 8, 9 and 19, and an adhesive is applied thereto while the block is in its raised position clear of the packet by means of the roller i^{10} carried by the rods i^{11} , Figs. 4 and 7, and which arms, as indicated by dotted lines in the figures just referred to, are pivotally connected at their inner ends at i^{12} to the underside of a slide i^{13} for which guides are provided upon the bracket i^{14} secured to the table a inside the chain. The roller is yieldably held in position by means of the spring i^{15} connected at one end to the rods i^{11} and also to the pin i^{16} upon the slide i^{13} . The bracket i^{14} also supports a gum reservoir i^{17} in which is disposed a roller i^{18} , Fig. 4, and which roller is actuated by means of a cord belt or the like i^{19} , Fig. 7, passing around guide sheaves i^{20} i^{20} and receiving motion from the sheave i^{21} on shaft

5 a^3 . The reciprocal movement of the slide i^{13} is obtained by means of a cam i^{22} upon the shaft a^3 , which cam actuates a lever i^{23} pivotally mounted on shaft c^9 and connected at its upper end by means of a rod i^{24} with the aforesaid slide i^{13} . The lever i^{23} and cam i^{22} are shown in full in Fig. 2 and the lever in dotted lines in Fig. 7. During the time that the folding and gumming operations just referred to are being performed, the sides of the packet which are not being operated upon are supported by means of side plates j^1, j^2 , Figs. 4 & 7. These plates which are arranged upon each side of the folder are inclined at an angle corresponding with the angle of the sides of the folder and they are normally held clear of the folder by means of springs, not shown, which act to keep them apart.

20 The plates after the folder has turned the side of the packet down are caused to move inward and press the upstanding sides so that they do not become distorted. The plates are carried by the levers j^2, j^3 pivotally mounted upon the table a by means of the eyes j^4 , see Fig. 4 secured to the upper surface of the said table. The levers pass through the table and at their lower ends they are connected by means of short links j^5 to the upper end of a rod j^6 slotted at j^7 and engaging a pin or stud upon an arm i^8 secured to the rock shaft c^3 . As the shaft c^3 is rocked the arm i^8 pulls the rod j^6 down causing the links j^5 to be brought more or less into a straight line and actuating the levers j^2, j^3 so that the plates j^1, j^2 are caused to press against the sides of the folder. The plates j^1, j^2 are of sufficient length to extend between the receptacles so that they are not only operative while the first fold is made but also coact with the second folder. This second folder comprises a body k having inclined sides, the body k being fixed in the line of movement of the packets and supported by means of a stud k^1 passing through a boss k^2 formed on the bracket i^2 . The stud k^1 at its lower end is provided with an eye k^3 , Fig. 4, a pin passing through said eye and through the walls of the body k . As the packet is drawn beneath the body k the opposite side is turned or folded down upon the first fold and pressed upon the adhesive on the outer surface of said first fold to secure it.

55 The packet, which is now partly closed, and which during the folding operations has been supported by the plate f is next raised until the lower end is upon a level with the upper surface of table a . This lifting of the packet is effected by means of a plate l , Figs. 1, 2 and 7, which plate forms part of the upper portion of an extension l^2 on a lever l^1 pivotally mounted on the spindle f^8 . The lever passes beneath the table a and at its free end it is connected to a lever l^3

straddling shaft a^2 and actuated by means of a cam l^4 , Fig. 1, upon said shaft. By this means the packet is lifted and is carried around by the receptacle on the upper surface of the table a until the chain commences its return movement when the packet drops on to the second plate f^1 and moves forward to the gummer, by which the gum is applied to the folded portions in order to secure the final folds. The gumming just referred to is effected by means of a gummer m , Figs. 2 and 4 which is provided with gumming surfaces m^1 . The gummer is pivotally secured at one end to a rod m^2 supported in a guide formed upon a bracket m^3 secured to table a . Also secured to the bracket m^3 is a rod m^4 curved as shown in Fig. 4 at its lower end and which rod forms a guide for the roller m^5 upon the gummer m . A spring m^6 is connected to the gummer m so that it is held in a position with its roller bearing upon the inner face of the rod m^4 and as it is carried downward when it reaches the curved portion of rod m^4 it turns into a horizontal position and comes into contact with the upper surface of the partly closed end of the packet applying the adhesive thereto in the known manner. A slipper m^7 upon the rod m^2 embraces the rod m^4 and serves to hold the rods against the action of the spring m^6 which otherwise would tend to force the said rods m^2, m^4 apart. The reciprocation of the rod m^2 is effected by means of a toothed section m^8 mounted upon a spindle m^9 supported by the bracket m^3 . The sector m^8 engages teeth formed on the back of rod m^2 and it receives motion by means of a pinion m^{10} on spindle m^9 which engages a rack formed at the upper end of the rod m^{11} . The rod m^{11} is supported in guides on the bracket m^3 and is held against displacement by means of the roller m^{12} . The rod m^{11} is connected at its lower end to the slotted end of an arm m^{13} secured to the rock shaft c^9 . The bracket m^3 also supports the gum reservoir and gum is taken therefrom by means of a roller m^{14} supported by brackets attached to the sides of the bracket m^3 as shown in Figs. 2 and 4. The roller m^{14} is in contact with a second roller m^{15} dipping into the gum receptacle m^{151} , the latter roller being driven by means of the chain indicated by m^{17} , Fig. 4 which passes around a chain wheel m^{18} and thence over guide pulleys m^{19} and around a chain wheel on shaft a^3 . The gum receptacle is supported upon a platform m^{20} on bracket m^3 as shown in Fig. 2.

The packet after the gum has been applied by the mechanism just referred to passes beneath a plate n , Figs. 2 and 7, which at its forward end is bifurcated as shown, the inner faces of such bifurcated portions being turned or inclined upward or otherwise provided with surfaces de-

signed to engage the upstanding sides of the packet and as it is drawn thereunder the said sides are turned inward until they lie flat upon the top of the packet. The plate n is supported by means of the studs n^1 tapped into the table a . The packet after the closing aforesaid is subjected to pressure at each of the next three periods of rest to insure the proper and effective adhesion of the gum. The pressing just referred to is effected by means of the plate o , Figs. 2, 16 and which plate is attached to the lower end of a rod o^1 supported in guides o^2 upon a bracket o^3 secured to table a . The rod has secured to it a block o^{31} to which are attached the ends of short links o^4 which at their opposite ends are attached to one end of a lever o^5 pivotally mounted upon bracket o^3 . The movement of the rod o^1 , is effected by means of a rod o^6 attached at its upper end to the aforesaid lever o^5 and at its lower end provided with a slotted head o^7 with which engages a stud o^8 upon a short arm o^9 upon the rock shaft c^9 . The closing of the packet having been effected it is next discharged from the machine and this is effected by means of the plate p attached to the upper end of the rod p^1 , see Fig. 17 in which figure the packet is shown in dotted lines supported upon the plate p . The plate passes through the receptacle, its reciprocation being effected by means of the sector p^2 upon rock shaft c^9 , which sector engages the teeth p^3 upon the rod p^1 supported in bracket p^4 . The packet when it has been raised clear of the receptacle is drawn forward and may be discharged into a chute by means of the plate q upon the inner end of a slide q^1 supported in guides upon a bracket q^2 upon table a . The slide q^1 is caused to reciprocate across the top of the receptacle by means of the rack q^{22} upon the underside, shown in dotted lines in Fig. 17 and in full in Figs. 2 and 18, with which rack engages a pinion q^3 mounted upon a spindle q^4 supported in bearings on the bracket q^2 . A second pinion q^5 is attached to the outer end of spindle q^4 and engaging the said pinion q^5 is a rack q^6 formed upon the upper end of the rod q^7 . The rod q^7 at its lower end straddles the shaft a^3 and is provided with a roller q^9 which engages a cam q^{10} , Fig. 2. The upper end of the rod is held against outward movement by means of the roller q^{11} supported upon bracket q^2 . Suitable springs are provided where necessary to keep the parts in contact with the operating cams, or as in the case of the vibrators the operating disk. I may in some instances dispense with the card inserting mechanism.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. In a packing machine an endless chain

of receptacles for the packets having both runs arranged in the horizontal plane, means for filling the packet, means for shaking the contents, means for pressing the contents, means for introducing a card into the filled packet prior to the closing thereof, a combined gumming and folding device for effecting the first fold, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outer surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds, and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

2. In a packing machine an endless chain of receptacles for the packets having both runs arranged in the horizontal plane, means for filling the packets comprising a vertically reciprocating funnel, a vibratory support for the packet during the filling operation, means for pressing the contents, means for introducing a card into the filled packet prior to the closing thereof, a combined gumming and folding device for effecting the first fold, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outside surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds, and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the heights of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

3. In a packing machine an endless chain of receptacles for the packets having both runs in the horizontal plane, means for filling the packets comprising a vertically reciprocating funnel, a vibratory support for the packet during the filling operation, a vertically reciprocating rod for pressing the contents of the packet, means for introducing a card into the filled packet prior to the closing thereof, a combined gumming and folding device, for effecting the first fold, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outer surface of the second fold, means for effecting the folding of the

side folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packet in the receptacles, and means for raising the packet to the level of the upper surface of the table.

4. In a packing machine, an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the lever to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine, and carrying them into a position where they may be picked up by the protruding ends of the pins, a combined gumming and folding device for effecting the first fold, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outer surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packet in the receptacles, and means for raising the packet to the level of the upper surface of the table.

5. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating

slide removing said cards from the magazine and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying the gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outer surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packet in the receptacles, and means for raising the packet to the level of the upper surface of the table.

6. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which pass a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine, and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged upon each side of the said first and second folding bodies, and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the outer surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

7. In a packing machine an endless chain

of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which pass a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine, and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller carrying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged upon each side of the said first and second folding bodies and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring actuated carriage with gum bearing surfaces thereon, a guide for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, means for effecting the folding of the surface, side folds, means for pressing the side folds, and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

8. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations; means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its

upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged on each side of the said first and second folding bodies and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring actuated carriage with gum bearing surfaces thereon, a guard for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, a bifurcated plate arranged above the ends of the receptacles for effecting the third and fourth folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for pressing the packet to the level of the upper surface of the table.

9. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine and carrying them into a position where they may be picked up by the pro-

truding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged on each side of the said first and second folding bodies and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring actuated carriage with gum bearing surfaces thereon, a guard for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, a bifurcated plate arranged above the ends of the receptacles for effecting the third and fourth folds, a reciprocating plate arranged to press the closed ends of the packet at each of its succeeding three periods of rest, means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

10. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged on each side of the said first and second folding bodies and mounted upon levers

whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring actuated carriage with gum bearing surfaces thereon, a guard for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, a bifurcated plate arranged above the ends of the receptacles for effecting the third and fourth folds, a reciprocating plate arranged to press the closed ends of the packet at each of its succeeding three periods of rest, a vertically reciprocating plate passing through the table and into the receptacle for raising the packet clear of the receptacle, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

11. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations, means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged on each side of the said first and second folding bodies and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring actuated carriage with gum bearing surfaces thereon,

a guard for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, a bifurcated plate arranged above the ends of the receptacles for effecting the third and fourth folds, a reciprocating plate arranged to press the closed ends of the packet at each of its succeeding three periods of rest, a vertically reciprocating plate passing through the table and into the receptacle for raising the packet clear of the receptacle, means for removing the packet from the machine comprising a horizontally reciprocating slide having a vertical member at one end adapted to come behind the packet when raised clear of the receptacle and pushes it forward clear of the receptacle, means for adjusting the height of the packet in the receptacles, and means for raising the packet to the level of the upper surface of the table.

12. In a packing machine an endless chain of receptacles having both runs arranged in the horizontal plane, means for filling the receptacles comprising a vertically reciprocating funnel, a vertically reciprocating rod for pressing the contents of the packet, a vibratory support for the packet during the filling and pressing operations; means for introducing a card in the filled packet comprising a vertically reciprocating rod having an arm supporting a hollow rod through which passes a second rod attached at its upper end to a spring controlled lever on the arm, a plate upon the lower end of the tubular rod having pins upon its under surface, a plate upon the second rod having perforations for the passage of the pins, means for actuating the levers to separate the plates, a card magazine, a reciprocating slide removing said cards from the magazine and carrying them into a position where they may be picked up by the protruding ends of the pins, a swinging block arranged in the path of the packet, a gum carrying surface on said block, a reciprocating roller conveying gum from a reservoir to the gum surface on the folder, a body fixed in the line of movement of the chain, plates arranged on each side of the said first and second folding bodies and mounted upon levers whereby they may be caused to press and support the upstanding ends of the packets, means for applying gum to the upper surface of the second fold comprising a vertically reciprocating rod having pivotally connected to it at one end a spring

actuated carriage with gum bearing surfaces thereon, a guard for the carriage whereby it is maintained in the vertical position until reaching its lowest position when it is brought by the spring into the horizontal plane, a gum reservoir, a continuously driven roller in said reservoir, a second roller in contact with the first roller and arranged in the line of movement of the gum surfaces on the carriage, a bifurcated plate arranged above the ends of the receptacles for effecting the third and fourth folds, a reciprocating plate arranged to press the closed ends of the packet at each of its succeeding three periods of rest, a vertically reciprocating plate passing through the table and into the receptacle for raising the packet clear of the receptacle, means for removing the packet from the machine comprising a horizontally reciprocating slide having a vertical member at one end adapted to come behind the packet when raised clear of the receptacle and pushes it forward clear of the receptacle, means for adjusting the height of the packets in the receptacles comprising plates arranged beneath apertures in the table and supported upon cams secured to spindles moving transversely of the line of travel of the packet, worms upon one end of said spindles, a second spindle carrying worm wheels engaging the worms, means for effecting the rotation of the spindle, and a vertically reciprocating plate disposed at one end of one of the adjustable plates for raising the packet to the level of the upper surface of the table.

13. In a packing machine an endless chain of receptacles for the packets having both runs arranged in the horizontal plane, means for filling the packet, means for shaking the contents, a combined gumming and folding device for effecting the first fold, a body fixed in the line of movement of the chain for effecting the second fold, means for supporting the remaining portions of the end of the packet during the first and second folding operations, means for applying gum to the outer surface of the second fold, means for effecting the folding of the side folds, means for pressing the side folds and means for lifting the packet clear of the receptacles, means for removing it from the machine, and means for adjusting the height of the packets in the receptacles, and means for raising the packet to the level of the upper surface of the table.

In witness whereof I have hereunto set my hand in the presence of the two undersigned witnesses.

EDWARD COLSTON LOVELL.

Witnesses:

L. H. TAYLOR,

HOMER M. BYINGTON.