Oct. 9, 1956 E. C. KRAUS ET AL 2,765,931

MACHINE FOR HANDLING MULTI-LAYER PAPER BAG PACKAGES

Original Filed May 14, 1947 5 Sheets-Sheet 1

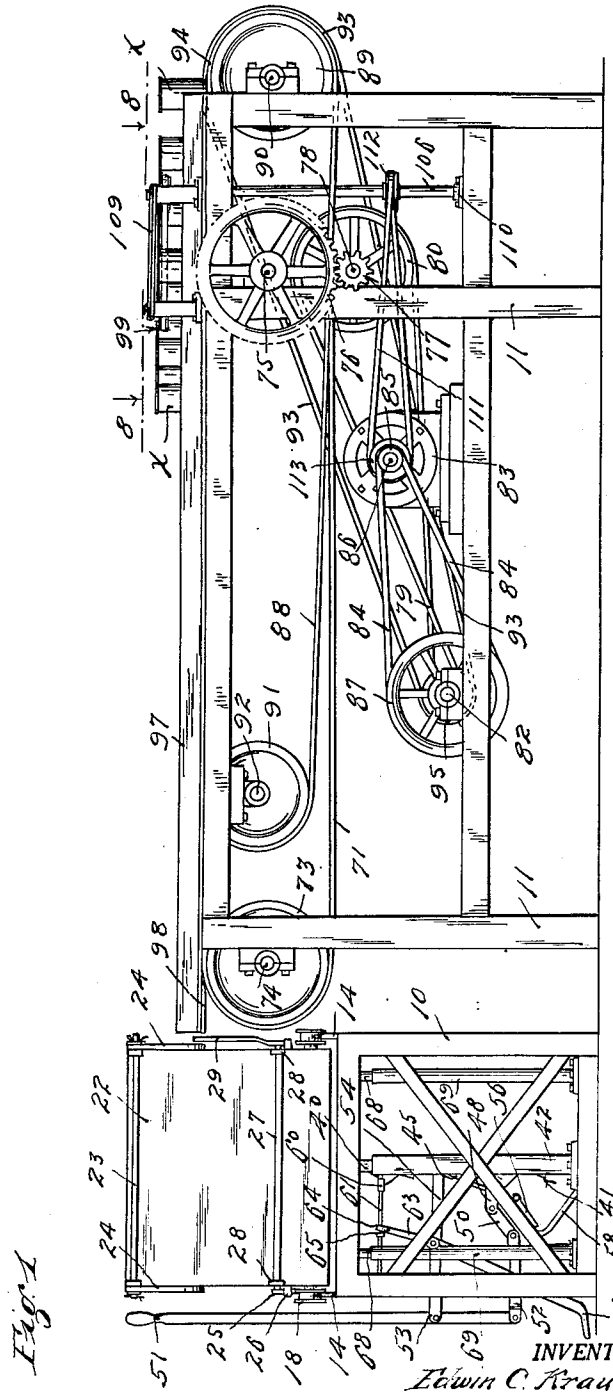


Fig. 1

INVENTORS
Edwin C. Krause
BY Maurice V. Douthitt
Harry W. Kilgore
Attorney

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Original Filed May 14, 1947 5 Sheets-Sheet 2

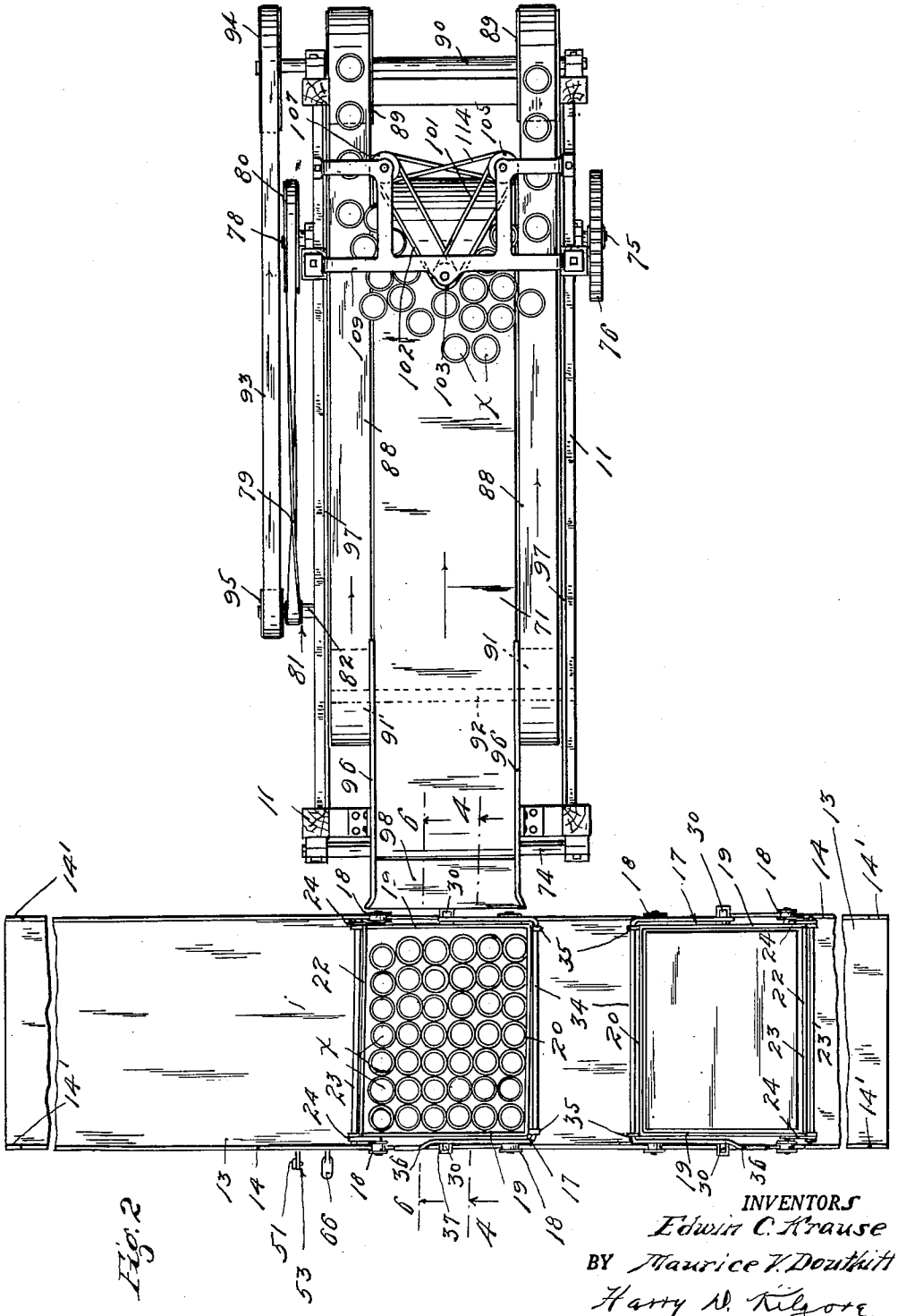


Fig. 2

INVENTORS
Edwin C. Krause
BY Maurice V. Douthitt
Harry N. Kilgore
Attorney

Oct. 9, 1956 E. C. KRAUS ET AL 2,765,931

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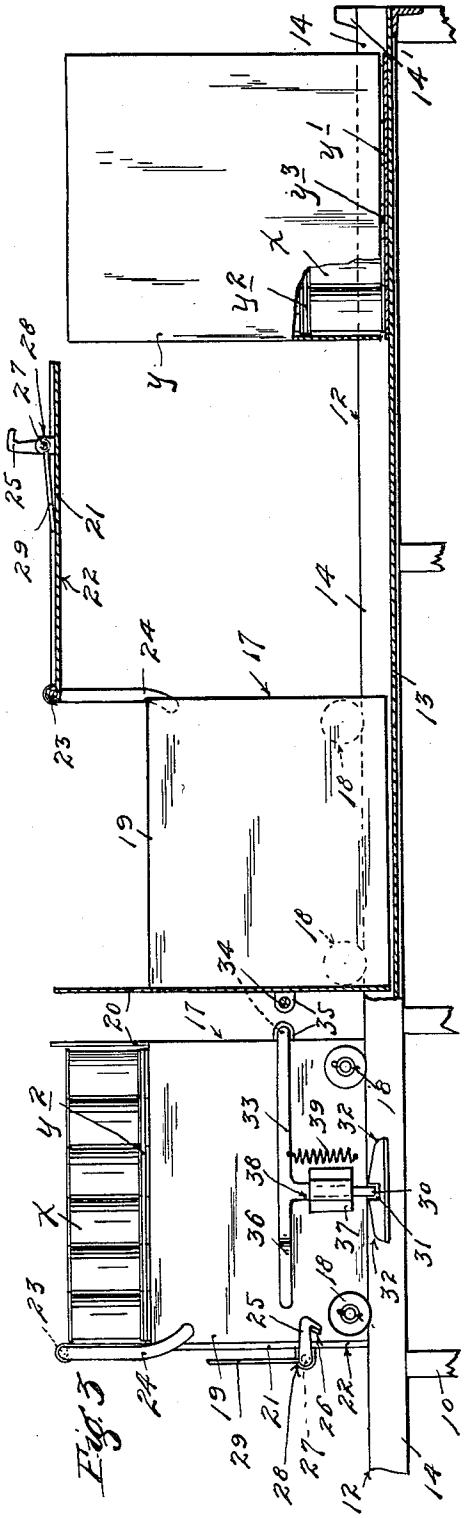


Fig. 3

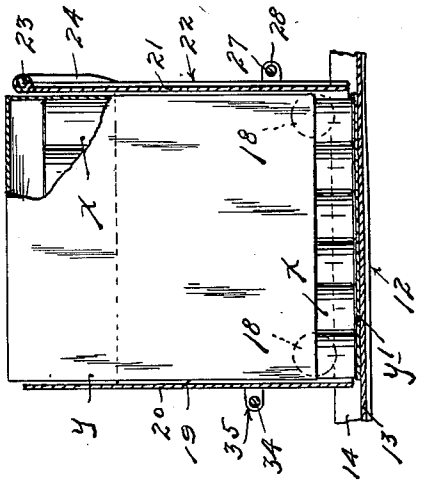


Fig. 5

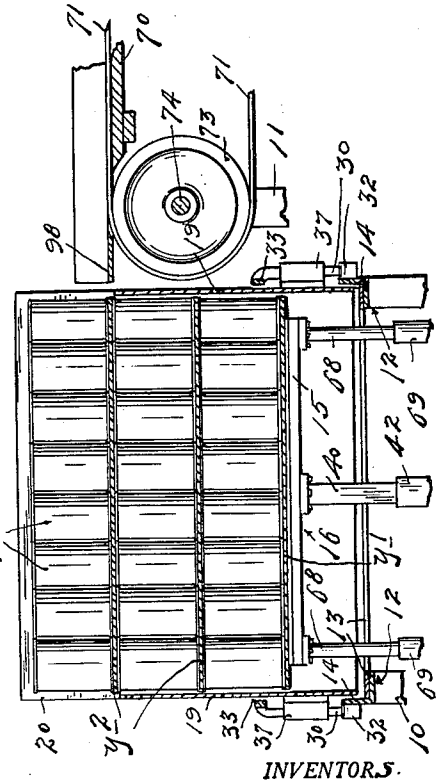


Fig. 4

INVENTORS.
Edwin C. Krause
BY Maurice V. Douthitt
Harry N. Kilgore
Attorney

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Fig 7

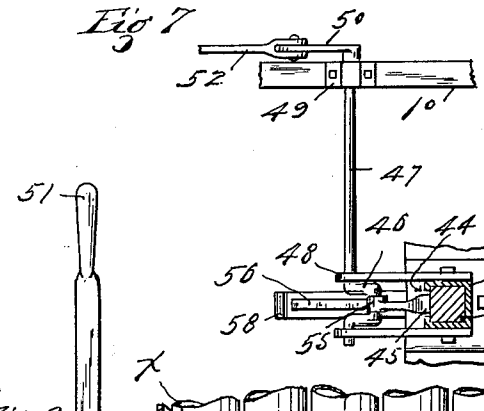


Fig 6

INVENTORS.
Edwin C Krause
BY Maurice V Doathitt
Harry D. Kilgore
Attorney

Oct. 9, 1956 E. C. KRAUS ET AL 2,765,931

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Fig. 8

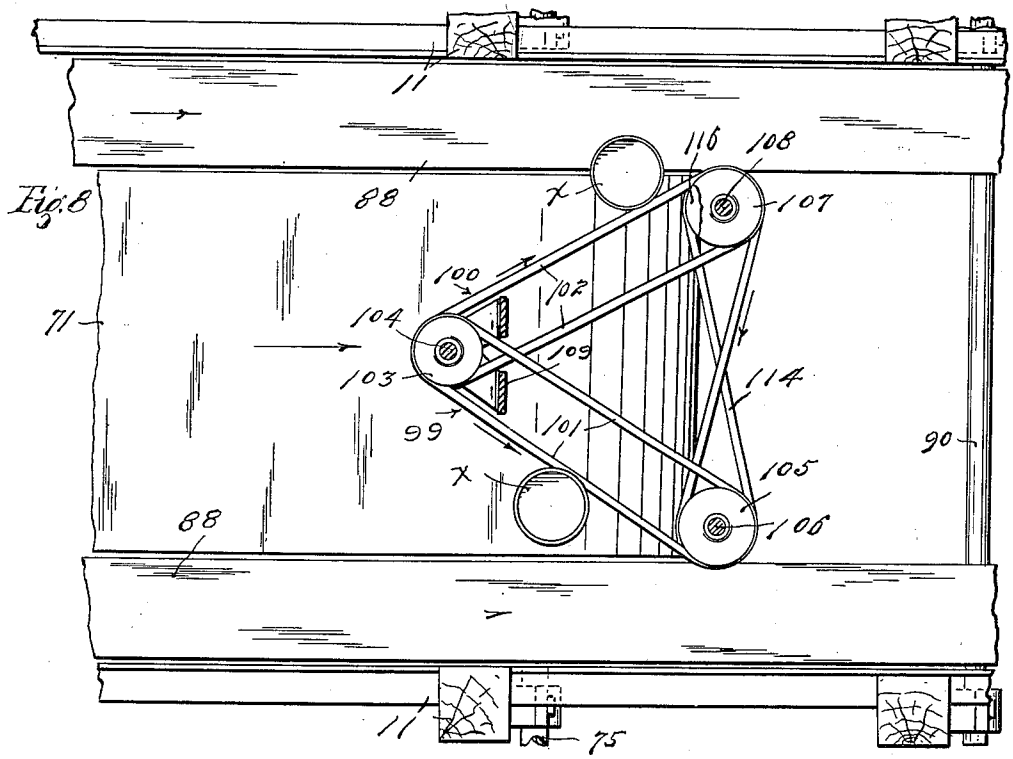
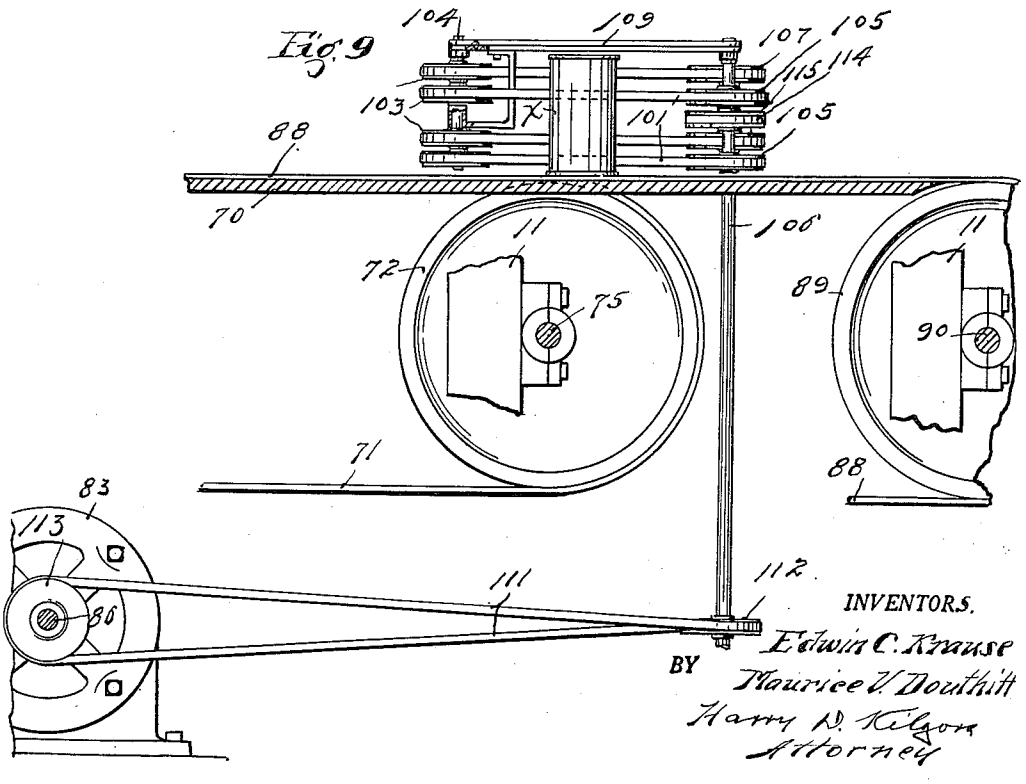


Fig. 9



INVENTORS.
Edwin C. Krause
Maurice V. Douthitt
BY Harry D. Kilgore
Attorney

United States Patent Office

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MACHINE FOR HANDLING MULTI-LAYER PAPER BAG PACKAGES

Edwin C. Kraus and Maurice V. Douthitt,
Ortonville, Minn.

Continuation of application Serial No. 748,132, May 14, 1947. This application February 2, 1953, Serial No. 334,406

8 Claims. (Cl. 214—8.5)

Our invention relates to a novel method and a highly efficient machine for handling tin cans to be filled.

As is well known, it is now quite the general practice for manufacturers of tin cans to ship the same to canning establishments without covers, in rectangular paper bags in which they are arranged in a plurality of tiers with a heavy paper divider between adjacent tiers. It is a slow and tedious process to remove these cans by hand from the bags in which they are shipped, and in placing the cans on conveying means that carries the same to a filling apparatus.

An object of this invention is to provide a novel method of encasing a bag containing empty tin cans, in emptying the bag and in delivering the cans to conveying means.

Another object of this invention is to provide a novel lift operable to successively bring tiers of empty tin cans into a position for discharge as an entirety onto conveying means.

Other objects of this invention will be apparent from the following description, reference being had to the drawings.

To the above end, generally stated, the invention consists of the novel method, devices and combination of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a right side elevational view of the improved machine;

Fig. 2 is a top plan view of the same, some parts being broken away;

Fig. 3 is a fragmentary front elevational view of the improved machine, some parts being sectioned;

Fig. 4 is a fragmentary view partly in right side elevation and partly in section taken on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view of one of the carriages having therein a bag of cans, the side members of said bag having been severed at the bottom member and the bag partly lifted from the cans therein;

Fig. 6 is a fragmentary view partly in side elevation and partly in vertical section taken on the line 6—6 of Fig. 2, on an enlarged scale;

Fig. 7 is a fragmentary detail view partly in plan and partly in section taken on the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary view partly in top plan and partly in section taken on the line 8—8 of Fig. 1, on an enlarged scale; and

Fig. 9 is a fragmentary view principally in side elevation of the parts shown in Fig. 8.

The improved machine includes a main frame 10 and an auxiliary frame 11, in T arrangement, the former forming the head of the T. This main frame 10 is long, relatively narrow and includes a pair of angle bars 12 at the top and sides thereof. The horizontal flanges of the angle bars 12 are in opposing relation and support thereon a flat, smooth sheet metal table 13 and the vertical flanges of said bars are upstanding and afford a pair of track rails 14. Formed in the table 13, at the longitudinal center thereof, is a rectangular opening for the platform 15 of a lift 16.

Two identical carriages 17, except that they face in opposite directions, are arranged to travel one over each end portion of the table 13 to be successively positioned over the lift platforms 15. Pairs of grooved wheels 18, journaled on the side members 19 of each carriage 17, are arranged to run on the track rails 14. On the outer end portions of the rails 14 are upstanding stops 14' for the carriages 17. The back member 20 of each carriage 17 is integral with the side members 19 thereof and the front member 21 of said carriage affords a gate 22. This gate 22 is pivoted at 23 to a pair of upstanding arms 24, for outwardly swinging movement. These arms 24 project materially above the side members 19 to which they are rigidly secured.

Each gate 22 is normally held closed by a pair of hook-like catches 25 that engage lock lugs 26 on the side members 19 of the carriage 17. The pair of catches 25 are secured to a rock-rod 27 journaled in bearings 28 on the gate 22, and which rod is manually operated by an upstanding handle 29 on said rod.

Each carriage 17 is releasably held centered when positioned over the lift platform 15 by a pair of dogs 30, that extend into notches 31 between pairs of reversely inclined cams 32 on the outer sides of the track rails 14. These dogs 30 depend from a pair of horizontally disposed arms 33 on a rock-rod 34 journaled in bearings 35 on the back member 20 of the carriage 17. One of the arms 33 is extended to form a handle 36 by which the arms 33 may be raised to withdraw the same from the lock notches 31. The dogs 30 loosely work through guides 37 on the carriage side members 19 and have stop shoulders 38 that engage the upper ends of the guides 37 and limit the downward movement of the dogs 30 into said guides. Coiled springs 39 anchored to the carriage side members 19 are attached to the arms 33 and yieldingly hold the dogs 30 in operative positions. Obviously, as one of the carriages 17 is being moved toward the lift 16, its dogs 30 will engage the adjacent cams 32, be lifted thereby against the tension of the springs 39, and upon passing said cams will be projected by the tensioned springs 39 into the lock notches 31.

A depending square shaft 40 is rigidly secured at its upper end to the under side of the platform 15 at the center thereof and is provided with a plurality of ratchet teeth 41 longitudinally spaced equi-distances apart. This shaft 40 extends into a correspondingly formed post 42 rigidly secured to a base 43 on the frame 10. In the front of the post 42 is a slot 44 in which the ratchet teeth 41 move.

Co-operating with the ratchet teeth 41 to lift the shaft 40 and hence the platform 15 is a pawl 45 pivoted to a crank 46 on a shaft 47 journaled in bearings 48 on the post 42 and a bearing 49 on the frame 10. On the outer end of the shaft 47 is a crank arm 50 pivotally connected by a link 52 to the lower or short end portion of an upstanding hand lever 51, in front of the frame 10. This hand lever 51 is pivoted to a bearing 53 on the outer end of a bar 54 rigidly secured to the frame 10.

Integral with the hub 55 of the pawl 45 is a lever extension 56 connected to one of the arms of the crank 46 by a coiled spring 57. This spring 57 yieldingly holds the pawl 45 in engagement with any one of the ratchet teeth 41, except the uppermost. When operating the hand lever 51 to move the pawl 45 out of engagement with an engaged ratchet tooth 41 and in lowering said pawl, the lever extension 56 engages an oblique arm 58 on the frame member 43 and moves the pawl 45 pivotally on the crank 46 for engagement with the next below ratchet tooth 41.

The upper end portion of the arm **58** is curved toward the shaft **40** to keep the lever extension **56** in engagement with said arm.

A dog **59** is provided for holding the shaft **40**, by being engaged by one of the ratchet teeth **41**, when the pawl **45** is out of engagement with a ratchet tooth **41**. This dog **59** is slidably mounted in a bearing **60** on the upper end portion of the post **42**. A rod **61** is attached at one of its ends to the outer end of the dog **59** and its other end portion slidably works in a bearing **62** on the frame **10**. The dog **59** is operated by a foot lever **63** intermediately pivoted at **63'** to the bar **54** and has on its upper end a shipper fork **64** that straddles the rod **61** and engages a collar **65** on said rod. The lower end portion of the foot lever **63** is materially longer than the upper end portion thereof and extends obliquely outwardly and has on its lower end a foot-piece **66**. A coiled spring **59'** anchored to the post **42** and attached to the dog **59** at its outer end, yieldingly holds the dog **59** in an operative position. Obviously, by moving the foot-piece **66** inwardly, the foot lever **63** by its engagement with the collar **65**, will retract the dog **59** and release the engaged ratchet tooth **41**.

To lower the lift **16**, the hand lever **51** is operated to move the pawl **45** out of engagement with the engaged ratchet tooth **41** and the foot lever **63** is operated to withdraw the dog **59** from the ratchet tooth **41** that rests thereon, and thus allows the lift **16** to drop by the force of gravity. In the bottom of the post **42** is a rubber buffer **67** which acts as a stop when the lift **16** is released.

The lift **16** is held by straight line raising and lowering movements by four corner rods **68** that are telescoped into tubular posts **69**. The rods **68** are rigidly secured to the platform **15** on its under side and depend therefrom and the posts **69** are rigidly secured to the base **43**.

It is important to note that the carriage back member **20** and the gate **22** extend materially above the side members **19** for a purpose which will hereinafter appear.

On the top of the auxiliary frame **11** is a deck **70** on which rests the upper run of a wide, endless conveyor belt **71**. This belt **71** runs over a driven front pulley **72** and a rear idle pulley **73**, the shaft **74** of which is journaled in bearings on the frame **11**. The shaft **75** of the pulley **72** is journaled in bearings on the frame **11** and has on one of its end portions a large spur gear **76** that meshes with a spur pinion **77** on the frame **11** directly below the shaft **75**.

A crossed belt **79** runs over a large pulley **80**, on the opposite end portion of the shaft **78** from the spur pinion **77**, and a small pulley **81** on a counter-shaft **82** journaled in bearings on the frame **11**. This counter-shaft **82** is driven from an electric motor **83** mounted on the frame **11** under the deck **70** by a belt **84** that runs over a small pulley **85** on the armature shaft **86** of the motor **83** and a large pulley **87** on the counter-shaft **82**.

By reference to Fig. 4, it will be noted that the upper run of the conveyor belt **71** is substantially in the plane of the upper edges of the carriage side members **19**.

A pair of narrow conveyor belts **88** extend parallel to the conveyor belt **71** and are closely positioned one at each longitudinal edge of the conveyor belt **71**. These two conveyor belts **88** run over driven pulleys **89**, on a shaft **90** journaled in bearings on the front end of the frame **11**, and rear idle pulleys **91** on a shaft **92** journaled in bearings on said frame. The shaft **90** is driven by a belt **93** that runs over a large pulley **94** on the shaft **90** and a small pulley **95** on the counter-shaft **82**.

The conveyor belts **71** and **88** are all driven in the same direction, as indicated by arrows thereon in Fig. 2, and their upper runs are all in the same plane. The conveyor belt **71** extends rearwardly of the conveyor belts **88** and the conveyor belts **88** extend forwardly of the conveyor belt **71**.

Guard rails **96** secured to the deck **70** extend from the frame **10** forwardly along the longitudinal edge portions of the conveyor belt **71** and overlap the inner longitudinal edges of the conveyor belts **88** at their rear end portions. At the outer longitudinal edges of the conveyor belts **88** are guard rails **97** secured to the frame **11** and extend substantially the full length of said belts. A short deck **98**, attached to the guard rails **96**, extends from the frame **10** to the upper run of the conveyor belt **71** and is in the same plane as said upper run.

Overlying the front end portion of the conveyor belt **71** is a pair of tin can deflectors **99** and **100**. Each deflector **99** and **100** includes two V belts **101** and **102**, respectively. The V belts of each deflector **99** and **100** are arranged to run in parallel horizontal planes. All of the V belts **101** and **102** run over pulleys **103** on a single rear shaft **104** at the transverse center of the conveyor belt **71**. The belts **101** also run over front pulleys **105** on a driven shaft **106** and the belts **102** run over front pulleys **107** on a driven shaft **108**. The two shafts **104** and **106** are directly opposite each other and the belts **101** and **102**, when they run over the pulleys **103** and **105**, slightly overlap the inner edge portions of the conveyor belts **88**. The shafts **104**, **106** and **108** are journaled in a bearing bracket **109** rigidly secured to the frame **11** and overlie the conveyor belts **71** and **88**.

The shaft **106** at its lower end is journaled in a bearing **110** on the frame **11** and is driven from the motor **83** by a belt **111** that runs over a pulley **112** on the shaft **106** and a pulley **113** on the armature shaft **86** to said motor. The shaft **108** is driven from the shaft **106** by a crossed V belt **114** that runs over a pulley **115** on the shaft **106** and a pulley **116** on the shaft **108**.

Tin cans x to be handled by the above described machine are received from the manufacturer in rectangular paper bags, only one of which is shown and indicated as an entirety by the letter y with the exception of its bottom member y^1. The cans x in the bag y are arranged in tiers, as shown four, and a divider y^2 is interposed between adjacent tiers. Each divider y^2 is a heavy sheet of paper.

Operation

Operation of the above described machine may be described as follows: The bag y containing empty cans x is placed on the outer right-hand end portion of the table **13** and the four sides of each bag y are completely severed, close to the bottom member y^1 of said bag, as indicated at y^3 in Fig. 3, by any suitable means, such as a knife or a ripping cord embodied in the side members of the bag y, but for the purpose of this case it will not be necessary to show the same. Next the gate **22** of the right-hand carriage **17** is opened, as shown in Fig. 3, into a horizontal position in which it is above the bag y and the carriage moved to receive the bag y and the gates **22** then closed. During the closing of the gate **22**, the catches **25** automatically interlock with the lock lugs **26** and hold the gate **22** closed.

The carriage **17** is then moved into a position over the lift platform **15** and during this movement, the bag y therein is being slid on the table **13** and from thence onto said platform. It is important to note the lower edges of the carriage **17** and its gate **22** are close to the table **13** so that the bottom member y^1 of the bag y is kept thereby in its original position with respect to the bag y. As the carriage **17** is moved over the platform **15**, the dogs **30** first engage the adjacent cams **32**, are lifted thereby and then projected into the lock notches **31** by the tensioned spring **39** and thus positively hold the carriage **17** centered over the lift platform **15**.

After the carriage **17** has been positioned over the lift platform **15**, the bag y with the exception of its bottom member y^1, which has been cut therefrom, is lifted from the carriage **17** to empty the same. This positioning of a carriage **17** over the lift platform **15** aligns the tiers of cans x thereon with the conveyor belt **71** and positions

the uppermost divider y^2 in the plane of the upper run of said belt or just slightly above the same.

The upper tier of cans x is next shoved, as an entirety, by an suitable means, not shown, from the underlying divider y^2, over the deck **98** and onto the conveyor belt **71**. The back member **20** and the gate **22** which project above the side member **19** prevent the cans x from falling out of the carriage **17** as they are being moved to the conveyor belt **71**.

After the discharge of the upper tier of cans x from the carriage **17**, the hand lever **51** is operated to lift the platform **15** and bring the next below tier of cans x into a position to be fed to the conveyor belt **71** and the uppermost divider y^2 removed therefrom and said cans fed to the conveyor belt **71**. This operation is repeated until all of the cans x in the carriage **17** have been fed to the conveyor belt **71**.

The cans x are carried in bulk by the conveyor belt **71** to the deflectors **99** and **100**. At this point, the cans x are divided and directed by the V belts **101** and **102** onto the conveyor belts **88** which are moving considerably faster than the conveyor belt **71**. The cans x, due to the different speeds at which the conveyor belts **71** and **88** are moving, are spaced apart in a single row on each conveyor belt **88**. From the conveyor belts **88**, the cans x are delivered to filling mechanism, not shown.

From the above summary of the operation, it is evident that while one of the carriages **17** is being unloaded, the other is being loaded. It will thus be seen that bags of cans may be quickly emptied and the cans fed to a filling apparatus.

This application is a continuation of our application, Serial No. 748,132, filed May 14, 1947, now Patent No. 2,656,910, entitled "Means for Conveying and Arranging Cans in Rows."

From the foregoing, it must be evident that the invention herein disclosed is capable of a large range of modifications within the spirit of the invention herein disclosed and claimed.

We claim:

1. In a machine of the class described, a table for slidably supporting thereon a bag containing receptacles in tiers, the body of the bag being completely severed from its bottom member, a lift at one end of the table and having a platform normally in the plane of the table, conveying means at one side of the lift and above the table, a carriage having a rectangular box-like body mounted to travel over the table, the bottom and the front of the carriage body being open, a gate normally closing the open front, said carriage being constructed and arranged when moved away from the lift and toward the bag on the table to receive said bag through the open front of its body and completely encase the same when the gate is closed with a working clearance between said body and bag whereby the bag may be lifted from the enclosed receptacles and the bottom member, said gate being constructed and arranged to engage the bag from top to bottom when the carriage is moved toward the lift and thereby slide the bag with the receptacles therein on the table and onto the platform of the lift, and means for operating the lift to project its platform through the open body of the carriage and impart a step by step lifting movement to the receptacles to successively position the tiers thereof for sliding movement out of the body and onto the conveying means.

2. In a machine of the class described, a pair of track rails, a table between the rails for slidably supporting a bag containing receptacles in tiers, the body of the bag being completely severed from its bottom member, a lift at one end of the table and having a platform normally in the plane of the table, conveying means at one side of the lift and above the table, a carriage having a rectangular box-like body and wheels arranged to run on the track rails, the bottom and the front of the carriage body being open, a gate normally closing the open front of the body, said carriage being constructed and arranged when moved away from the lift and toward a bag on the table to receive said bag through the open front of its body and completely encase the same when the gate is closed with a working clearance between said body and the bag, whereby the bag may be lifted from the enclosed receptacles and the bottom member, said gate being constructed and arranged to engage the bag from top to bottom when the carriage is moved toward the lift and thereby slide the bag with the receptacles on the table and onto the platform of the lift, and means for operating the lift to project the platform through the open body of the carriage and impart a step by step lifting movement to the receptacles to successively position the tiers thereof for sliding movement out of the body and onto the conveying means, said gate and back member extending above the side members of the body to afford guides for the receptacles in the upper tier as they are moved out of the body and onto the conveying means.

3. The structure defined in claim 1, in which the gate is hinged at its top to the carriage body for lifting movement into a raised position in which it will pass over the bag when the carriage body is moved to receive the same.

4. The structure defined in claim 1, in which one of the sides of the carriage body is lower than the back thereof and the gate to permit the uppermost tier to be slid thereover from the carriage body and in which the back of the carriage body and the gate afford guides for said uppermost tier as the same is being slid from the carriage.

5. A machine for unloading cans from multi-layer paper bag packages, and comprising an elevator platform arranged to receive a can stack comprising the package, receiving means disposed laterally adjacent the elevator platform, said elevator platform being movable from a lower position below the level of said receiving means to an upper position substantially coplanar therewith, a supporting platform substantially coplanar with said elevator platform in its lower position, a frame structure including a series of side walls for substantially encompassing a can stack on the supporting platform at a position removed from the elevator platform, means mounting said frame structure for shifting movement along said supporting platform between a position receiving and laterally encompassing the can stack to a position encompassing the elevator platform with the can stack resting thereon, and means for raising the elevator platform step by step to bring successive can layers into coplanar relation with said receiving means.

6. A machine for unloading cans as claimed in claim 5, wherein the means mounting said frame structure for shifting movement along said supporting platform comprises track and wheel mechanism.

7. A machine for unloading cans as claimed in claim 5, wherein the frame structure comprises a wheel supported carriage having one side in the form of a pivoted gate adapted to engage the package from top to bottom for shifting the same along the supporting platform to the elevator platform.

8. A machine for unloading cans as claimed in claim 5, wherein the elevator platform is located between lateral projections of the supporting platform.

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