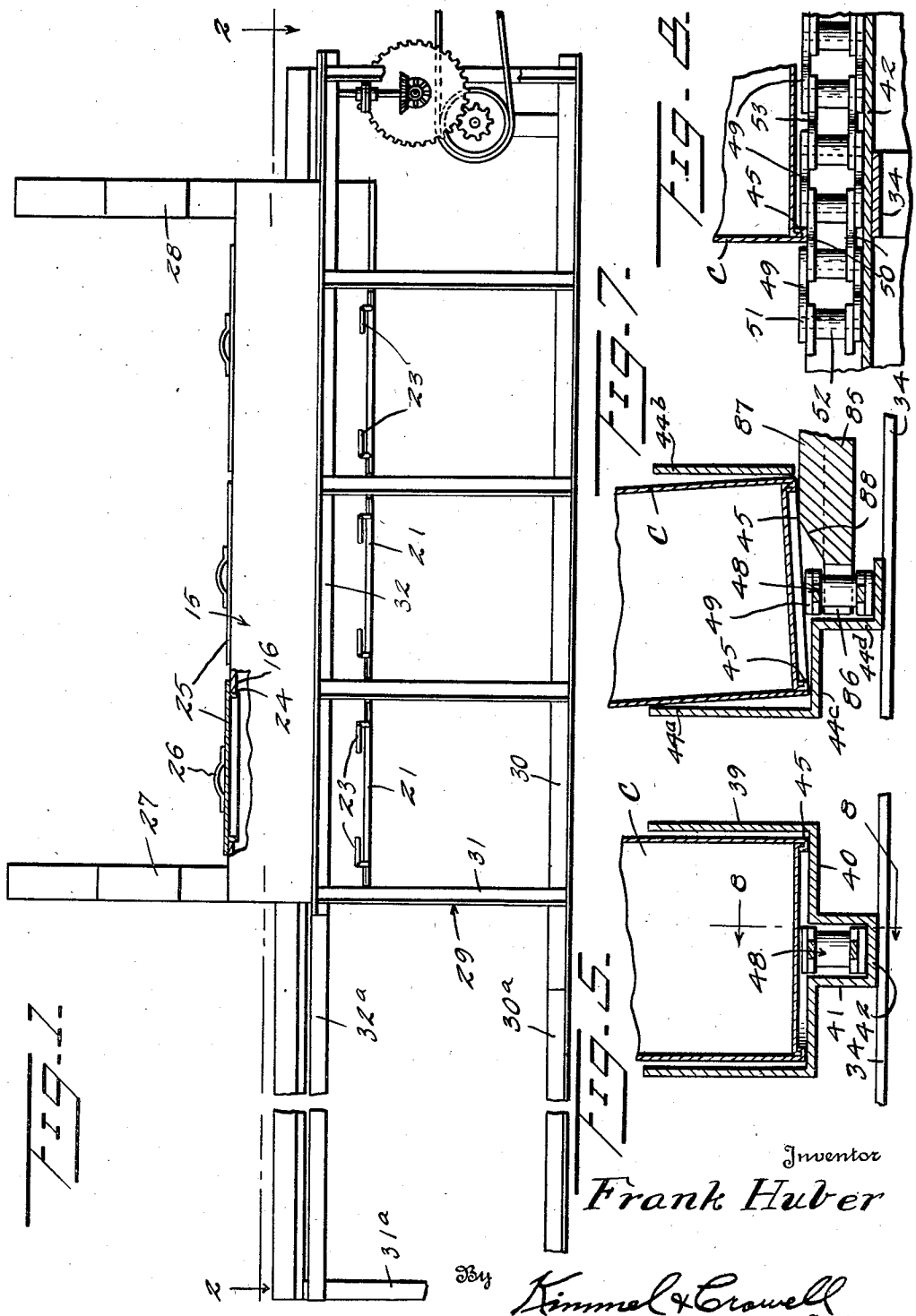
Nov. 18, 1941. F. HUBER 2,263,499

EXHAUST BOX CONVEYER

Filed Oct. 1, 1940 3 Sheets-Sheet 1



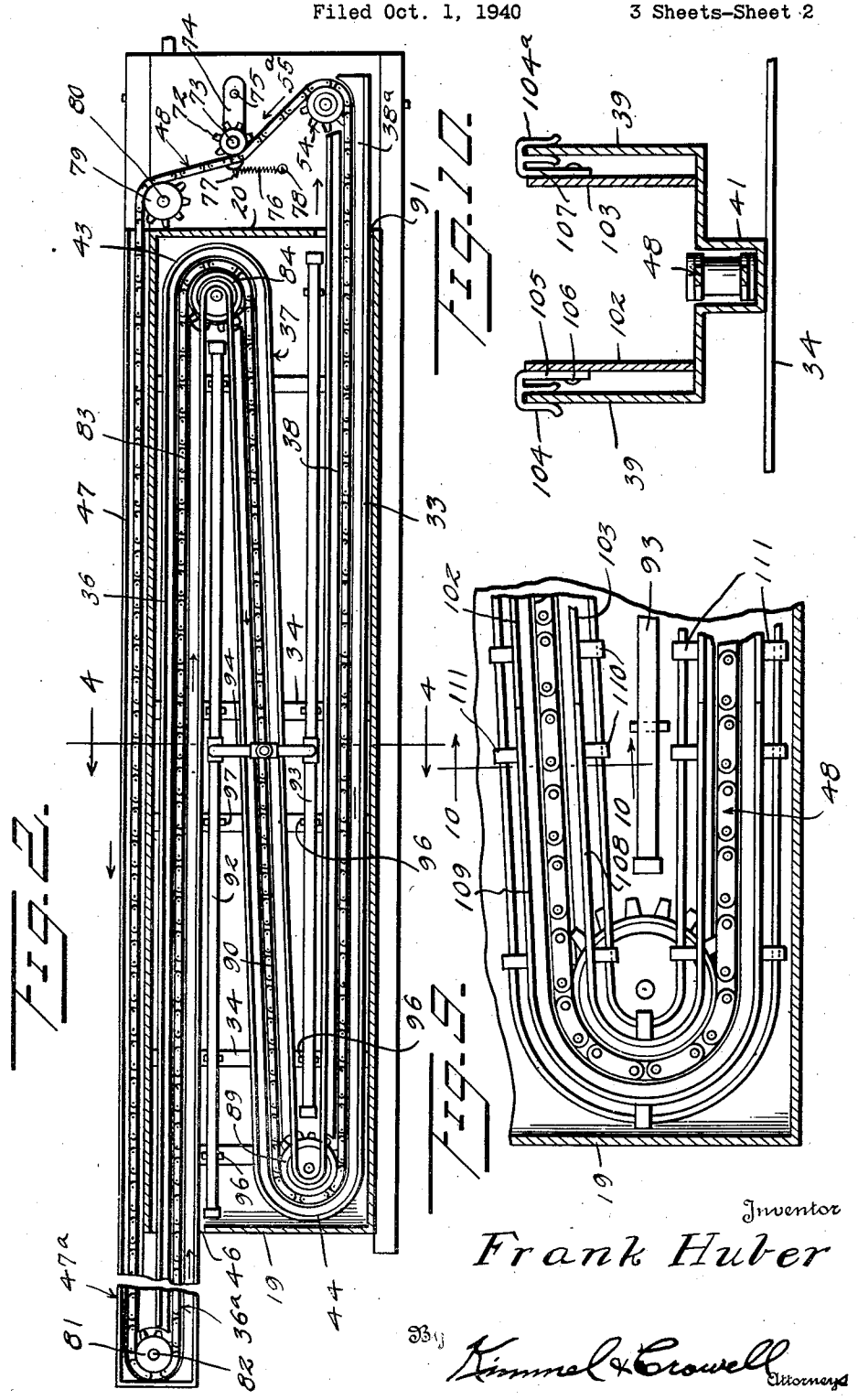
Inventor
Frank Huber

By Kimmel & Crowell
Attorneys

Nov. 18, 1941. F. HUBER 2,263,499

EXHAUST BOX CONVEYER

Filed Oct. 1, 1940 3 Sheets-Sheet 2



Inventor
Frank Huber

By Kimmel & Crowell Attorneys

Nov. 18, 1941. F. HUBER 2,263,499

EXHAUST BOX CONVEYER

Filed Oct. 1, 1940 3 Sheets-Sheet 3

Fig. 3.

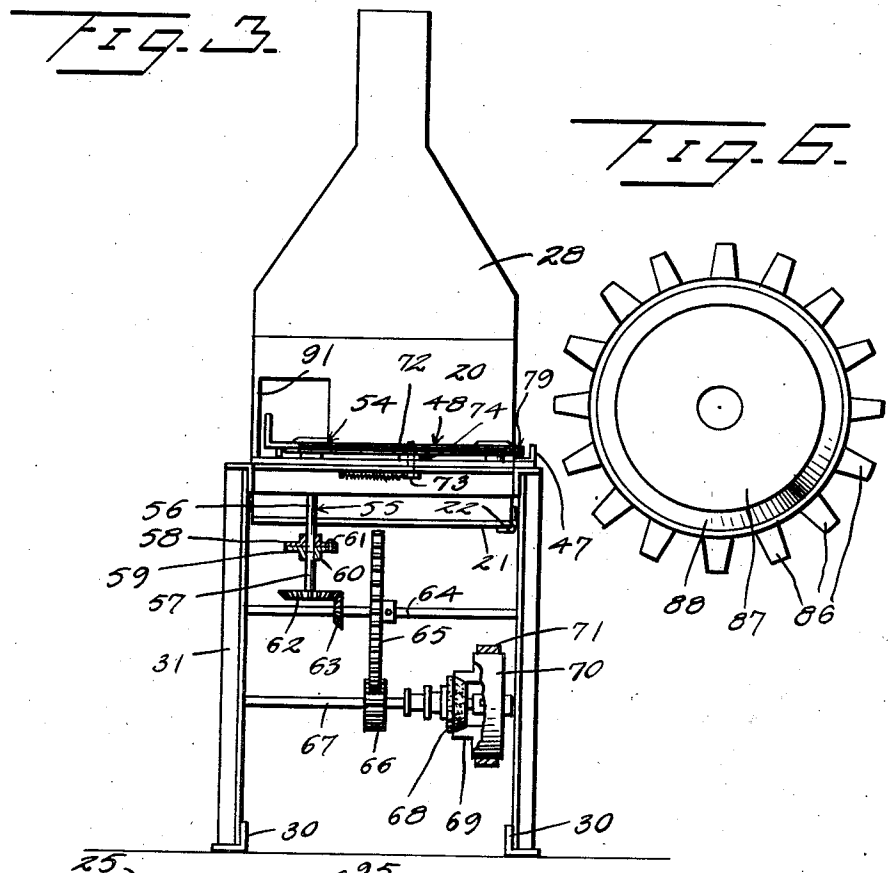
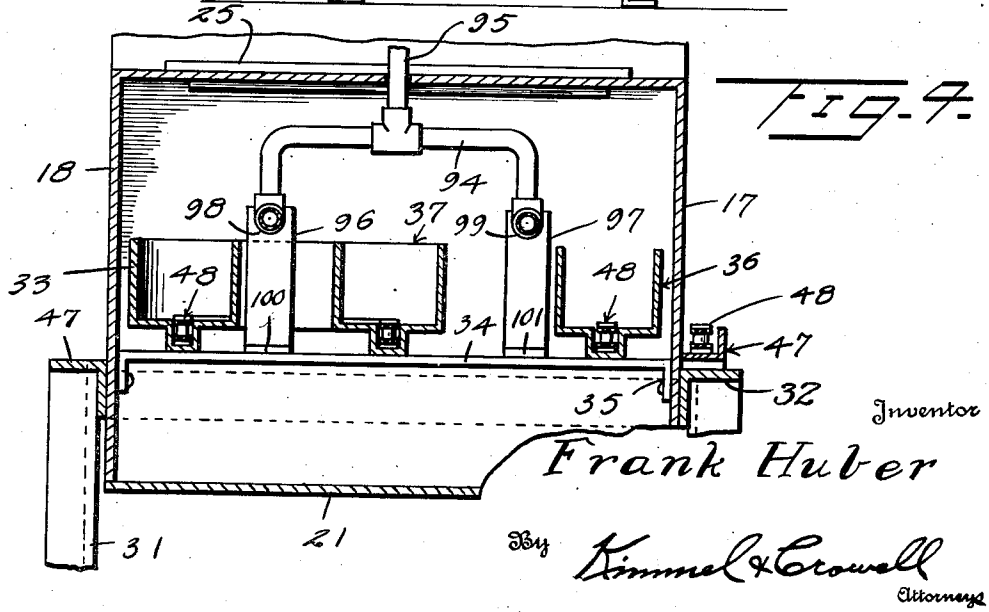


Fig. 6.

Fig. 4.



Inventor

Frank Huber

By Kimmel & Crowell

Attorneys

Patented Nov. 18, 1941 2,263,499

UNITED STATES PATENT OFFICE

2,263,499

EXHAUST BOX CONVEYER

Frank Huber, Gaston, Ind., assignor to Indiana Foundry, Machine & Supply Company, Brazil, Ind.

Application October 1, 1940, Serial No. 359,291

8 Claims. (Cl. 198—168)

This invention relates to exhaust boxes for exhausting air from cans containing canned goods and preheating the goods in the cans.

An object of this invention is to provide in an exhaust box, a single endless conveyer for moving the cans through the box.

Another object of this invention is to provide a device of this kind which is strong, durable, and economical of construction and operation.

A further object of this invention is to provide a device of this kind which can easily and quickly be adapted to different sizes of cans.

A still further object of this invention is to provide in combination with an endless conveyer in the form of a chain, means whereby the crimped lower edges of the cans are released from the chain at the point where the cans are transferred from one guide trough to a second or return trough, in order that the cans will not be damaged and will not crowd up at the adjacent ends of the troughs.

A further object of this invention is to provide an improved sprocket structure for use with a chain conveyer which is formed on one side thereof with a can releasing and shifting means which is so constructed as to lift the crimped lower edge of the can out from between a pair of chain links so that the lower edge of the can will not become pinched between the links, the can being transferred from one trough to another by the lifting means.

A further object of this invention is to provide in a device of this kind, an improved chain tensioning means for holding the conveyer chain taut.

A further object of this invention is to provide a frangible coupler in the conveyer driving means so that in the event undue strain is applied to the conveyer, the chain and other parts will not be damaged.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings wherein are shown embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation partly broken away and in section of an exhaust box constructed according to an embodiment of this invention.

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1.

Figure 3 is a detail end elevation of one end of the device.

Figure 4 is a sectional view taken on the line 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary sectional view through one of the elongated troughs.

Figure 6 is a plan view of one of the sprockets used with the conveyer chain.

Figure 7 is an enlarged fragmentary sectional view of a connecting trough and a sprocket.

Figure 8 is an enlarged fragmentary sectional view taken on the line 8—8 of Figure 5.

Figure 9 is an enlarged fragmentary horizontal section looking from above of a pair of connected troughs showing the removable side members for the troughs to accommodate smaller sized cans.

Figure 10 is a sectional view taken on the line 10—10 of Figure 9.

Referring to the drawings, the numeral 15 designates generally a box or housing structure including a top wall 16, side walls 17 and 18 and end walls 19 and 20. A plurality of clean-out doors 21 are hingedly secured as at 22 to the side wall 18 and are locked in closed horizontal position by means of latches 23. The top wall 16 is provided with a plurality of openings 24 and a cover 25 having a handle 26 adapted to enclose the opening 24. The housing 15 at each end thereof is formed with hoods 27 and 28 which communicate with the interior of the housing 15 and provide a means for carrying off steam or the like which may be discharged into the interior of the housing 15.

The housing 15 is supported by means of a supporting frame structure generally designated as 29. The frame structure 29 includes a pair of base parallel angle members 30 which have secured thereto a plurality of upright standards or legs 31. The legs 31 are formed of angle members and lower ends of the legs 31 are adapted to be fixed to the base members 30 by any suitable fastening means such as rivets or welding. A pair of upper side rails or angle bars 32 are fixed to the upper ends of the uprights or legs 31 and the side rails 32 are adapted to be fixed to the sides 17 and 18 of the housing 15 by any suitable fastening means.

One side rail 32^a is adapted to be extended to a greater length than the opposite side rail 32 and in like manner, one base rail 30^a is of greater length than the opposite base rail 30 and the ends of the long rails 30^a and 32^a are connected together by an upright or leg 31^a.

An upwardly opening can guiding trough structure generally designated as 33 is disposed within the housing 15, being supported in the housing 15 above the bottom clean-out doors 21 by means of a plurality of transversely extending supporting bars 34 which at their opposite ends are formed with depending angle members 35 which are adapted to be fixed to the side walls 17 and 18. The trough structure 33 comprises

an intake trough member **36** which is disposed closely adjacent the side wall **17**. The trough member **36** at its inner end is connected to an intermediate trough member **37** and the intermediate trough member **37** at the opposite end thereof is connected to an outlet trough member **38**. These trough members **36**, **37** and **38** are of like construction being shown in greater detail in Figures 5 and 7.

Each trough member comprises a pair of vertical or upright side walls **39** which are secured at their lower ends to the outer edges of a flat bottom wall **40** formed of a pair of spaced inner edgewise aligned sections. A substantially U-shaped chain guiding channel **41** is secured to and extends downwardly from the inner edges of the sections of the bottom wall **40** and communicates at its upper end with the interior of the trough. The bight or bottom **42** of the channel **41** rests on the transverse supporting members **34** and may be fixed thereto by any suitable fastening means.

The inner end of the intake trough **36** is connected to the adjacent end of the intermediate trough **37** by an arcuate connecting trough structure **43** and the opposite end of the intermediate trough **37** is connected to the adjacent end of the outlet trough **38** by an arcuate connecting trough **44**. The arcuate connecting troughs **43** and **44** are similar in every detail to the trough structure shown in Figure 7, and each includes a pair of curved parallel inner and outer side walls **44***a*, **44***b*, with the wall **44***b* of less height than the wall **44***a*. The bottom of the latter depends below the bottom of wall **44***b*. Each arcuate connecting trough includes a bottom wall **44***c* which is integral with and extends inwardly from the lower end of the wall **44***a*. The wall **44***a* in transverse cross section has its length slightly less than the width of a trough **43** or **44**. The construction of the connecting trough as aforesaid forms the trough with a clearance at the lower portion of the inner side for the passage of a sprocket member to be referred to. The inner side edge of the bottom wall **44***c*, of a trough **43** or **44**, merges into the upper end of the vertical leg of a depending L-shaped chain guide **44***d*. The bottom wall of each trough constitutes a can guiding surface over which the lower crimped edge **45** of a can C is adapted to slide.

The side walls of a trough are spaced apart a distance sufficient so that the sides of the can C will freely move therebetween without scratching or marring the finish on the exterior of the can.

The end wall **19** is formed with an intake opening **46** and the intake trough **36** is adapted to extend through the opening **46** and is continued for the length of a supporting rail **32**[a] as shown at **36**[a]. An outer chain guiding channel **47** is disposed exteriorly of the side wall **46** and is extended as at **47**[a] for the length of the rail extension **32**[a]. The chain guiding channel **47**[a] is adapted to slidingly receive one run of an endless conveyer chain generally designated as **48**. The conveyer chain **48** is adapted to engage in the several chain guides **41** of each trough **36**, **37** and **38** and of the connecting troughs **43** and **44** and is also adapted to slidingly engage in the return guiding channel **47**.

The chain conveyer **48** as shown more specifically in Figure 8 is formed of pairs of overlapping links **49** and **50** which are connected to pins **51**. A roller **52** is positioned about each pin **51** and loosely engages between the inner pair of links **50**. The links **49** are outer pairs of links which overlap the adjacent ends of the inner pairs of links **50**. The links **49** on the upper side of the chain **48** comprise can moving links and each adjacent pair of links is spaced apart a distance sufficient to form a space **53** in which the crimped lower edge **45** of each can C is adapted to engage.

The links herein shown may be spaced apart sufficiently so that the diameter of the can will extend over substantially two uppermost adjacent pairs of links **49**, but if desired the links **49** and **50** may be longer or shorter than herein shown so that the crimped edge **45** of the can will extend over one or more of the links **49**. A driving sprocket member **54** is secured to the upper end of a vertically disposed drive shaft **55** which is journalled through a table **55**[a]. The shaft **55** includes an upper shaft **56** and a lower axially aligned shaft **57**. These two shafts **56** and **57** are coupled together by means of a pair of flanged coupling members **58** and **59**, respectively.

Preferably the shaft **56** extends downwardly below the coupling member **58** into a bore **60** carried by the lower coupling member **59**. A shear pin **61** extends through the two flanges of the coupling members **58** and **59** at one side of the axial center thereof so that in the event undue strain is applied to the conveyer chain **48**, the pin **61** will shear off and thus prevent damage to the chain **48** or to any cans which may be passing through the several troughs.

The lower end of the lower shaft **57** has a bevelled gear **62** fixed thereto which meshes with a gear **63** carried by a counter-shaft **64**. The counter-shaft **64** is journalled between a pair of upright legs **31** and a relatively large spur gear **65** is fixed to the counter-shaft **64**. The gear **65** meshes with a driving gear **66** which is mounted on a drive shaft **67**. The drive shaft **67** is journalled between a pair of leg members **31** and a slidable clutch element **68** is splined on the drive shaft **67**. A second clutch element **69** is loosely mounted on the shaft **67** and includes a pulley **70** about which a belt or other driving element **71** is adapted to engage.

The belt **71** may be connected to a suitable power supply (not shown). The clutch element **68** is adapted to be shifted to a clutching or unclutching position by a conventional clutch shifting means (not shown) and of well known construction.

An idler sprocket **72** is rotatably carried by a stub shaft **73** which is fixed in an upright position to a supporting arm **74**. The arm **74** is pivotally carried by a pivot member **75** which may be fixed to the platform or table **56**. A spring **76** is fixed at one end to a pin **77** which may be fixed to the inner end of the supporting arm **74** and the opposite end of the spring **76** may be secured to a fixed pin **78**. The spring **76** is adapted to yieldingly hold the sprocket **72** in engagement with the chain **48** and provides a means for yieldably holding the chain **48** taut. After passing the idler sprocket **72**, the chain passes over an idler sprocket **79** rotatably carried by a shaft **80** which is fixed to the table or platform **56** adjacent the return trough **47**. The chain **48** then slidably engages the trough **47** and at the extreme end of the trough **47** is trained about an idler sprocket **81** which is rotatably carried by a shaft **82** fixed to the rail **32**[a].

The cans are adapted to be inserted in the

trough extension 36a by any suitable means and the cans are then moved through the intake opening 46. The intake run 83 of the chain 48 which slidingly engages in the chain guide formed on the trough 36 moves the can along the trough 36 for the entire length of this trough. At the inner end of the trough 36, where this trough is connected to the arcuate trough 43, the intake run 83 of the chain 48 is trained about a sprocket member 84 which is extended into the clearance on the lower portion of the inner side of the trough 39. The sprocket member 84 is constructed similar to the sprocket shown in Figures 6 and 7 and includes a plate 85 formed with sprocket teeth 86 on its periphery, and preferably formed integral with the plate 85 is a plate 87 which is formed with a bevelled peripheral edge 88 having the greatest diameter thereof substantially less than the diameter of the plate 85 at the base or inner ends of the sprocket teeth 86. This bevelled edge 88 forms a can releasing means as shown in Figure 7, the crimped lower edge 45 of the can C riding upwardly over the bevelled edge 85 so as to release the can C from the chain structure.

The plate 87 also comprises a means for shifting the can about the arcuate connecting trough 43 to a point where this trough 43 connects and merges with the adjacent end of the trough 37. After the can C rides downwardly off of the plate 87, the crimped lower edge 45 again extends between a pair of adjacent links 49 and is thus carried longitudinally of the intermediate trough 37. A second inner sprocket member 89 engages the intermediate run 90 of the chain. The sprocket 89 is of a construction similar to that shown in Figure 7 and it is arranged relative to trough 44 in the same manner as the sprocket 84 is arranged relative to trough 43 whereby when the can enters the arcuate connecting trough 44, the can is released from between a pair of links 49 and is carried about the connecting trough 44 until the can enters the adjacent end of the outlet trough 38. The sprocket member 54 may be constructed similar to the sprocket structure shown in Figure 7 so that when the can arrives at the sprocket 54, the can is released from the conveyer 48 and may be removed from the extended trough structure 38a. The trough structure 38 extends through an outlet opening 91 which is formed in the end wall 20.

The two hoods 27 and 28 are positioned over the end walls 19 and 20 so as to withdraw any steam or fumes from the interior of the housing 15. The hoods 27 and 28 will prevent any steam or fumes from passing through the openings 46 and 91 in the end walls 19 and 20.

In order to provide a means whereby the interior of the housing may be properly heated so as to exhaust the air in the cans C as the cans move along the several runs of the conveyer, I have provided a pair of heating coils 92 and 93 which may be connected together by a connecting pipe 94. The pipe 94 may be extended as at 95 through the top wall 16 of the housing 15 and may be connected to a suitable source of steam supply. The steam coils 92 and 93 are supported between the troughs 36, 37 and 38 by means of upright coil supporting brackets 96 and 97, respectively.

The brackets 96 and 97 are formed with upwardly opening notches or slots 98 and 99 respectively forming saddles to receive the coils 92 and 93. The coil supporting members 96 and 97 may be formed with right angular base members 100 and 101, respectively, which may be fixed by any suitable fastening means to the transverse supporting bars 34.

In order to provide a means whereby smaller sized cans may be moved through the exhaust box 15, I have provided pairs of straight side wall members 102 and 103 which are adapted to be supported in inwardly spaced relation to the spaced sides of the troughs 36, 37 and 38, being supported in inwardly spaced relation to the side walls 39 of these troughs by means of U-shaped clips 104. The clips 104 removably engage over the upper edges of the side walls 39 and each clip 104 has formed therewith a substantially L-shaped supporting member 105 which is adapted to be fixed as by fastening members 106 to the side wall members 102. The side wall members 103 are held in inwardly spaced relation from the adjacent side wall 39 by clips 104a which are secured to the auxiliary trough wall 103 by L-shaped supporting members 107.

The lower edges of the auxiliary side walls 102 and 103 are adapted to rest on the bottom walls 40 of the several troughs. At the ends of the troughs 36, 37 and 38, inner and outer U-shaped auxiliary walls 108 and 109, respectively, are secured to the adjacent side walls of the respective troughs by means of clips 110 and 111 which are similar in every detail to the clips 104 and 104a.

In the use and operation of this exhaust box, the cans are adapted to be inserted in the trough extension 36a. The cans preferably being open at their upper ends so that the air may freely be discharged therefrom and the cans are also filled with the desired material. As the cans move along the intake trough 36, they are subjected to the heat emanating from the coils 92 and 93 and when the cans reach the idler sprocket 84 they are lifted to a released position from the chain 48 by means of the can releasing plate 87. Each can is then carried around the arcuate trough 43 by frictional contact with the plate 87 and then delivered to the adjacent end of the intermediate run 90 of the chain 48.

The cans then drop off of the plate 87 and the crimped lower edge 45 of each can engages between selected pairs of upper links 49. The same releasing operation is effected by means of the sprocket member 89 as the can passes through the intermediate trough 44 and enters the adjacent end of the outlet trough 38. The can finally passes through the outlet opening 91 and is completely released from the conveyer 48 by means of the releasing and driving sprocket 54. The housing 15 by being formed with a plurality of removable lids or covers 25 may be readily examined or cleaned out from above and by providing the lower doors 21, the lower bottom of the housing 15 may be easily and quickly cleaned and the moving parts thereof oiled.

By constructing an exhaust box with a single endless conveyer chain 48 which is disposed in edgewise position in the chain guiding troughs or channels 41 and 47, the chain can be moved by a relatively small powered power member and also by providing the can releasing sprocket plates 87, the cans are released from the sprockets at the bends of the chain so that each can will not be damaged by the links of the chain and in addition the chain will not be damaged due to the release of the cans from the chain at the points where the adjacent ends of the troughs are connected together.

An exhaust box has been constructed according

to this invention and has been found to give more satisfactory results than exhaust boxes at present available and in addition the exhaust box can be constructed and maintained in operating condition at a smaller cost than the exhaust boxes at present available.

What I claim is:

1. An exhaust box comprising a housing, an intake trough extending lengthwise of said housing, an outlet trough parallel with said intake trough, an intermediate trough communicating at one end with said intake trough and at its opposite end with said outlet trough, an endless chain conveyer common to said troughs, channel-shaped guide means depending from the bottom of and opening into each trough for movably supporting said conveyer with certain of the links of one side thereof extending partly above the bottoms of said troughs whereby the crimped lower edge of a can may engage between certain pairs of links, and means at each end of said intermediate trough and operated by the conveyer for raising the crimped edge of a can out of engagement with said conveyer while simultaneously shifting the can from one trough to another trough to be subsequently engaged by the conveyer.

2. An exhaust box comprising a housing, a plurality of connected troughs in said housing, a guide channel carried by each trough lengthwise thereof projecting downwardly thereof and opening into the trough, an endless conveyer chain movably engaging in said channels, said chain common to said troughs and being disposed with the links of one side thereof uppermost and certain of said uppermost links projecting above the bottoms of said troughs whereby the lower crimped edges of cans may engage between pairs of said certain links, and means operated from the conveyer and disposed at the point of connection of one trough with another trough for initially raising a can above said conveyer to release the can from between said links and for shifting the can from one trough to another and finally lowering the can to said conveyer to be engaged by the latter.

3. An exhaust box comprising a housing, a plurality of connected troughs in said housing, a guide channel carried by each trough lengthwise thereof and projecting downwardly thereof, an endless conveyer chain movably engaging in said channels, said chain common to said troughs and being disposed with the links of one side thereof uppermost and certain of said uppermost links projecting above the bottoms of said troughs whereby the lower crimped edges of cans may engage between pairs of said certain links, and means operated from the conveyer disposed at the point of connection of one trough with another trough for initially raising a can above said conveyer to be engaged by the latter to release the can from between said links and for shifting the can from one trough to another and finally lowering the can to said conveyer, said means including a sprocket and an upwardly offset part carried by said sprocket inwardly of the teeth thereof.

4. In an exhaust box, an endless chain conveyer for shifting cans relative to said box, and sprockets engaging said chain within said box, each sprocket including an upwardly offset part inwardly of the teeth thereof for engagement with the lower edge of a can whereby to lift the lower edge of the can out of engagement with the chain.

5. An exhaust box comprising a housing, an intake trough extending therein, an outlet trough arranged in the housing and extended therefrom, an intermediate trough within the housing and disposed between said other troughs, an arcuate trough connecting the inner end of the intake to one end of the intermediate trough, a second arcuate trough connecting the other end of the intermediate trough to the inner end of the outlet trough, said troughs throughout having their bottoms provided with depending chain guides, one guide forming a continuation of the other, an endless chain conveyer common to said troughs and guides traveling in and supported by said guides and having a portion thereof extending into the troughs through the bottoms of the troughs, said conveyer having that portion extended into the troughs formed with spaced means whereby the crimped lower edge of a can is engaged to thereby provide for the conveying of the can in the intake, outlet and intermediate troughs, idler sprockets arranged below the arcuate troughs and engageable with and operated from the conveyer, and means bodily carried by said idler sprockets and engaging with the can for releasing it from the conveyer and for transfering the can to be engaged by the conveyer within a follower trough.

6. An exhaust box comprising a housing, an intake trough extending therein, an outlet trough arranged in the housing and extended therefrom, an intermediate trough within the housing and disposed between said other troughs, an arcuate trough connecting the inner end of the intake to one end of the intermediate trough, a second arcuate trough connecting the other end of the intermediate trough to the inner end of the outlet trough, said troughs throughout having their bottoms provided with depending chain guides, one guide forming a continuation of the other, an endless chain conveyer common to said troughs and guides traveling in and supported by said guides and having a portion thereof extending into the troughs through the bottoms of the troughs, said conveyer having that portion extended into the troughs formed with spaced means whereby the crimped lower edge of a can is engaged to thereby provide for the conveying of the can in the intake, outlet and intermediate troughs, idler sprockets arranged below the arcuate troughs and engageable with and operated from the conveyer, and a bevelled edge plate carried by each idler sprocket and having its edge engageable with the can for releasing it from the conveyer and for transfering the can to be engaged by the conveyer within a follower trough.

7. The invention as set forth by claim 5 having the chain guides depending from the intake, intermediate and outlet troughs of U-shape contour in transverse cross section, and the chain guides depending from the arcuate connecting troughs of L-shape contour in transverse cross section.

8. The invention as set forth by claim 6 having the chain guides depending from the intake, intermediate and outlet troughs of U-shape contour in transverse cross section and the chain guides depending from the arcuate connecting troughs of L-shape contour in transverse cross section.

FRANK HUBER.