June 6, 1967 C. S. JOHNSON, JR., ET AL 3,323,283

APPARATUS FOR HANDLING CASES BEING LOADED

Filed June 15, 1964

5 Sheets-Sheet 1

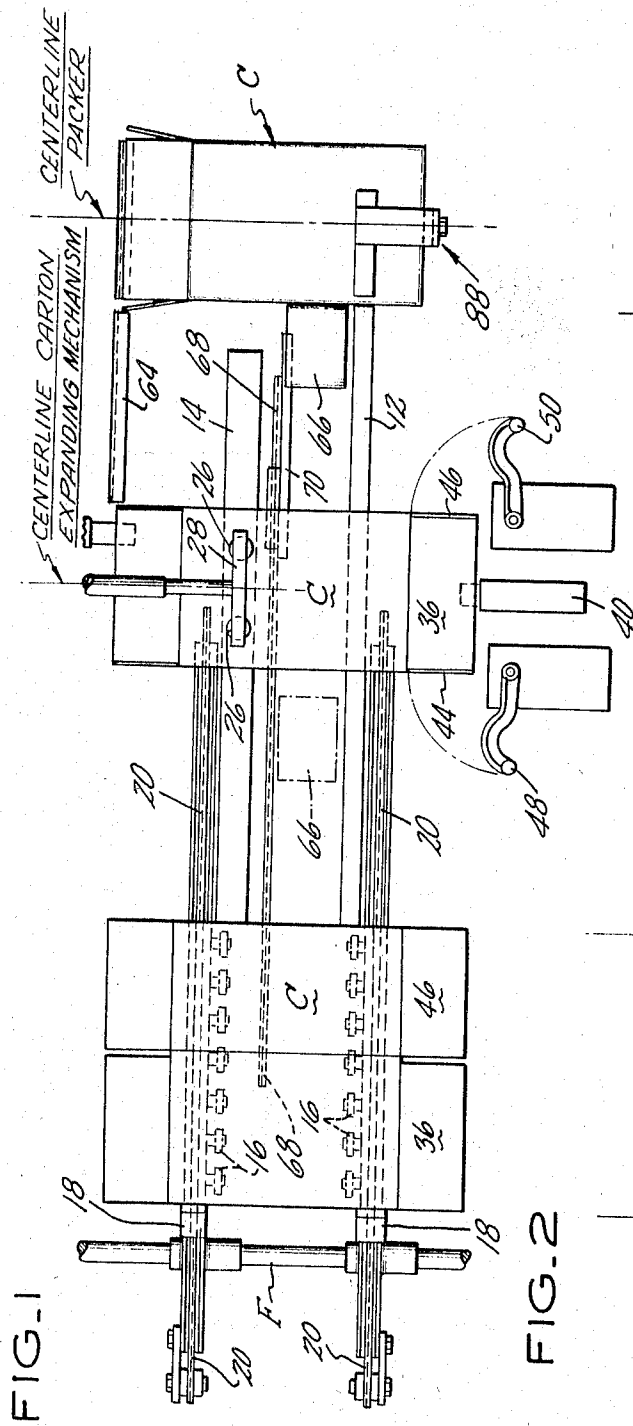



FIG. 1

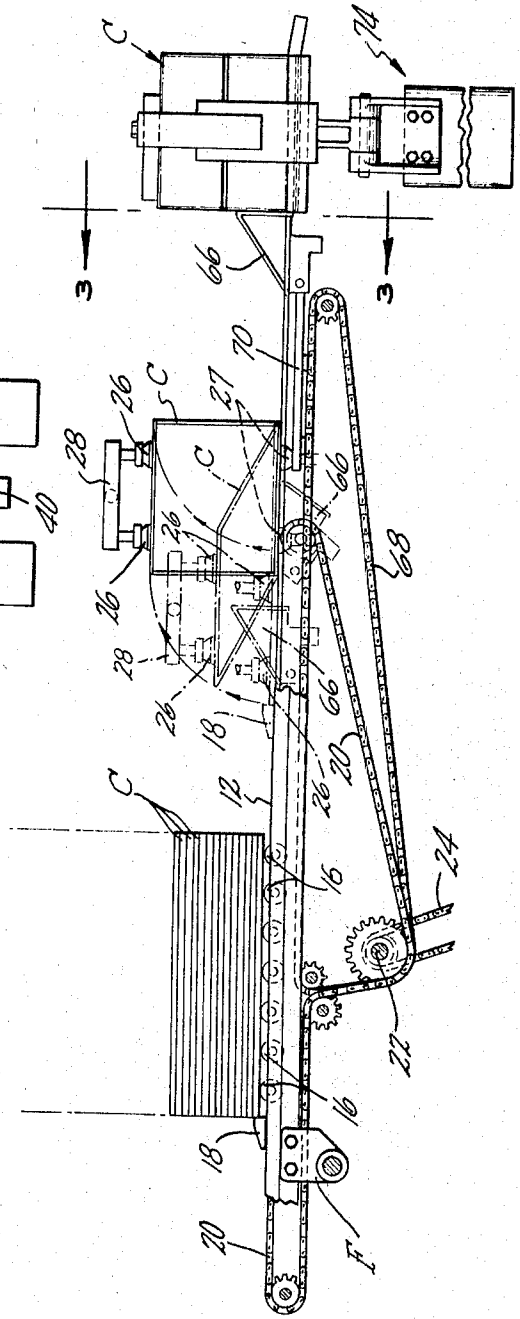


FIG. 2

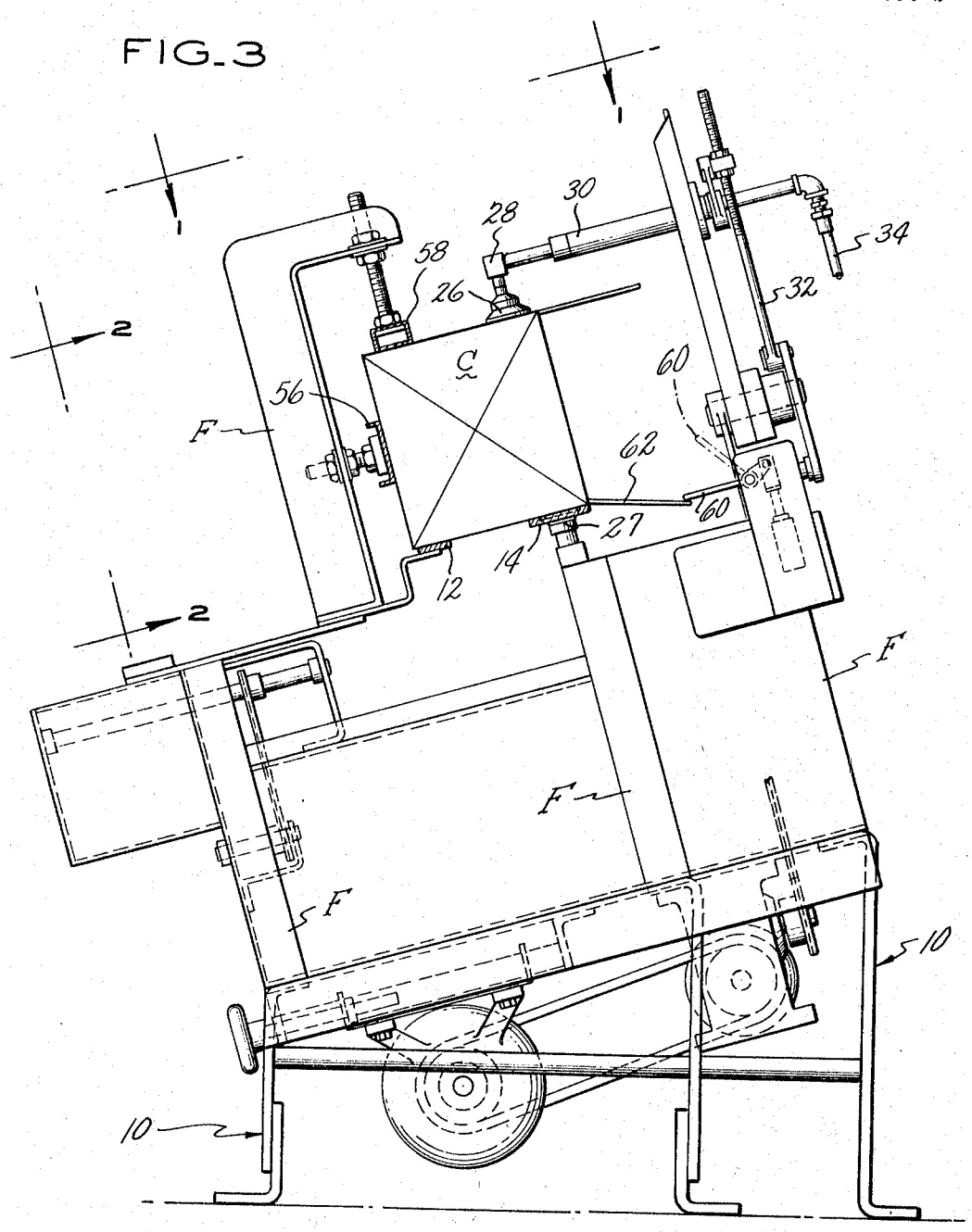
INVENTORS
CURTISS S. JOHNSON, JR.
EDWARD A. COUTANT
BY McCormick, Paulding & Huber
ATTORNEYS

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FIG_3



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FIG. 9

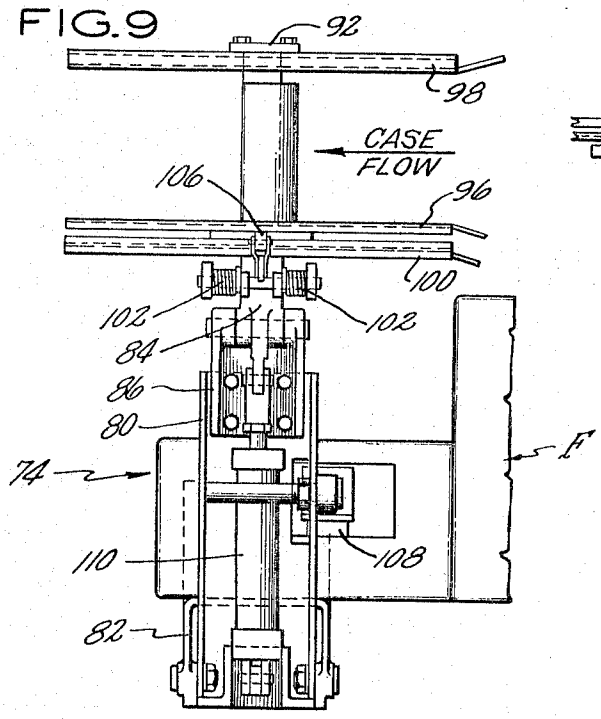



FIG. 8

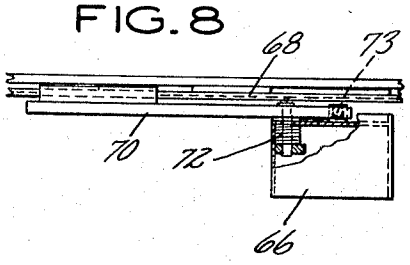



FIG. 7

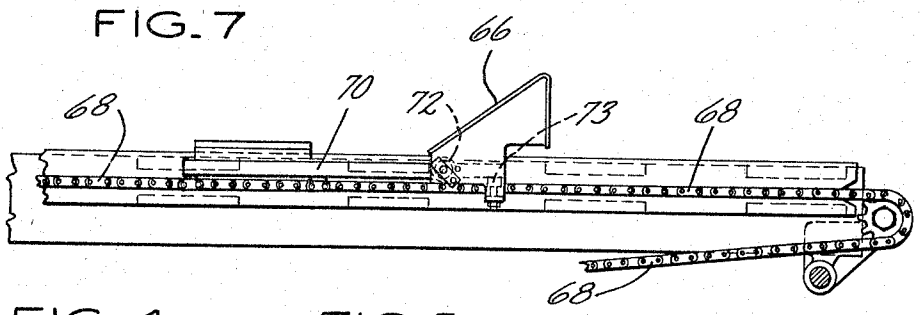



FIG. 4

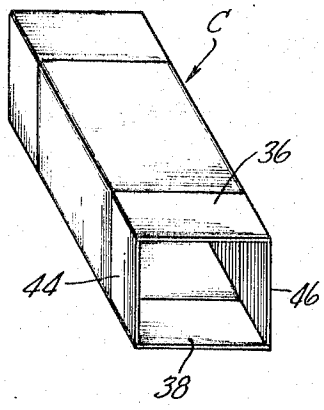



FIG. 5

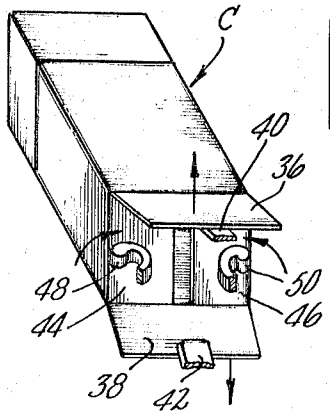
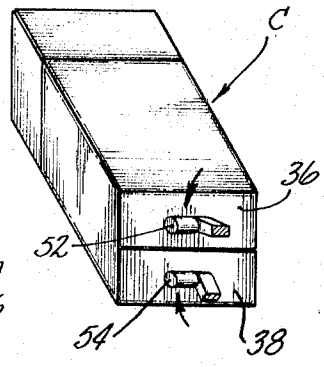



FIG. 6



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FIG. 10

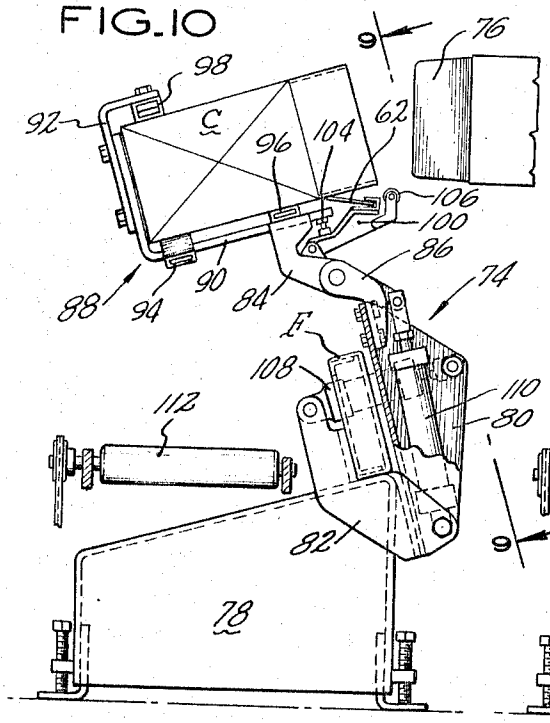



FIG. 11

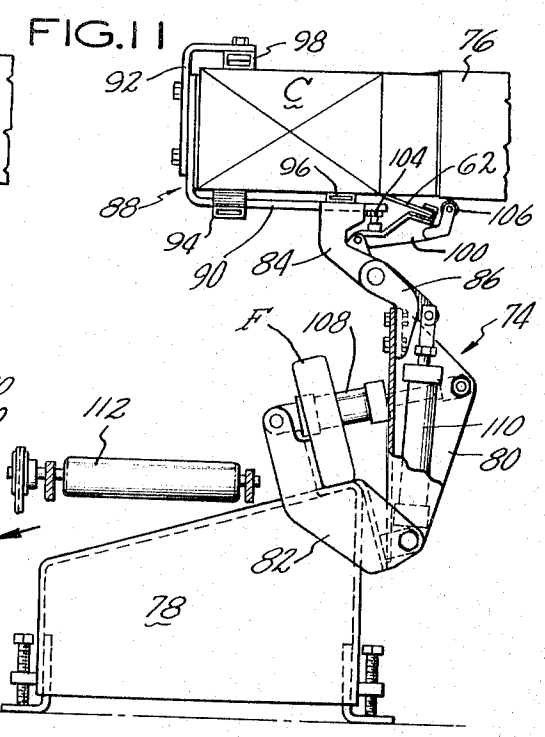



FIG. 13

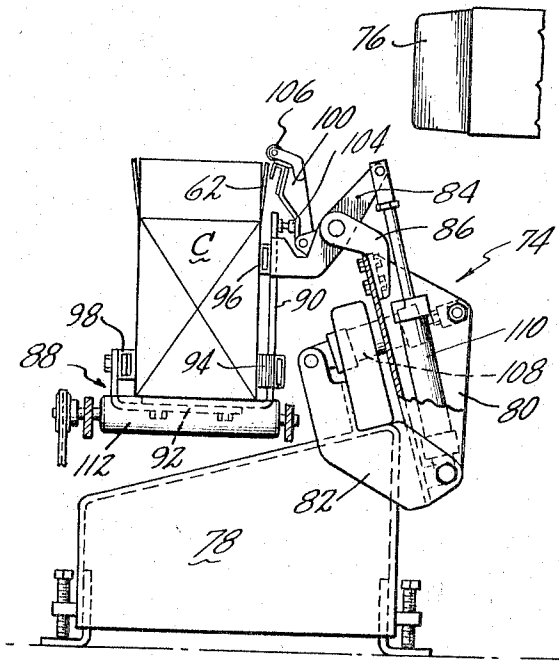



FIG. 14

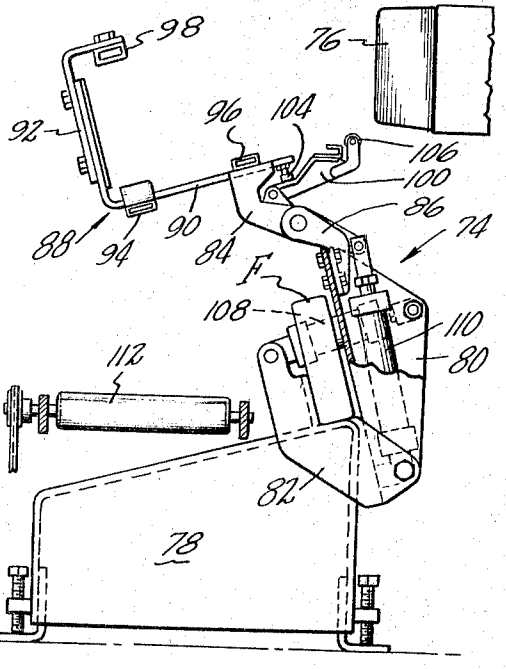


FIG_15

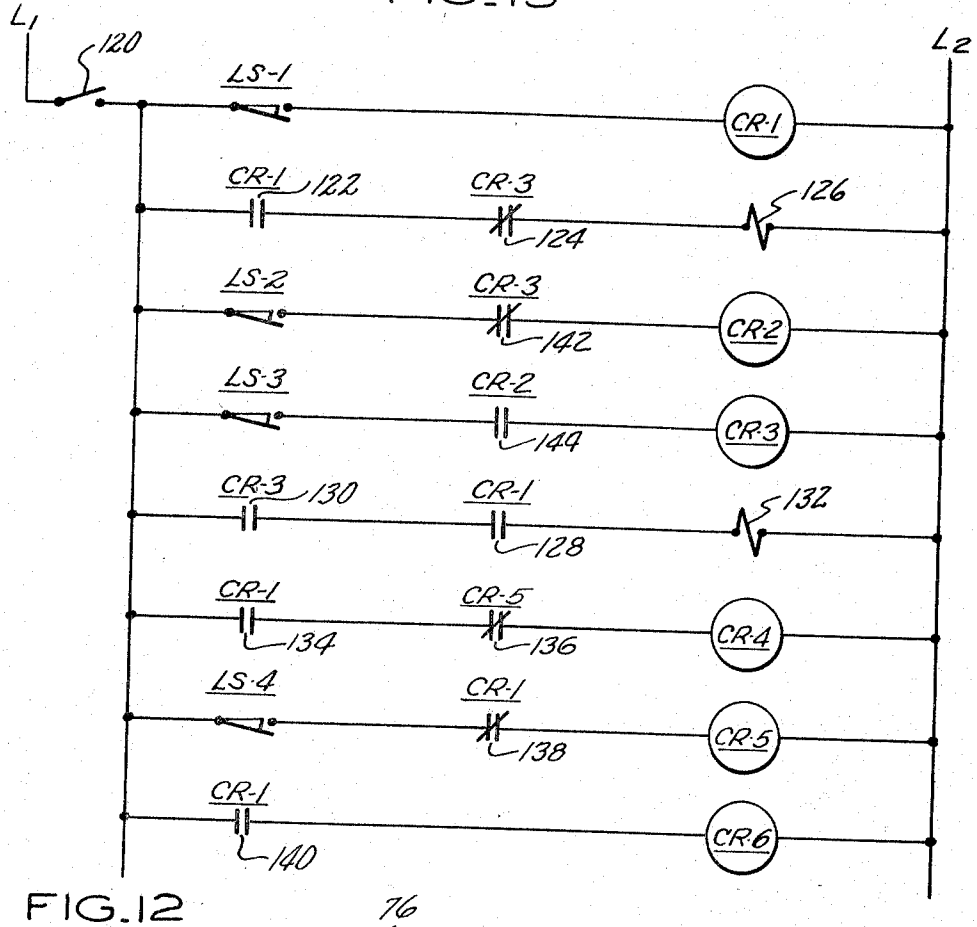



FIG_12

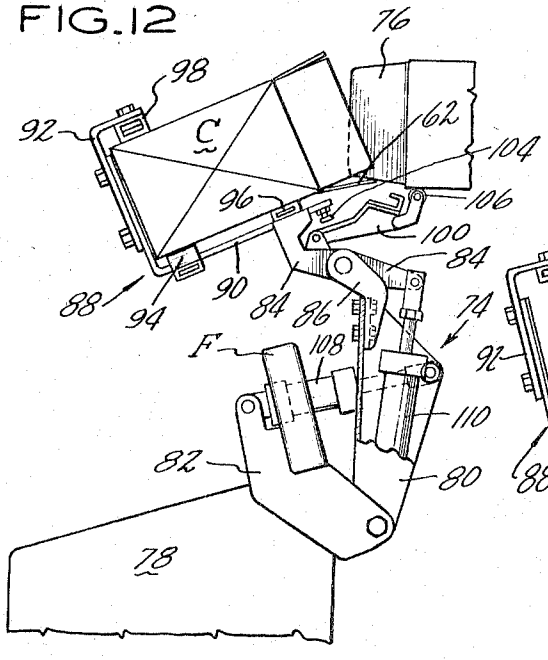
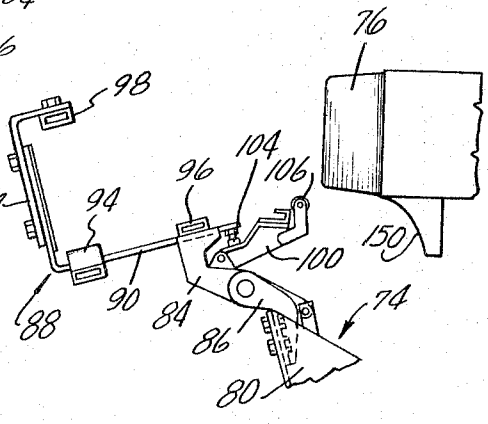



FIG_16



United States Patent Office 3,323,283 Patented June 6, 1967



3,323,283

# APPARATUS FOR HANDLING CASES BEING LOADED

Curtiss S. Johnson, Jr., Middle Haddam, and Edward A. Coutant, Rockfall, Conn., assignors to Emhart Corporation, a corporation of Connecticut

Filed June 15, 1964, Ser. No. 375,013
8 Claims. (Cl. 53—186)

## ABSTRACT OF THE DISCLOSURE

Apparatus for removing a flat case from a stack, erecting the case and closing its flaps at one end while moving it into position in front of a horizontal loading case packing machine with the case inclined toward the packer, for then moving the case into horizontal position to receive the load, and for then pivoting the filled case away from the packer into an erect position on a horizontal take-away conveyor.

This invention relates to improvements in a case packing machine and, more particularly, to an improved apparatus for handling cases being loaded by a case packing machine of the type having a horizontally disposed funnel through which the case load is thrust into an open end of a case being loaded.

It is the general object of the invention to provide an apparatus capable of automatic operation to select a case from a stack of flat open end cases, to erect a case while it rests on its side while at the same time closing the flaps on one end of the case, to then move the erected case onto the funnel to receive the load, and to then set the case down in an erect position with its open end up in front of the funnel where it can automatically be removed from the case handling apparatus by a conveyor.

It is a more specific object of the invention to provide case handling apparatus of the aforedescribed type which will place the erected case in an inclined position in front of the funnel so that it can be pivoted upwardly onto the funnel to receive the load and then pivoted downwardly beyond its original inclined position to an erect position on a take-away conveyor.

The drawings show preferred embodiments of the invention and such embodiments will be described, but it will be understood that various changes may be made from the constructions disclosed, and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

FIG. 1 is a plan view of the case handling apparatus of the present invention, but it is to be observed that this view is taken in a plane indicated by the line 1—1 of FIG. 3 which is inclined toward a horizontal plane;

FIG. 2 is an elevational view of the case handling apparatus but which is inclined to the vertical as indicated by the line 2—2 of FIG. 3;

FIG. 3 is a vertical cross-sectional view through the apparatus taken as indicated by the line 3—3 of FIG. 2;

FIGS. 4, 5 and 6 are similar perspective views of an open end case being handled by the apparatus of this invention and illustrating schematically the manner in which the flaps are closed at one end of the said case;

FIG. 7 is a shortened elevational view of the pusher mechanism utilized to move an erected case toward the loading station of the case handling apparatus;

FIG. 8 is a shortened plan view of the pusher mechanism shown in FIG. 7;



FIG. 9 is an elevational view of the case support mechanism utilized at the loading station;

FIGS. 10, 11, 12, 13 and 14 are end elevational views of the articulate case support means at the loading station and illustrate the manner in which a case to be loaded is moved from an inclined position upwardly and rearwardly onto the case packer funnel in a horizontal position and then moved downwardly and forwardly to stand erect on a conveyor which removes the loaded case from the case handling apparatus;

FIG. 15 is a wiring diagram illustrating automatic controls for the case handling apparatus; and

FIG. 16 is a view similar to FIG. 14 showing an alternative construction.

As will be described in more detail hereinafter, the case handling apparatus of the present invention includes an elongated base which is disposed in front of the packing machine funnel and extends transversely thereof. A magazine supports a stack of flat cases on this base at one side of the funnel, the stack being arranged so that the open end flaps of the flat cases face forwardly and rearwardly, respectively of the base. The apparatus includes means for removing one flat case from the magazine or stack and for shifting it into position where erecting mechanism works on the case to erect it while it still rests on its side on the base. When the case is erected, the open flaps at the front of the case are closed, and then the case is moved into position at the loading station in front of the packer funnel. A cradle is located at the said loading station to receive the case, to move it onto the funnel for loading and then move it forwardly and downwardly away from the funnel into an erect position on a conveyor which removes the case from the apparatus of this invention and transports it onward to mechanism which will close the open top flaps of the case.

It is a feature of the present invention that the base and the entire case handling apparatus is inclined upwardly and rearwardly so that when the erected case is located at the loading station, its open end will face upwardly and rearwardly toward the funnel. This arrangement of the case handling apparatus has a distinct advantage in that elaborate and complex flap spreading mechanism is not needed in order to pivot the open end case upwardly and rearwardly onto the end of the horizontal funnel of the packing machine. Thus, case handling apparatus provided in accordance with the present invention is more economical than most automatic case handling equipment used with a packer having a horizontal funnel, and it is also reliable and foolproof in operation.

Except for the inclined angle at which the case handling apparatus is built, there is no invention per se in the construction of the flap case magazine or in the means utilized to make up a case or to erect a case taken from the magazine. Accordingly, FIGS. 1–3 illustrating this portion of the case handling apparatus are only schematic and some of the structure has not been shown in the interest of illustrating the general arrangement of the apparatus.

In FIGS. 1–3, the aforementioned inclined base is indicated generally by the reference numeral **10**, and it supports a plurality of frame elements F, F which include a pair of longitudinally extending rails **12** and **14**. It will be observed that the base **10** is inclined upwardly and rearwardly to the horizontal at an acute angle which preferably is in the range of from approximately 15° to approximately 20°.

At the left-hand end of the rails **12** and **14** as viewed in FIGS. 1 and 2, a stack of flat cases C, C is supported on two longitudinal series of rollers **16**, **16**. Preferably, frame elements (not shown) are arranged to provide a magazine for holding the stack of cases so that only the lowermost case C can be removed from the magazine and advanced over the rails **12** and **14** from left to right.

The means for removing the lowermost case from the stack includes a pair of dogs 18, 18 which are respectively connected to a pair of spaced apart longitudinally extending chains 20, 20. Each of the chains 20, 20 is endless and is entrained over suitable sprockets including a sprocket keyed to a drive shaft 22. The shaft 22 is driven off a chain 24 by means (not shown) which will reverse its direction of drive so as to reciprocate the chains 20, 20 and thereby to reciprocate the case feeding dogs 18, 18 between the full line and broken line positions shown in FIG. 2. In the full line position of the dogs 18, 18 they engage the lowermost flat case in the stack to move it away from the stack to the broken line position of the dogs wherein the flat case is engaged by carton erecting or expanding mechanism to make it up for receiving a load.

When moved to the broken line position of FIG. 2, the flap case C still rests on its side on the rails 12 and 14 so that the uppermost side panel of the case can be engaged by a pair of vacuum cups 26, 26 supported from a vacuum head 28 while the lowermost side panel is engaged by vacuum cups 27, 27. The case erecting or expanding mechanism including the vacuum head 28 is conventional. That is, this mechanism includes a pipe 30 connected to and supporting the head 28, the said pipe being carried on pivoted linkage means 32 and being connected as by a hose 34 with means for establishing a vacuum. The pipe 30 and vacuum head 28 are pivoted by the linkage means 32 so that the vacuum cups can engage the top side panel of a flat case in the broken line position of FIG. 2 and erect it to the full line position as shown while the lowermost side panel is retained by the vacuum cups 27, 27.

When the case has been expanded or erected while still resting on its side on the rails 12 and 14, its front end flaps are closed by conventional flap closing mechanism which has been illustrated only schematically. That is, when the case has been erected as shown in FIGS. 1 and 2, the top and bottom flaps 36 and 38 (FIGS. 4–6) are spread apart by fingers 40 and 42 to permit closing the side flaps 44 and 46 by tucker arms 48 and 50 respectively. Then, the top and bottom flaps 36 and 38 are closed over now closed side flaps 44 and 46 by means of tucker arms 52 and 54, the spreading fingers 40 and 42 having been removed from engagement with the said top and bottom flaps. After the front or bottom end of the case C has been closed as described, it is immediately moved along the rails 12 and 14 to engage adjustable plows 56 and 58 which respectively engage the closed bottom flaps and the top side panel of the erected case. Also, a finger 60 is operated to engage and spread downwardly the open bottom flap 62 at the upper end of the case. As the case is moved along from left to right (in FIGS. 1 and 2) from the position wherein it was expanded and had its bottom closed, the bottom flap 62 at the open end of the case is held down by a longitudinally extending guide or plow 64 (FIG. 1).

The means for moving the expanded or erected case while still on its side into loading position at a loading station is shown in FIGS. 7 and 8. This means includes pusher element 66 which is pivotally connected with and reciprocates with an endless chain 68 (FIGS. 1 and 2). The chain is entrained over suitable sprockets, one of which is on the previously mentioned drive shaft 22 so that the said chain is reciprocated back and forth from left to right as viewed in FIG. 1. The pusher 66 is pivotally connected to the end of a rod 70 which is connected to links of the chain 68 so that in the reciprocating movement of the said chain the pusher will move between the full line position and broken line position of FIGS. 1 and 2. In the broken line position of these figures, the pusher is disposed so as to engage an erected case C and to move it from the location wherein it was expanded or erected into position at the loading station, this position being indicated by the full line position of the pusher. When the pusher is retracted from the full line position to the broken line position, it will engage the corner of a flat case or a case being erected and it will pivot downwardly to pass beneath that case to a position wherein it can spring upwardly. A torsion spring 72 (FIG. 8) serves to erect the pusher after it has cleared a case being expanded, and an adjustable stop 73 is provided on the pusher to locate it correctly relative to a case as it swings upwardly.



In keeping with the present invention, a novel articulate support means indicated generally by the reference numeral 74 is provided for the case C at the loading station. This support means is provided to receive the case in its inclined position of movement along the rails 12 and 14 and to pivot the case upwardly and rearwardly so that its open end will be thrust over a funnel 76 (FIGS. 10–14) forming a part of the case packing machine. It will be observed that the funnel 76 is disposed horizontally and after the case has been pivoted by the support means 74 from its inclined position to a horizontal position on the funnel for loading, it is then tilted or pivoted forwardly and downwardly to stand erect.

More specifically, and as best shown at FIGS. 9–14, the support for the case at the loading station includes an inclined base 78 which may be an extension of the previously mentioned base 10. A first arm 80 which is generally U-shaped in cross section is pivotally connected at its lower end to the base 78 as by a bracket 82, and the said arm extends upwardly therefrom. A second arm 84 is pivotally connected to the upper end of the first arm 80 as by a bracket 86. This second arm is formed as a part of or rigidly supports a cradle indicated generally by the reference numeral 88 which is generally C-shaped when viewed from the end as in FIGS. 10–14. The C-shaped cradle comprises two adjustably connected main members 90 and 92 which can be adjusted relative to each other to accommodate cases of different size. Cross bars 94 and 96 on the cradle element 90 and a cross piece 98 on the cradle element 92 extend transversely of the funnel 76 to help support a case C in front of and on the said funnel. The case is initially thrust into the opening provided by the cradle in its inclined position by the pusher member 66, this position of the case being shown in FIG. 10. When the case is thrust into the cradle, its lower flap 62 at the open end moves into a pivoted channel member 100 so that it will be held down in a position wherein it will clear the funnel 76 when the case is pivoted upwardly and rearwardly to be thrust over the end of the said funnel. The channel member 100 is biased in a counterclockwise direction as viewed in FIGS. 10–11 by means of torsion springs 102, 102 (FIG. 9) the limit of counterclockwise movement of the said member being fixed by an adjustable stop 104 so that the said channel member is properly positioned to receive the edge of the bottom flap 62 at the open end of the case. A roller 106 is mounted on the pivoted channel member 100 to engage the bottom of the funnel 76 when the case is thrust off the funnel to move the said channel member 100 farther downwardly and thus to permit the bottom flap 62 to escape as shown in FIG. 12.

The case C is received in the cradle 88 in its inclined position of advance as illustrated in FIG. 10 when the first arm 80 of the articulate support is in a first pivoted position shown in FIGS. 10, 13 and 14 and when the second arm 84 is in a first pivoted position relative to the said first arm as shown in FIGS. 10, 11 and 14. With the second arm 84 remaining in its first position relative to the first arm 80, the said first arm can be moved to a second position shown in FIG. 11. As shown, this moves the cradle 88 so that the open end case C is thrust over the end of the horizontal funnel 76 and it too is positioned substantially horizontally to receive a load thrust through the funnel into the case by the packer. The second arm 84

also has a second position relative to the first arm **80**, this position being shown in FIG. 13. As shown in FIG. 13, when the first arm **80** is in its first position and the second arm **84** is in its second position, the case C will have pivoted downwardly and forwardly by movement of the cradle **88** to a position wherein it stands substantially erect with its open end up.

The said first and second arms are pivoted between their aforesaid positions by first and second motor means, respectively comprising a fluid motor **108** which engages the first arm **80** and the bracket **82** to move the said first arm between its first and second positions and a second fluid motor **110** which is connected between the first and second arms to move the second arm **84** between its first and second positions relative to said first arm. Thus, in the two position movement of each of the first and second arms of the articulate support for the case at the loading station, the cradle **88** is moved between three positions. That is, a first position for the cradle is illustrated at FIG. 10 wherein a case C is supported in an inclined position in which it is received from the previously described portion of the case handling apparatus. In its second position, the cradle is disposed as shown in FIG. 11 to support the case horizontally and thrust over the end of the funnel **76**. In its third position, the cradle **88** is supported as shown in FIG. 13, wherein the case is disposed substantially erect with its open end up.

In further keeping with the present invention, conveyor means comprising a series of driven rolls **112** is constructed and arranged to cooperate with the articulate support and cradle to remove a loaded case from the cradle. That is, the driven rolls **112** are arranged in a spaced apart series extending horizontally and transversely in front of the funnel **76**. When the cradle **88** is lowered to the position shown in FIG. 13, the standing case C therein will be engaged by the conveyor rolls **112** and moved out of the cradle in a left to right direction as viewed in FIGS. 1 and 2.

It will be readily understood that a loaded case C is rotated or pivoted through 90° from the horizontal position of FIG. 11 to the vertical position of FIG. 12. In order to avoid the possibility of load contents spilling from the case during this pivotal movement, the radius of such movement is reduced to a minimum. This is accomplished by operating the first and second fluid motor means **108** and **110** nearly simultaneously so as to move the first arm from its second position to its first position while also moving the second arm **84** from its first position to its second position. While the motors are operated nearly simultaneously, the motor **110** is started slightly in advance of the motor **108** so that the second arm **84** will start pivoting counterclockwise first. This thrusts the roller **106** into engagement with the funnel **76** to pivot the channel member **100** clockwise and permit the case flap **62** to escape from it as shown in FIG. 12.

The aforedescribed case handling apparatus can be operated automatically in cooperation with the packer by a variety of different control circuits and devices. An example of one such circuit is shown in FIG. 15, and it utilizes conventional control devices as will be understood from the following description of a cycle of operation.

Assuming that in starting operation a case C has been placed in the cradle **88** in the position shown in FIGS. 1, 2 and 10, that a flat case is positioned as shown in FIG. 2 for expansion and that the feed dogs **18**, **18** and the pusher element **66** are in their right-hand positions, the start switch **120** can be closed to start a cycle of automatic operation. Upon closing of switch **120**, the relay CR–1 will be energized in a circuit between the power lines $L_1$ and $L_2$ because this relay circuit includes a normally open limit switch LS–1 which has been closed by placing a case C in the cradle **88**.

When energized, control relay CR–1 closes its normally open contacts **122** to complete a circuit including normally closed contacts **124** and energizes a solenoid **126** which operates a control valve (not shown) for the first reversible fluid motor **108** to cause that motor to move the first arm **80** to its second position and thus to place the case C over the end of the funnel **76** as shown in FIG. 11. (Whenever the solenoid **126** is de-energized, its associated control valve is spring returned to a normal position to reverse the motor **108** and return the first arm to its first or normal position). Also, the energized relay CR–1 closes its contacts **128** in a power circuit with normally open contacts **130** to a solenoid **132** to condition that solenoid to be energized later, and it closes its contacts **134** in a power circuit with normally closed contacts **136** for a relay CR–4. It also opens its normally closed contacts **138** in a power circuit with normally open limit switch LS–4 for relay CR–5.

The thus energized relay CR–4 controls the motor operating the drive chain **24** to rotate the drive shaft **22** counterclockwise as viewed in FIG. 2 to return the chains **20** and **68** and their associated dogs **18**, **18** and pusher **66** to the left to position them for engagement with the bottom case in the stack and a case being expanded. At the same time, the relay CR–1 closes its normally open contacts **140** in circuit with relay CR–6 which is thereby energized and operates to effect operation of the conventional case expanding and flap closing mechanisms previously described. Thus, as the feed dogs **18**, **18** and the pusher **66** are retracted, a case is erected or expanded and its flaps are closed so as to be ready to be moved into the cradle.

In the meantime, the case already in the cradle has been moved onto the funnel **76** as shown in FIG. 11 and as has been mentioned. When the case C reaches the funnel, the cradle **88** then closes normally open limit switch LS–2 in circuit with normally closed contacts **142** to energize relay CR–2. Relay CR–2 controls operation of the packer to cause it to thrust a load through the funnel **76** and into the open case and return, and it also closes its contacts **144** in circuit with normally open limit switch LS–3 and with relay CR–3.

When the load has been thrust into the case, the packer closes limit switch LS–3 to energize relay CR–3 which is a time delay relay. This relay immediately opens its contacts **142** in circuit with packer relay CR–2 to prevent the packer from thrusting a new load until a subsequent cycle of the apparatus and it simultaneously closes its contacts **130** to energize solenoid **132**. Solenoid **132** when energized operates a valve (not shown) for the second reversible fluid motor **110** to cause that motor to start to move the second arm **84** from its first or normal position relative to the first arm **80** (FIGS. 10, 11 and 14) toward its second position relative thereto (Fig. 13). (Whenever the solenoid **132** is de-energized, its associated control valve is spring returned to a normal position to reverse the motor **110** and return the second arm to its first or normal position.) This initial movement of the arm **84** engages the roller **106** with the funnel **76** to release the flap **62** from the channel member **100** as has been mentioned and as is shown in FIG. 12. After the second arm **84** has started to move, the relay CR–3 opens its contacts **124** to de-energize solenoid **126** so that the first arm **80** will start to return to its normal position.

Thus, the articulate case support and case C are moved from the position of FIG. 11 to the position of FIG. 13. In such position, the case is engaged by the driven conveyor means **112** and removed, as it stands erect, from the cradle **88**. Immediately that the loaded case is removed from the cradle, the limit switch LS–1 opens to de-energize relay CR–1.

When relay CR–1 is de-energized, its contacts **128** open to de-energize solenoid **132** to cause the second arm to return to its normal position to thus position the articulate support means **74** as shown in FIG. 14. Also the relay CR–1, being de-energized, closes its contacts **138** while opening its contacts **134** to cause feeding of a new flat case for expansion and a new expanded case for load-

ing. This feeding is controlled by relay CR–5 which will automatically be energized because limit switch LS–4 was previously closed by the dogs 18, 18 and pusher 66 being in proper position for a feeding cycle. This feeding cycle initiates a whole new cycle of operation by thrusting a new carton into the cradle.

The modification of the aforedescribed apparatus shown in FIG. 16 is particularly adapted for loading cases under conditions where the flap 62 must be released immediately the case reaches the funnel. This may be necessary for loading cases with small cans or other containers. In this embodiment a cam 150 is mounted (preferably on the funnel 76) to engage the roller 106 immediately upon entry of the funnel in the open end of the case. As will be seen from the shape of the cam 150, it will pivot the channel member 100 clockwise to release the flap 62 before the load is thrust fully into the case.

We claim:

1. In apparatus for handling cases being loaded by a packer which thrusts a load substantially horizontally into an open end of a case at a loading station, the combination comprising an articulate support for the case at the loading station including a first arm which is pivotally supported at its bottom and extends upwardly, a second arm pivotally mounted on the upper end of the first arm and having a cradle which in a normal first position of said first and second arms is positioned to receive a case in an inclined position with an open end up and a closed end down, said first arm being movable between its first position and a second position wherein the case is disposed horizontally to receive a load through its open end, said second arm being movable between its first position relative to the first arm and a second position wherein the case stands erect with its open end up, and said first and second arms being movable substantially simultaneously toward their respective first and second positions.

2. Case handling apparatus as set forth in claim 1, and including first and second reciprocable motor means for respectively pivoting said first and second arms, said first and second motor means being operable nearly simultaneously to move said first and second arms to their respective first and second positions to reduce the radius of pivotal movement of a loaded case from the horizontal position to the position wherein it stands erect.

3. In apparatus for handling cases being loaded by a packer which thrusts an assembled pack of articles substantially horizontally into a case at a loading station, the combination comprising an articulate support for a case at the loading station including a base, a first arm pivotally mounted on the base to extend upwardly, a second arm pivotally mounted on the upper end of the first arm and having a cradle adapted to receive and support a case resting on its side with one end closed and its other end opened and facing toward the packer, a first reciprocable motor for pivoting said first arm between a first position wherein a case in the cradle is inclined with its open end uppermost and a second position wherein the case is substantially horizontal for loading, a second reciprocable motor for pivoting the second arm between a first position corresponding to the inclined position of the case and a second position wherein the case stands erect with its open end up, said first and second motors being operable nearly simultaneously to move said first and second arms toward their respective first and second positions whereby to reduce the radius of pivotal movement in moving a loading case from the horizontal position in which it was loaded to an erect position, and conveyor means cooperating with said articulate support to engage and remove a case therefrom when said first arm is in its first position and said second arm is in its second position.

4. Apparatus for handling cases to be loaded by a packer having a horizontal funnel through which a load is thrust into the open end of a case, said apparatus comprising a base extending transversely in front of the funnel and which is inclined upwardly and rearwardly toward the funnel, a magazine on the base at one side of the funnel for supporting a stack of flat open end cases having flaps at their ends facing forwardly and rearwardly of the base, means for feeding one case at a time from the magazine to a case erecting station on the base, means for erecting said case while resting on its side on the base and for closing the front end flaps thereof at said station, means for moving the thus erected case to a loading station adjacent the funnel, an articulate support for the case at the loading station including a first arm which is pivotally supported at its bottom end and extends upwardly, a second arm pivotally mounted on the upper end of the first arm and having a cradle which in a first position of said first and second arms is positioned to receive the case in the inclined position of the base, said first arm being movable betwen its first position and a second position wherein the open flap end of the case is thrust over the funnel, said second arm being movable between its first position relative to the first arm and a second position wherein the case stands erect in front of the funnel with its open end up, said first and second arms being movable substantially simultaneously toward their respective first and second positions.

5. Case handling apparatus as set forth in claim 4, including first and second reciprocable motor means for respectively pivoting said first and second arms between their said positions, and wherein said first and second reciprocable motor means are operable nearly simultaneously to move said first and second arms to their respective first and second positions to reduce the radius of pivotal movement of a loaded case from the funnel to its standing position.

6. Apparatus for handling cases to be loaded by a packer having a horizontal funnel through which a load is thrust into the open end of a case, said apparatus comprising a base extending transversely in front of the funnel and which is inclined upwardly and rearwardly toward the funnel, a magazine on the base at one side of the funnel for supporting a stack of flat open end cases having flaps at their ends facing forwardly and rearwardly of the base, means for feeding one case at a time from the magazine toward the funnel, means for erecting each such case while on its side on the base and for closing its front end flaps, means for moving the thus erected case in front of the funnel on the base in an inclined position with its open flap end facing upwardly and rearwardly toward the funnel, an articulate support for the case at the loading station including a first arm which is pivotally supported at its bottom end and extends upwardly, a second arm pivotally mounted on the upper end of the first arm and having a cradle which in a first position of said first and second arms is positioned to receive the case in the said inclined position, said first arm being movable between its first position and a second position wherein the open flap end of the case is thrust over the funnel, said second arm being movable between its first position relative to the first arm and a second position wherein the case stands erect in front of the funnel with its open end up, said first and second arms being movable substantially simultaneously toward their respective first and second positions, and conveyor means cooperating with said articulate support to engage and remove a case standing erect in front of the funnel.

7. Case handling apparatus as set forth in claim 6, including first and second reciprocable motor means for respectively pivoting said first and second arms between their said positions, and wherein said first and second motor means are operable nearly simultaneously to move said first and second arms to their respective first and second positions to reduce the radius of pivotal movement of a loaded case from the funnel to its standing position.

8. In apparatus for handling cases having end closure flaps and being loaded by a packer having a horizontal

funnel for entry into an open end of a case to permit thrusting a load into the case at a loading station, the combination comprising an articulate support for the case at the loading station including a base, a first arm pivotally mounted on the base to extend upwardly, a second arm pivotally mounted on the first arm and having a cradle adapted to support a case resting on its side with one end closed and the other end open and facing toward the packer funnel and also having means for holding a lower flap at the open end of the case down to facilitate movement of the open end over the funnel, a first reciprocable motor for pivoting said first arm between a first position wherein a case in the cradle is inclined with its open end uppermost and a second position wherein the case is horizontal with the funnel projecting into its open end for case loading, a second reciprocable motor for pivoting the second arm between a first position corresponding to the inclined position of the case and a second position wherein the case stands erect with its open end up, said first and second motors being operable nearly simultaneously to move said first and second arms toward their respective first and second positions whereby to reduce the radius of pivotal movement of a loaded case from its horizontal to its erect position, and conveyor means cooperating with said articulate support to engage and remove a case therefrom when said first arm is in its first position and said second arm is in its second position.




**References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,613,021 | 10/1952 | Bowes | 53—165 X |
| 2,886,929 | 5/1959 | Villemont | 53—164 |
| 2,896,384 | 7/1959 | Carlsen et al. | 53—250 X |
| 2,941,339 | 6/1960 | Salwasser | 53—247 |
| 3,067,556 | 12/1962 | Neer | 53—186 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 932,565 | 7/1963 | Great Britain. |



TRAVIS S. McGEHEE, *Primary Examiner.*

N. ABRAMS, *Assistant Examiner.*