Jan. 20, 1959 H. C. PIRSIG 2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Filed Dec. 16, 1957 5 Sheets-Sheet 1

Fig. 1.

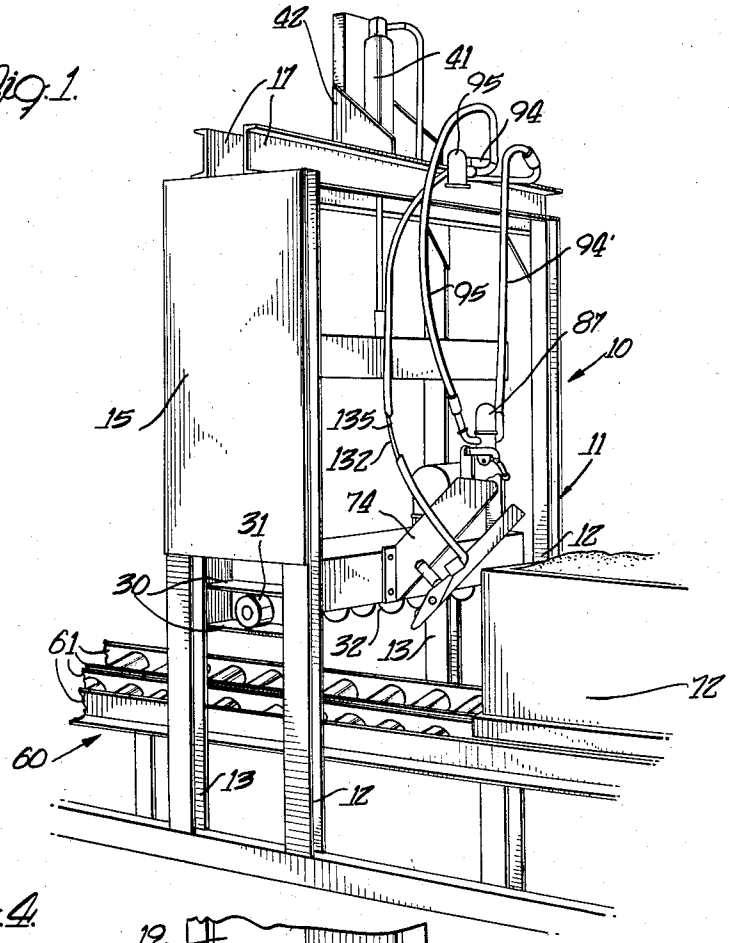
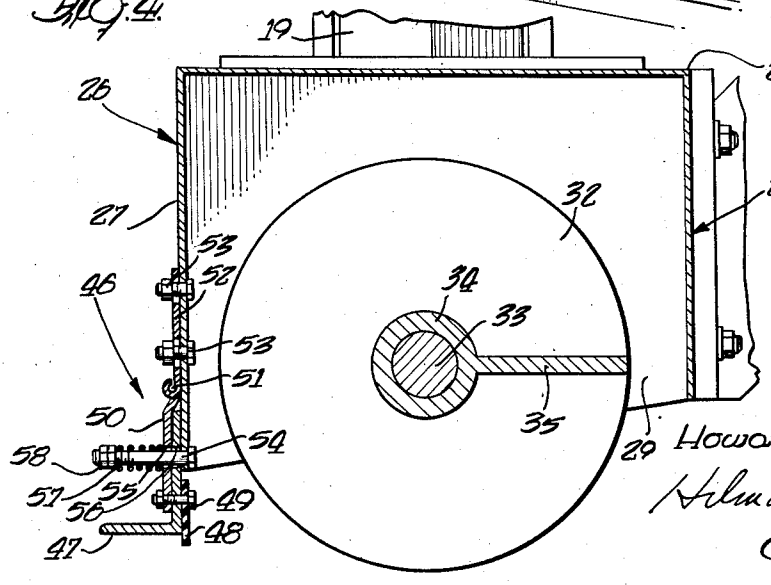


Fig. 4.



Inventor
Howard C. Pirsig
Hilmand O. Vagle
Attorney

Jan. 20, 1959 H. C. PIRSIG 2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Filed Dec. 16, 1957 5 Sheets-Sheet 2

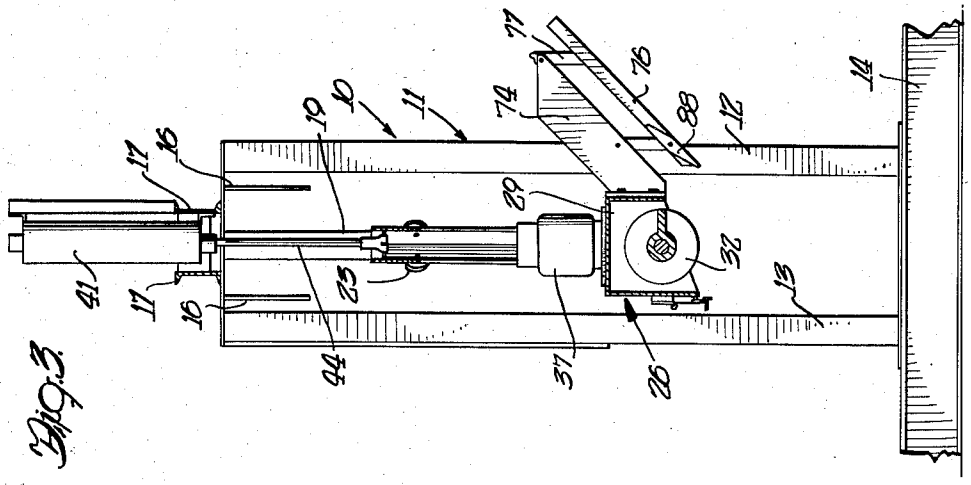


Fig. 3.

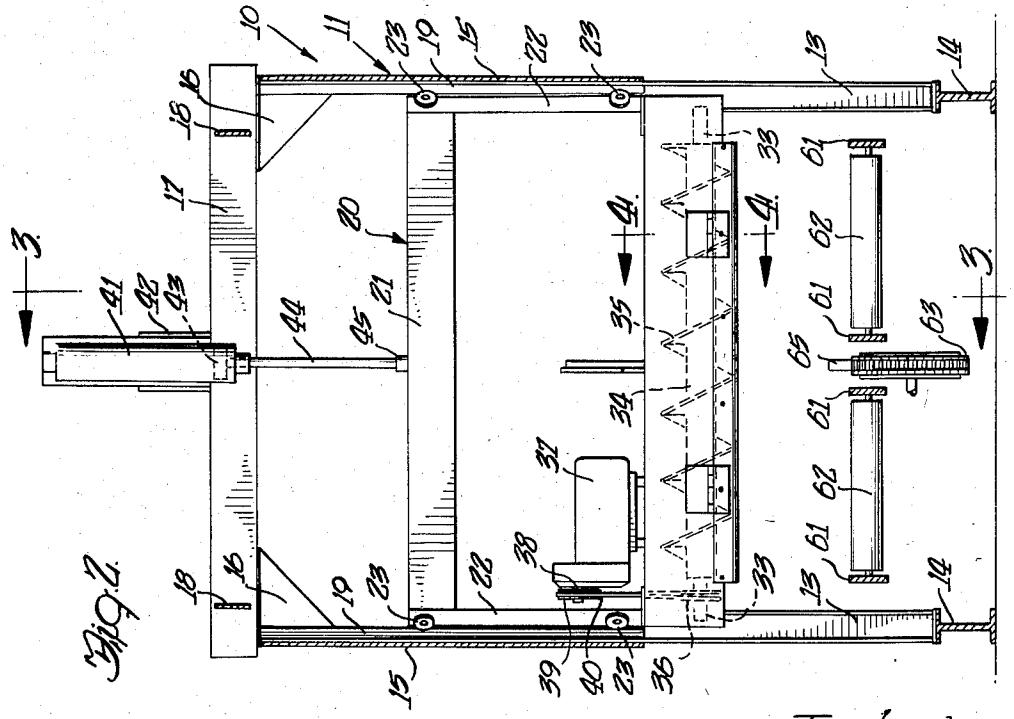


Fig. 2.

Inventor
Howard C. Pirsig
Edmund O. Vogel
Attorney

Jan. 20, 1959 H. C. PIRSIG 2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Filed Dec. 16, 1957 5 Sheets-Sheet 3

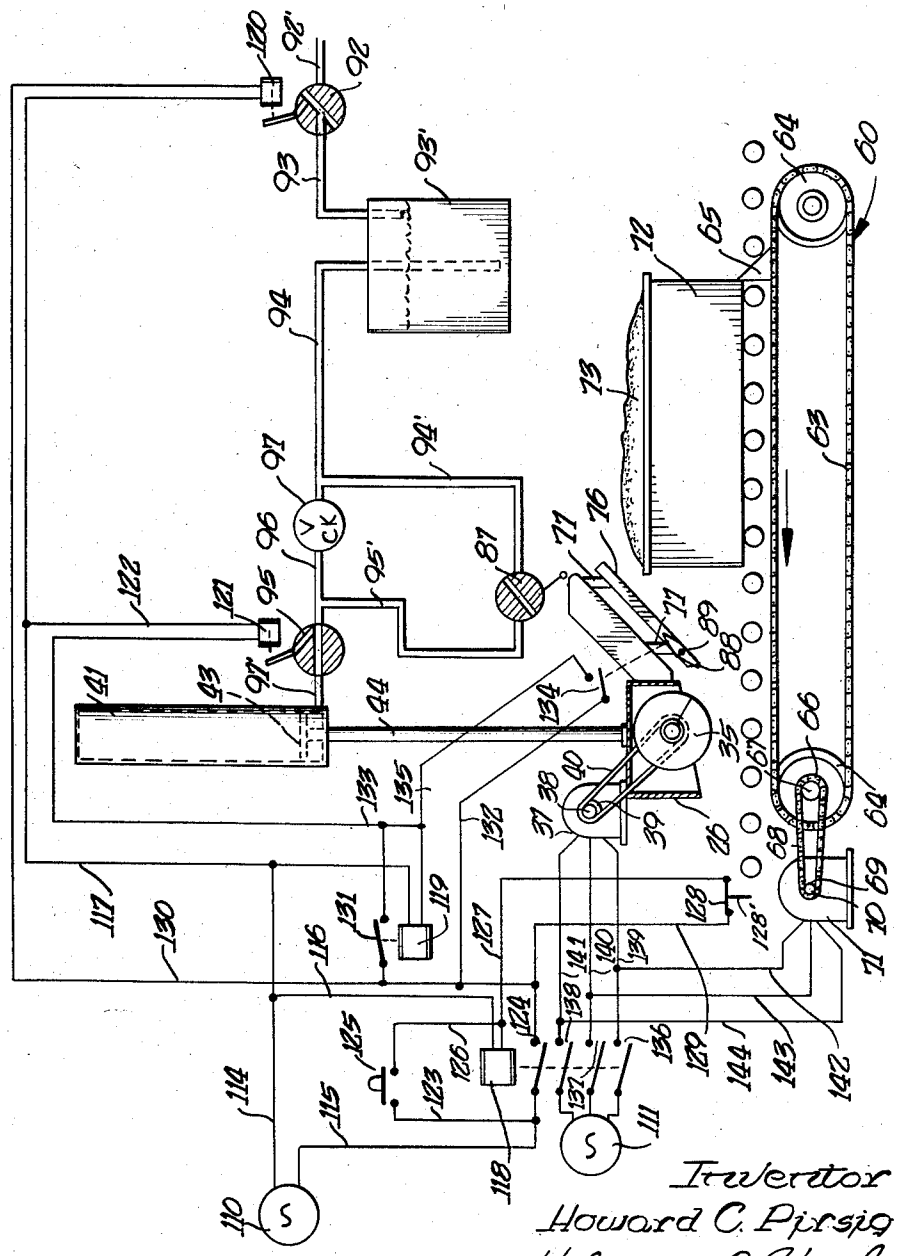


Fig. 11.

Jan. 20, 1959 H. C. PIRSIG 2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Filed Dec. 16, 1957 5 Sheets-Sheet 4

Fig. 5.

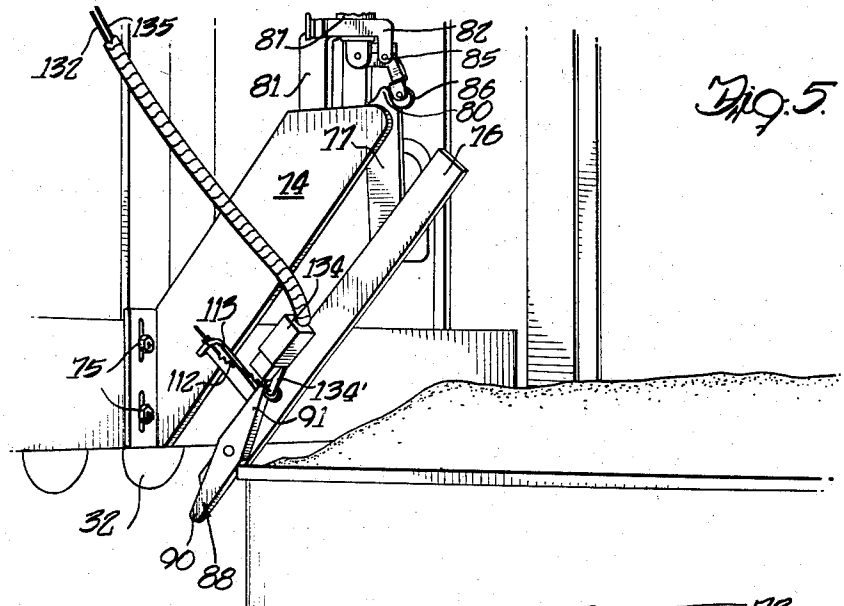
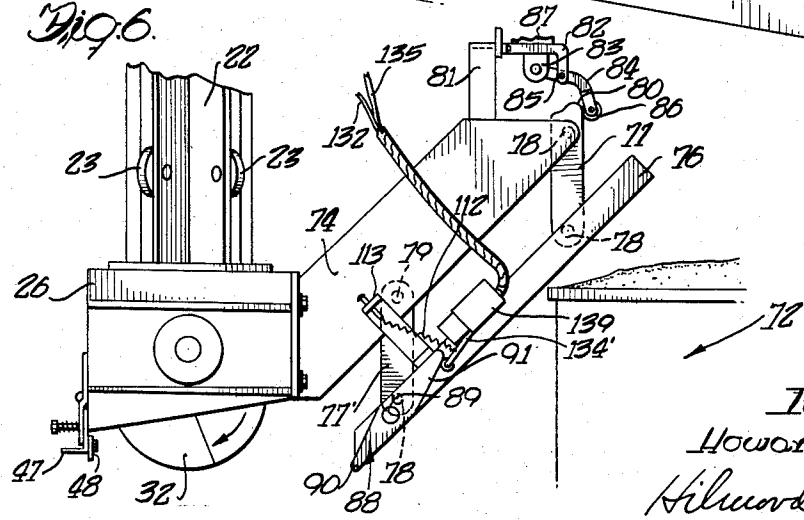


Fig. 6.



Inventor
Howard C. Pirsig
Hilmond O. Vogel
Attorney

Jan. 20, 1959 H. C. PIRSIG 2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Filed Dec. 16, 1957 5 Sheets-Sheet 5

Fig. 7.

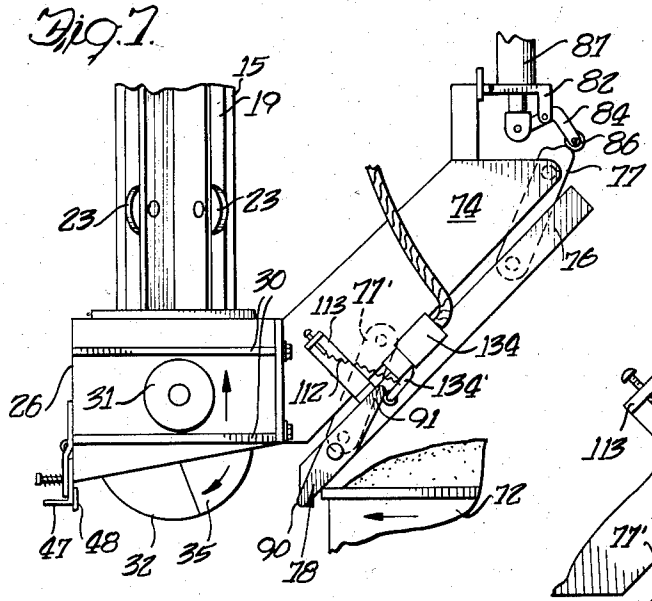


Fig. 8.

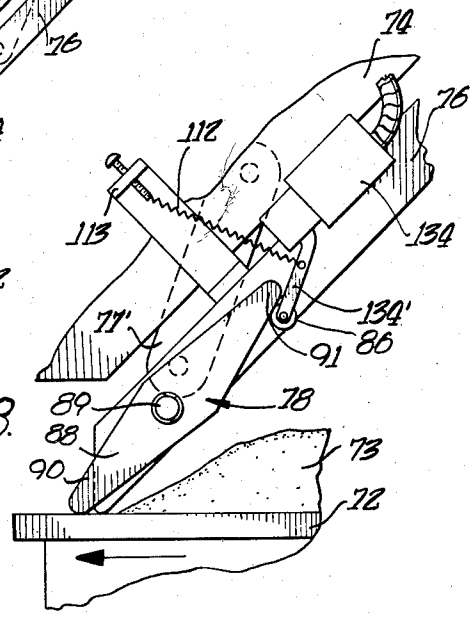


Fig. 9.

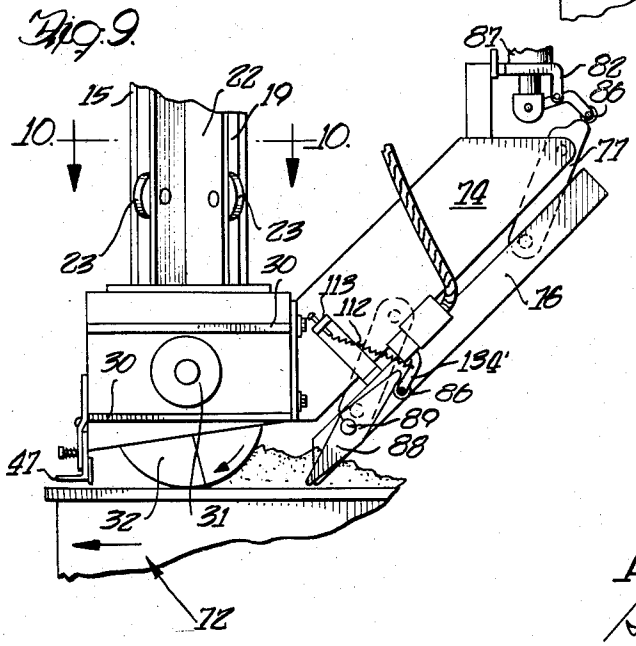
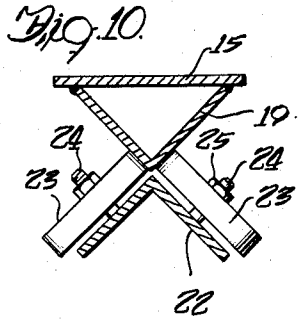


Fig. 10.



Inventor
Howard C. Pirsig
Edmund O. Vogel
Attorney

United States Patent Office 2,869,189 Patented Jan. 20, 1959

2,869,189

HELICOID STRIKE-OFF DEVICE FOR VARIABLE HEIGHT FLASKS

Howard C. Pirsig, Racine, Wis., assignor to Belle City Malleable Iron Company, a corporation of Wisconsin

Application December 16, 1957, Serial No. 703,018

22 Claims. (Cl. 22—9)

This invention relates to a strike-off device for operation on a sand filled flask. More specifically the invention relates to an improved strike-off device adapted to accommodate a variety of different height flasks.

In the operation of packing sand around a pattern within a flask a quantity, or pile, of excess sand usually projects upwardly from the upper open end of the flask. This is true whether or not the sand is rammed into the flask by means of a machine or whether the flask is packed with sand by manual operation. The excess sand which projects upwardly from the flask must be removed and a smooth packed surface is highly desired. In order to secure quantity production it is desirable to provide power driven strike-off machines or stationary strike-off blades which will engage the upper edges of the flasks to strike-off, or scrape off, the excess sand in order to leave a smooth flat surface. Various types of strike-off devices are known in the industry but none of these are adapted to handle a variety of different height flasks. In high production foundry operations different size flasks may constantly be in use and thus a strike-off device, in order to be highly efficient, but be able to adapt itself to a variety of size flasks. It is a prime object of this invention to provide an improved strike-off device which will automatically adapt itself, and position itself in operative engagement with respect to a number of different height flasks.

A still further object is to provide an improved power driven strike-off device, the said device including a combination of a helicoid or screw strike-off which cooperates with a strike-off blade adapted to leave a smooth flat surface along the upper portion of the flask after the helicoid has removed the excess sand.

A still further and more specific object is to provide an improved strike-off device including a helicoid initial strike-off member and a strike-off blade resiliently mounted on a frame which is adapted to adjust itself to the heights of various flasks used in the foundry operation.

A still further object is the provision of an improved screw type strike-off, the said strike-off being driven by a power unit and being adapted to strike-off the excess sand from a flask which is conveyed to the strike-off by means of a driven conveyer.

A still further object of the invention is to provide an improved power driven strike-off, the said strike-off comprising a frame which is vertically movable to a plurality of different heights for accommodating different size flasks.

A still further object is the provision of an improved power driven strike-off having a movable frame adapted to be moved relative to the upper surface of a flask, the said strike-off device including feeler means which is adapted to be engaged by a flask and which is operative to automatically raise the strike-off to the desired height to accommodate the particular flask which is in operative engagement with the feeler means.

These and further objects will become more readily

apparent from a reading of the specification and description when examined in connection with the accompanying sheets of drawings.

In the drawings,

Figure 1 is a perspective view of an improved strike-off device including a conveyer and flask as it enters into operative engagement with the strike-off device;

Figure 2 is a rear elevational view, partially in section, of the improved strike-off device;

Figure 3 is a cross sectional view taken particularly along the line 3—3 of Figure 2;

Figure 4 is an enlarged detailed sectional view taken substantially along the line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary perspective view of portions of a strike-off device and conveyer;

Figure 6 is a fragmentary view showing a feeler device for a strike-off, the said feeler device being initially engaged by a flask moving toward said strike-off;

Figure 7 is an enlarged fragmentary view of a feeler device showing the engagement of an actuating member by a flask moving into position underneath the strike-off;

Figure 8 is a fragmentary elevational view again showing another stage in the operation of a feeler device for a strike-off;

Figure 9 shows a strike-off device in operative engagement with excess sand disposed on the upper surface of a flask;

Figure 10 is a detailed sectional view taken particularly along the line 10—10 of Figure 9; and

Figure 11 is a schematic diagram showing the electrical circuitry and also the hydraulic and pneumatic assembly for operating the improved strike-off device.

Referring now particularly to Figures 1, 2 and 3 a strike-off device is generally designated by the reference character 10. The strike-off device 10 comprises a support generally designated at 11. The support 11 includes a pair of transversely spaced upright front supports 12 and a pair of transversely spaced upright rear supports 13. The lower ends of the supports 12 and 13 are suitably supported on transversely spaced I-beams 14. The front and rear supports 12 and 13 are suitably connected by side plates 15. Laterally spaced gussets 16 are suitably connected to the side plates 15, the said gussets 16 supporting a pair of transversely spaced channel members 17 extending in a transverse direction and connecting the transversely spaced rear supports 13 and 14. Connector plates 18 suitably connect the channel members 17 together. A vertically extending V-track is suitably connected to each of the inner sides of the side plates 15, this being best shown in Figures 2, 3 and 10.

A strike-off frame is generally designated at 20. The strike-off frame 20 includes a transversely extending beam 21 connected to a pair of transversely spaced vertically extending V-shaped uprights 22, the said uprights 22 also being shown in Figure 10. Each of the uprights 22 has vertically spaced pairs of wheels or rollers 23 connected thereto, these wheels 23, as shown in Figure 10, being in operative engagement with the V-tracks 19 to permit vertical reciprocating movement of the frame 20. The wheels 23 are suitably connected to the uprights 22 by means of shafts 24 and nuts 25. The lower end of the frame 20 is provided with a box member 26 suitably connected at its ends to the laterally spaced uprights 22. The box member 26 comprises sides 27, a top 28 and end plates 29 as best shown in Figure 4.

As shown in Figure 1 opposite ends of the box member 26 are provided with vertically spaced cross plates 30 which may be suitably connected to the outer sides of the end plates 29. The cross plates 30 rigidly support bearings 31. A helicoid strike-off, or screw, 32 is best shown in Figures 2, 4 and 9. The helicoid strike-off 32 includes a shaft 33 rigidly secured to a tubular sleeve

34, the said sleeve 34 having a helicoid blade 35 connected thereto. A pulley 36, as shown in Figure 2, is securely connected to rotate the shaft 33 and screw 32. An electric motor 37 is supported on the top of the box member 26. The electric motor includes a shaft 38 having a drive pulley 39 rigidly secured theerto. The drive pulley 39 drives a belt 40 which also is in operative relation with respect to the pulley 36. Thus, operation of the motor 37, causes rotation of the helicoid or strike-off screw 32.

Referring now particularly to Figures 1, 2 and 3, a fluid actuated power member 41 is supported on the channel members 17. A bracket structure 42 suitably connected to the channel member 17 rigidly supports the fluid actuated power member 41. The power member 41 includes a reciprocating piston 43 connected to a piston rod 44. The piston rod 44, as indicated at 45, is securely connected to the transversely extending beam 21. Thus reciprocation of the piston rod 44 moves the frame 20 on the tracks 19.

Referring now particularly to Figure 4 a scraper assembly is designated at 46. The scraper assembly 46 is also well disclosed in Figure 2. The scraper assembly 46 comprises a transversely extending angle support 47 having a rubber wiper blade 48 connected thereto. The wiper blade 48 is connected by means of fastening means 49 which also secures a pair of transversely spaced hinge brackets 50 to the angle support 47. Hinge pins 51, suitably connected in each of the hinge brackets 50, are also connected to transversely spaced hinge brackets 52 supported on the rear side 27 by means of bolts and nuts 53. Thus the wiper blade 48 and angle support 47 is hingedly connected with respect to the box member 26. The hinge brackets 52 are provided with openings 55 and the angle support 47 is provided with openings 56 through which bolts 54 project. A spring 57 is supported on each bolt 54 and jam nuts 58 are threaded to the ends of the bolts 54 so that the spring normally urges the angle supports 47 and wiper blade 48 in the direction toward the helicoid 32.

As best shown in Figures 1, 2 and 5, a conveyer is designated at 60. The conveyer 60 comprises laterally spaced pairs of conveyer supports 61, each of the pairs 61 having a plurality of rollers 62 rotatably positioned thereon. The rollers 62 and conveyer 60 may be of conventional construction, the said pairs being transversely spaced to accommodate an endless chain 63 which, as shown in Figure 11, is in operative engagement with longitudinally spaced sprockets 64. The chain has a dog 65 rigidly secured thereon, the said dog traveling in a longitudinal direction between the spaced pairs of conveyer supports 62. A driven sprocket 66 is rigidly connected to a shaft 67 which drives one of the sprockets 64. A shaft 70 projects from the electric motor 71, the said shaft 70 being rotatable for driving the conveyer chain 63.

As indicated in the schematic view Figure 11 and in some of the other views, a flask is generally designated at 72. The flask 72 has packed therein molding sand 73, the excess sand projecting upwardly from the upper normally open end of the flasks. The flasks 72 may have been packed with molding sand by either manual or machine ramming or slinging methods. It is desired to remove the excess sand and to leave a flat packed surface along the upper edge of the flasks. Referring now particularly to Figures 5 and 9 a bracket 74 is adjustably connected as indicated at 75 to the forward face of one of the sides 27. A feeler bar or feeler arm is designated at 76. The feeler arm 76 is shown to be positioned in angular or diagonal relation, the said bar 76 extending in a general longitudinal direction with respect to the conveyer 60. The bar 76 is supported by forward and rearward parallel links 77 and 77'. The links 77 and 77' are generally connected at longitudinally spaced points to the brackets 74 as indicated at 78 and 79. The parallel link 77 is provided with a cam 80. A bracket 81 is suitably connected to the bracket 74 and extends upwardly with respect thereto. The bracket 81 has connected thereto an L-shaped arm 82. A valve actuator 83 is in operative engagement with an L-shaped arm 84 which is pivotally supported on the L-shaped arm 82. The arm 84 also is pivotally connected to the valve actuator 83 and the arm 84 is pivotally connected to the said L-shaped arm 82 by means of a pivot member 85. The end of the arm 84 is provided with a roller 86' which is adapted to be engaged by the cam 80. The actuator 83 is in operative relation with respect to a valve 87 securely mounted on the bracket 81. A finger feeler or lever 88 is pivotally connected to the lever 76 as indicated at 89. The finger feeler 88 is provided with opposed end portions 90 and 91. The purpose of these end portions 90 and 91 will be described later.

Figures 1 through 10 show the structural relationship of the various portions of the invention. In these figures some of the valve elements, conduits, and electrical wires are shown. However, the schematic view of Figure 11 shows the complete pneumatic, hydraulic, and electrical circuitry, the said view showing in detail the operating elements for operating the structural features which are shown in the other views.

Referring now to Figure 11 a valve 92 is adapted to be placed into communication with a conduit 92' which extends through a suitable source of air under pressure. A conduit 93 is adapted also to be placed into direct communication with the conduit 92' by means of the valve 92. The conduit 93 is in communication with the closed reservoir 93' having a suitable oil level therein. The reservoir 93' is in communication with a conduit 94 which is adapted to carry oil through the said conduit during application of air pressure to the chamber 93'. The conduit 94 also has a branch 94' which is adapted to be placed into communication with the valve 87. The valve 87 also is adapted to communicate with a conduit 95' which in turn communicates with a conduit 96. The conduit 96 is in communication in one direction with the conduit 94 by means of a check valve 97. The conduit 96 is adapted to be placed into communication with a valve 95 and a conduit section 97' is adapted to communicate with the lower end of the power actuated device 41 for delivering fluid under pressure to raise the piston 43.

In the electrical circuit for the present invention two power sources 110 and 111 are provided. Power source 110 provides the relatively light power requirements for the control circuit and power source 111 provides the relatively high power requirement of the motors 71 and 37. One side of the power source 110 is connected to conductor 114 and the other side of the power source 110 is connected to conductor 115. Conductor 114 is connected in parallel to conductors 116 and 117. The other end of conductor 116 is connected to one side of the coil of relay 118. One end of conductor 117 is connected to one side of the coil of relay 119. The other end of conductor 117 is connected to one side of the coil of solenoid 120. One side of the coil of solenoid 121 is connected to conductor 117 through conductor 122.

The other end of conductor 115 is connected in parallel to conductor 123 and one side of the relay contacts 124 of relay 118. Conductor 123 is connected to one side of the push button switch 125. The other side of the push button switch 125 is connected to conductor 126. The other end of conductor 126 is connected to conductor 127. One end of conductor 127 is connected to the other side of the coil of relay 118, and the other end of conductor 127 is connected to one side of the normally closed switch 128. The other side of the switch 128 is connected through conductor 129 to the other side of the relay contacts 124 of relay 118. One end of conductor 130 is also connected to conductor 129. The other

end of conductor 130 is connected to the other side of the coil of solenoid 120. Conductor 130 is also connected in parallel to one side of the relay contacts 131 of relay 119 and to conductor 132. The other side of the relay contacts 131 of relay 119 is connected to a conductor 133, and the other end of conductor 133 is connected to the other side of the coil of the solenoid 121 and in parallel to conductor 135. The other end of conductor 132 is connected to one side of the normally open switch 134. The other side of normally open switch 134 is connected through conductor 135 to the other side of the coil of relay 119.

The three sets of contacts 136, 137 and 138 of relay 118 are each connected at one side thereof to the power source 111. The other side of the relay contacts 136, 137 and 138 of relay 118 are respectively connected to conductors 139, 140 and 141. The other end of each of the conductors 139, 140 and 141 are connected to the motor 37 for operation thereof. Conductors 142, 143 and 144 are respectively connected to conductors 139, 140 and 141. The other end of each of the conductors 142, 143 and 144 are connected to the motor 71 for operation thereof. Thus it may be seen that when relay 118 is energized to close its relay contacts, the two motors 71 and 37 are simultaneously operated by the power source 111.

Turning next to the description of the operation of the control circuit it may be seen that when push button switch 125 is momentarily depressed the following circuit for the energization of relay 118 is completed: from one side of the coil of relay 118, conductor 116, conductor 114, power source 110, conductor 115, conductor 123, push button switch 125, conductor 126, conductor 127 to the other side of the coil of relay 118. Relay 118 in operating will, among other things, complete the following lockup circuit: from one side of the coil of relay 118, conductor 116, conductor 114, power source 110, conductor 115, relay contacts 124, conductor 129, normally closed switch 128, conductor 127, to the other side of relay 118. The closing of the other contacts 136, 137 and 138 of relay 118 will complete the obvious circuits for operation of the motors 71 and 37.

Simultaneously with the operation of relay 118, the solenoid 120 is operated over the following circuit: from one side of the coil of solenoid 120, conductor 117, conductor 114, power source 110, conductor 115, relay contacts 124, conductor 130, to the other side of the coil of solenoid 120.

Thus it may be seen that with the momentary operation of the push button 127, relay 118 is energized and locked up, the power source 111 is connected to simultaneously operate the motors 71 and 37, and solenoid 120 is operated.

When the normally open switch 134 is closed the following circuit for the energization of relay 119 is completed: one side of the coil of relay 119, conductor 117, conductor 114, power source 110, conductor 115, relay contacts 124, conductor 129, conductor 130, conductor 132, switch 134, conductor 135 to the other side of the coil of relay 119.

The energization of relay 119 and the closing of its contacts 131 will complete the following circuits for the operation of solenoid 121 and for holding relay 119 operated from one side of the coil of solenoid 121 through conductor 122 and from one side of relay 119 to conductor 117, conductor 114, power source 110, conductor 115, relay contacts 124, conductor 129, conductor 130, relay contacts 13, conductor 133 to the other side of the coil of solenoid 121 and to the other side of relay 119.

Thus it may be seen that with the closing of switch 134, solenoid 121 is operated and relay 119 is operated and locked up.

When normally closed switch 128 is opened, the locking circuit for relay 118 is opened, and relay 118 will then restore to open its relay contacts 136, 137, 138 and 124. With the openings of these relay contacts the power source 111 is disconnected from the motors 71 and 37 and the operating circuits for relay 119 and solenoids 120 and 121 are opened to cause a complete restoration of the circuit.

The location of the switches are well shown in the schematic view of Figure 11. The switch 134 also is shown in position in Figure 6, the said switch being mounted securely to the arm 76. The switch 134 also includes a lever 134' which is adapted to be engaged by the end portion 91 of the finger feeler 88. The arm 134' normally is urged upwardly by means of a spring 112 which is suitably connected to a bracket 113 also mounted on the lever 76. Referring again to the schematic view of Figure 11 the valve 95, as shown in Figure 1, may be positioned near the fluid actuator member 41. The reservoir 93' may be positioned adjacent the strike-off machine. The position of the motor 37, is shown in Figure 2, and the motor 71 may be suitably positioned, as indicated in Figure 11, adjacent the conveyer 60.

Operation

As shown in Figure 11 the flask 72 is on the conveyer 60. The flask has a surplus of sand 73 projecting upwardly from the said flask. The electrical circuit and the operation has been heretofore described. When the switch 125 is closed the motors 71 and 37 begin operation. Thus the helicoid 35 is now rotating and the conveyer chain 63 is set in motion causing engagement of the dog 65 with the rear end of the flask 72 whereupon the flask 72 is moved on the conveyer rollers toward the strike-off device. The valve 92 has moved in response to the solenoid 120 to the open position so that air under pressure is directed by means of the conduit 93 to the reservoir 93'. The conduit 94 and 94' therefor has oil, now under pressure, therein.

The strike-off device and helicoid 35 are now at the lowermost position with the piston 43 at the lower end of the fluid actuated power cylinder and device 41. As the flask 72 moves toward the strike-off helicoid 35 it initially engages the arm 76 moving the same on its parallel links 77 and 77'. This initial engagement of the flask 72 with the arm 76 is best shown in Figure 6. As the arm 76 is pivoted the cam 80 rides against the roller 86 of the arm 84 whereupon the valve actuator 83 is moved and the valve 87 is moved to an open position whereupon fluid under pressure flows through the valve 87, through the conduit 95' and through the normally opened valve 95, through the conduit 97' and to the lower portion of the fluid actuated member 41 which causes the piston 43 to move in an upward direction. The piston 43 moving upwardly, raises the rotating helicoid 35. As the frame 20 and helicoid 35 are moved upwardly the flask is simultaneously moved forwardly and the forward edge of the flasks slides against the leading edge of the arm 76 keeping the valve 87 open so that continuous raising of the frame 20 results. Figures 7 and 8 show the leading edge of the flask 72 in engagement with the feeler finger or lever 88 the said engagement being at the portion 90. The finger 88 is moved in a clockwise direction which causes the engaging portion 91 to move the arm 134' of the switch 134. The switch 134 is now closed and the solenoid 121 actuates the valve 95 to close communication between the conduits 96 and 97'. Thus oil is now locked in the fluid actuated member 41 below the piston 43, and the piston 43 is locked in position. Movement of the frame 20 in an upward direction now ceases and the helicoid 35 is now in operative position with respect to the sand 73 of the flask 72. This is best shown in Figure 9. The helicoid 35 now strikes off the excess sand and the scraper blade 48 effectively smoothens out and scrapes the top of the flasks and the sand to create a perfectly smooth packed surface. The flask 72 continues its movement past the strike-off

helicoid 35 and blade 48, and the dog 65 then engages a switch trip member 128' whereupon the switch 128 is opened. As indicated above the circuit is now restored to its original position shown in Figure 11 and the cycle of operation can be repeated. Since the frame 20 and strike-off device 35 are lowered by gravity the oil may now be returned to the reservoir 93' the said oil flowing through the check valve 97 toward the reservoir 93'.

Thus it can be seen that the unit will accommodate various different height flasks and in each case will adapt itself to such different flasks by virtue of the feeler elements. Once the flask trips the finger 88 the height of the helicoid is fixed and the helicoid effectively discharges excess sand from the top of the flask. The complete operation and cycle is automatic after the operator presses the start button. As the front end of the flask 72 engages the leading edge of the arm 76 the helicoid and arm raise upwardly while the flask continues its movement and maintains its operating relation with respect to the arm 76 until the finger feeler 88 is engaged by the forward portion of the flask whereupon the locking action of the fluid power actuating means 41 takes place.

Thus it can be seen that a new and improved strike-off device has been disclosed. It must be understood that changes and modifications may be made without departing from the spirit of the invention as disclosed or the scope thereof as defined in the appended claims.

What is claimed is:

1. A mold strike-off device comprising a support including a pair of transversely spaced upright members adapted to be positioned on opposite sides of a movable conveyor having a sand filled flask movably supported thereon, a track on each upright member, a frame vertically movable on said support between said upright members, said frame including vertically spaced transversely extending frame members, vertically extending end members connecting said frame members, roller members on said frame supporting said frame on said tracks, a fluid power actuated member connected to said support, said fluid power actuated member including an extensible member connected to said frame for reciprocating the same, a transversely extending helicoid strike-off member rotatably supported on the end members of said frame, means connected to said strike-off member for rotating the same, a transverse leveling blade positioned on one side of said strike-off member, means supporting said leveling blade on said frame comprising a first hinge member connected to said frame, a second hinge member hingedly engaging said first hinge member, said second hinge member being connected to said leveling blade, and resilient means connecting said leveling blade and frame whereby said blade is normally urged toward said helicoid strike-off member, a bracket mounted on said frame, an arm, parallel links pivotally connected to said arm and to said bracket, said arm being engageable and movable by a flask moving on said conveyor toward said strike-off member, a lever movably positioned on said arm, a fluid reservoir, a normally closed first valve, a first conduit connecting said first valve and said reservoir, a normally closed second valve, a second conduit connecting said first valve and said second valve, a third conduit connecting said second valve and said fluid power actuated member, means on said first valve engageable by said arm during movement thereof to open said first valve thereby delivering fluid under pressure from said reservoir to said fluid power actuated member whereby said frame is raised, first electrical means connected to said second valve, said lever being engageable and movable by said moving flask as it moves into position beneath said strike-off member whereby said first electrical means is responsive to close said second valve to shut-off fluid to said power actuated member whereby the frame is held against further movement, and second electrical means responsive to movement of said flask after it leaves said strike-off member to deenergize said first electrical means whereby said second valve is opened to permit fluid from said power actuated member to return to said reservoir and said frame is lowered to its initial starting position.

2. A mold strike-off device comprising a support including a pair of transversely spaced upright members adapted to be positioned on opposite sides of a movable conveyor having a sand filled flask movably supported thereon, a track on each upright member, a frame vertically movable on said support between said upright members, said frame including vertically spaced transversely extending frame members, vertically extending end members connecting said frame members, roller members on said frame supporting said frame on said tracks, a fluid power actuated member connected to said support, said fluid power actuated member including an extensible member connected to said frame for reciprocating the same, a transversely extending helicoid strike-off member rotatably supported on the end members of said frame, means connected to said strike-off member for rotating the same, a transverse leveling blade positioned on one side of said strike-off member, means supporting said leveling blade on said frame, a bracket mounted on said frame, an arm, parallel links pivotally connected to said arm and to said bracket, said arm being engageable and movable by a flask moving on said conveyor toward said strike-off member, a lever movably positioned on said arm, a fluid reservoir, a normally closed first valve, a first conduit connecting said first valve and said reservoir, a normally closed second valve communicating with said first valve, a second conduit connecting said second valve and said fluid power actuated member, means on said first valve engageable by said arm during movement thereof to open said first valve thereby delivering fluid under pressure from said reservoir to said fluid power actuated member whereby said frame is raised, first electrical means connected to said second valve, said lever being engageable and movable by said moving flask it is moves into position beneath said strike-off member whereby said first electrical means is responsive to close said second valve to shut off fluid to said power actuated member whereby the frame is held against further movement, and second electrical means responsive to movement of said flask after it leaves said strike-off member to deenergize said first electrical means whereby said second valve is opened to permit fluid from said power actuated member to return to said reservoir and said frame is lowered to its initial starting position.

3. A mold strike-off device comprising a support including a pair of transversely spaced upright members adapted to be positioned on opposite sides of a movable conveyer having a sand filled flask movably supported thereon, a track on each upright member, a frame vertically movable on said support between said upright members, said frame including vertically spaced transversely extending frame members, vertically extending end members connecting said frame members, roller members on said frame supporting said frame on said tracks, a fluid power actuated member connected to said support, said fluid power actuated member including an extensible member connected to said frame for reciprocating the same, a transversely extending helicoid strike-off member rotatably supported on the end members of said frame, means connected to said strike-off member for rotating the same, a bracket mounted on said frame, an arm, parallel links pivotally connected to said arm and to said bracket, said arm being engageable and movable by a flask moving on said conveyer toward said strike-off member, a lever movably positioned on said arm, a fluid reservoir, a normally closed first valve, a first conduit connecting said first valve and said reservoir, a normally closed second valve, a second conduit connecting said first valve and said second valve, a third conduit connecting said second valve and said fluid power actuated member, means on said first valve engageable by said arm during movement thereof to open said first valve

thereby delivering fluid under pressure from said reservoir to said fluid power actuated member whereby said frame is raised, first electrical means connected to said second valve, said lever being engageable and movable by said moving flask as it moves into position beneath said strike-off member whereby said first electrical means is responsive to close said second valve to shut off fluid to said power actuated member whereby the frame is held against further movement, and second electrical means responsive to movement of said flask after it leaves said strike-off member to deenergize said first electrical means whereby said second valve is opened to permit fluid from said power actuated member to return to said reservoir and said frame is lowered to its initial starting position.

4. A mold strike-off device comprising a support adapted to be positioned over a movable conveyer having a sand filled flask movably supported thereon, a frame vertically movable on said support, a fluid power actuated member connected to said support, said fluid power actuated member including an extensible member connected to said frame for reciprocating the same, a transversely extending helicoid strike-off member rotatably supported on the end members of said frame, means connected to said strike-off member for rotating the same, a bracket mounted on said frame, an arm, parallel links pivotally connected to said arm and to said bracket, said arm being engageable and movable by a flask moving on said conveyer toward said strike-off member, a lever movably positioned on said arm, a fluid reservoir, a normally closed first valve, a first conduit connecting said first valve and said reservoir, a normally closed second valve, a second conduit connecting said first valve and said second valve, a third conduit connecting said second valve and said fluid power actuated member, means on said first valve engageable by said arm during movement thereof to open said first valve thereby delivering fluid under pressure from said reservoir to said fluid power actuated member whereby said frame is raised, first electrical means connected to said second valve, said lever being engageable and movable by said moving flask as it moves into position beneath said strike-off member whereby said first electrical means is responsive to close said second valve to shut off fluid to said power actuated member whereby the frame is held against further movement, and second electrical means responsive to movement of said flask after it leaves said strike-off member to deenergize said first electrical means whereby said second valve is opened to permit fluid from said power actuated member to return to said reservoir and said frame is lowered to its initial starting position.

5. A mold strike-off device comprising a support adapted to be positioned over a movable conveyer having a sand filled flask movably supported thereon, a frame vertically movable on said support, a fluid power actuated member connected to said support, said fluid power actuated member including an extensible member connected to said frame for reciprocating the same, a transversely extending helicoid strike-off member rotatably supported on the end members of said frame, means connected to said strike-off member for rotating the same, an arm movably connected to said frame, said arm being engageable and movable by a flask moving on said conveyer toward said strike-off member, a lever movably positioned on said arm, a fluid reservoir, a normally closed first valve, a first conduit connecting said first valve and said reservoir, a normally closed second valve, a second conduit connecting said first valve and said second valve, a third conduit connecting said second valve and said fluid power actuated member, means on said first valve engageable by said arm during movement thereof to open said first valve thereby delivering fluid under pressure from said reservoir to said fluid power actuated member whereby said frame is raised, first electrical means connected to said second valve, said lever being engageable and movable by said moving flask as it moves into position beneath said strike-off member whereby said first electrical means is responsive to close said second valve to shut off fluid to said power actuated member whereby the frame is held against further movement, and second electrical means responsive to movement of said flask after it leaves said strike-off member to deenergize said first electrical means whereby said second valve is opened to permit fluid from said power actuated member to return to said reservoir and said frame is lowered to its initial starting position.

6. A strike off device comprising a support adapted to be positioned adjacent a movable conveyer having a sand filled flask movably supported thereon, a frame vertically moveable relative to said support, a fluid cylinder connected to said support, a ram reciprocally positioned on said cylinder, said ram being connected to said frame, a transversely extending helicoid strike-off member rotatably supported on said frame, means rotating said strike-off member whereby said strike-off member may engage and strike-off excess sand from the top of said flask, an arm movably connected to said frame, said arm being movable toward said frame during engagement thereof with a filled flask, a lever pivotally connected to said arm adjacent one end thereof, means for raising and lowering said frame and strike-off member, relative to different height flasks including, a source of fluid under pressure, a normally closed first valve means communicating with said source, a conduit in communication with said first valve means, a second normally open valve means communicating with said conduit and said cylinder, means responsive to movement of said arm during engagement by a flask to open said first valve to direct fluid to said fluid cylinder to raise said frame and helicoid to accommodate the flask, first electrical actuating means responsive to movement of said lever during engagement with a flask to close said second valve whereby fluid flow to said cylinder ceases and said helicoid is positioned in operative relation to a flask, and second electrical means responsive to movement of a flask to a position away from said strike-off member whereby said first electrical means is deenergized and said second valve opens to permit lowering of the frame and strike-off member to its initial position.

7. A strike off device comprising a support adapted to be positioned adjacent a movable conveyer having a sand filled flask movably supported thereon, a frame vertically moveable relative to said support, a fluid cylinder connected to said support, a ram reciprocally positioned on said cylinder, said ram being connected to said frame, a transversely extending helicoid strike-off member rotatably supported on said frame, means rotating said strike-off member whereby said strike-off member may engage and strike-off excess sand from the top of said flask, an arm movably connected to said frame, said arm being movable during engagement thereof with a filled flask, a lever movably connected to said arm adjacent one end thereof, means for raising and lowering said frame and strike-off member, relative to different height flasks including, a source of fluid under pressure, a normally closed first valve means communicating with said source, a conduit in communication with said first valve means, a second normally open valve means communicating with said conduit and said cylinder, means responsive to movement of said arm during engagement by a flask to open said first valve to direct fluid to said fluid cylinder to raise said frame and helicoid to accommodate the flask, and electrical actuating means responsive to movement of said lever during engagement with a flask to close said second valve whereby fluid flow to said cylinder ceases and said helicoid is positioned in operative relation to a flask, said electrical means being responsive to movement of a flask to a position away from said strike-off member whereby said electrical means is deenergized and said

second valve opens to permit lowering of the frame and strike-off member to its initial position.

8. A strike-off device comprising a support adapted to be positioned adjacent to a moveable conveyer having a sand filled flask movably supported thereon, a frame vertically movable on said support, fluid actuated means between said frame and support for raising and lowering the same, a transversely extending strike-off screw rotatably mounted on said frame for vertical movement therewith with respect to said conveyer, means for supplying fluid under pressure to said fluid actuated means comprising a first normally closed valve means adapted to communicate with a source of fluid under pressure, a second normally open valve means communicating with said first valve means and with said fluid actuated means, a feeler member disposed in the path of movement of a flask on said conveyer toward said strike-off screw; said feeler member comprising an elongated bar, a pair of longitudinally spaced links pivotally connected to said bar and to said frame, whereby said bar is disposed in longitudinal and angled relation relative to said conveyer, said bar having an engaging edge, an actuating element pivotally connected to the end portion of said bar nearest said frame, means responsive to movement of said bar as a flask engages said engaging edge for opening said first valve to direct fluid to said fluid actuated device whereby said frame and said strike-off screw is raised, the flask engaging said actuating element during movement underneath said strike-off screw, and electrical means actuated by said actuating element and connected to said second valve for closing the same to restrain fluid flow to and from said fluid actuated device whereby said strike-off screw is positioned at an operative height with respect to the top of said flask, and means responsive to movement of said flask from said strike-off screw to return said valves to their initial position.

9. A strike-off device comprising a support adapted to be positioned adjacent to a movable conveyer having a sand filled flask movably supported thereon, a frame vertically movable on said support, fluid actuated means between said frame and support for raising and lowering the same, a transversely extending strike-off element rotatably mounted on said frame for vertical movement therewith with respect to said conveyer, means for supplying fluid under pressure to said fluid actuated means comprising a first normally closed valve means adapted to communicate with a source of fluid under pressure, a second normally open valve means communicating with said first valve means and with said fluid actuated means, a feeler member disposed in the path of movement of a flask on said conveyer toward said strike-off element; said feeler member comprising an elongated bar, a pair of longitudinally spaced links pivotally connected to said bar and to said frame whereby said bar is disposed in longitudinal and angled relation relative to said conveyer, said bar having an engaging edge, an actuating element pivotally connected to said bar, means responsive to movement of said bar as a flask engages said engaging edge for opening said first valve to direct fluid to said fluid actuated device whereby said frame and said strike-off element is raised, the flask engaging said actuating element during movement underneath said strike-off element, and electrical means actuated by said actuating element and connected to said second valve for closing the same to restrain fluid flow to and from said fluid actuated device whereby said strike-off element is positioned at an operative height with respect to the top of said flask, and means responsive to movement of said flask from said strike-off element to return said valves to their initial position.

10. A strike-off device comprising a support adapted to be positioned adjacent to a movable conveyer having a sand filled flask movably supported thereon, a frame vertically movable on said support, fluid actuated means between said frame and support for raising and lowering the same, a transversely extending strike-off element rotatably mounted on said frame for vertical movement therewith with respect to said conveyer, means for supplying fluid under pressure to said fluid actuated means comprising a first normally closed valve means adapted to communicate with a source of fluid under pressure, a second normally open valve means communicating with said first valve means and with said fluid actuated means, a feeler member disposed in the path of movement of a flask on said conveyer toward said strike-off screw; said feeler member comprising an elongated bar, means movably connecting said bar to said frame whereby said bar is disposed over said conveyer, said bar having an engaging edge, an actuating element supported in the path of movement of said flask, means responsive to movement of said bar as a flask engages said engaging edge for opening said first valve to direct fluid to said fluid actuated device whereby said frame and said strike-off element is raised, the flask engaging said actuating element during movement underneath said strike-off element, and means actuated by said actuating element and connected to said second valve for closing the same to restrain fluid flow to and from said fluid actuated device whereby said strike-off element is positioned at an operative height with respect to the top of said flask, and means responsive to movement of said flask from said strike-off element to return said valves to their initial position.

11. A strike-off device comprising a support adapted to be positioned adjacent to a moveable conveyer having a sand filled flask movably supported thereon, a frame movable on said support, fluid actuated means between said frame and support for moving said frame, a strike-off element mounted on said frame for movement therewith with respect to said conveyer, means for supplying fluid under pressure to said fluid actuated means comprising a first normally closed valve means adapted to communicate with a source of fluid under pressure, a second normally open valve means communicating with said first valve means and with said fluid actuated means, a feeler member disposed in the path of movement of a flask and said conveyer toward said strike-off element; said feeler member comprising an engaging edge and being moveable, an actuating element supported in the path of movement of said flask, means responsive to movement of said feeler element as a flask engages said engaging edge for opening said first valve to direct fluid to said fluid actuated device whereby said frame and said strike-off element is moved, the flask engaging said actuating element during movement underneath said strike-off element, and means actuated by said actuating element and connected to said second valve for closing the same to restrain fluid flow to and from said fluid actuated device whereby said strike-off element is positioned at an operative height with respect to the top of said flask, and means responsive to movement of said flask from said strike-off element to return said valves to their initial position.

12. A strike-off device comprising a support adapted to be positioned adjacent to a moveable conveyer having a sand filled flask movably supported thereon, a frame movable on said support, fluid actuated means between said frame and support for moving said frame, a strike-off element mounted on said frame for movement therewith with respect to said conveyer, means for supplying fluid under pressure to said fluid actuated means comprising a first normally closed valve means adapted to communicate with a source of fluid under pressure, a second normally open valve means communicating with said first valve means and with said fluid actuated means, a feeler member disposed in the path of movement of a flask and said conveyer toward said strike-off element;

said feeler member comprising an engaging edge and being moveable, an actuating element supported in the path of movement of said flask, means responsive to movement of said feeler element as a flask engages said engaging edge for opening said first valve to direct fluid to said fluid actuated device whereby said frame and said strike-off element is moved, the flask engaging said actuating element during movement underneath said strike-off element, and means actuated by said actuating element and connected to said second valve for closing the same to restrain fluid flow to and from said fluid actuated device whereby said strike-off element is positioned at an operative height with respect to the top of said flask.

13. A strike-off device comprising a support adapted to be positioned adjacent a movable conveyer on which sand filled flasks are movable, a frame movably supported on said support, a strike-off element on said frame, fluid power actuating means between said frame and said support for moving said frame, means for supplying fluid under pressure to said actuating means including a valve assembly in one position adapted to communicate with a source of fluid and with said actuating means, said valve assembly in a second position being adapted to restrain fluid from moving to and from said actuating means to lock said frame and strike-off element in position, a feeler element disposed in the path of travel of said flask, means responsive to said feeler element for actuating said valve assembly to a first position whereby fluid flows to said actuating means and said frame and strike-off element are moved into operative relation relative to said flask, and means responsive to said feeler element when engaged by said flask as it moves into operative position relative to said strike-off element to actuate said valve assembly to said second position.

14. A strike-off device comprising a support adapted to be positioned adjacent a movable conveyer on which sand filled flasks are movable, a frame movably supported on said support, a strike-off element on said frame, fluid power actuating means between said frame and said support for moving said frame, means for supplying fluid under pressure to said actuating means including a valve assembly in one position adapted to communicate with a source of fluid and with said actuating means, said valve assembly in another position being adapted to restrain fluid from moving to and from said actuating means to lock said frame and strike-off element in position, a feeler element disposed in the path of travel of said flask, and means responsive to said feeler element for actuating said valve assembly whereby fluid flows to said actuating means and said frame and strike-off element are moved into operative relation relative to said flask.

15. A strike-off device for operation with a conveyer including means for moving a filled flask into operative relation with respect to said strike-off device comprising; a support, a helicoid strike-off movably positioned on said support for vertical movement from a lowered to a raised position, said strike-off extending across said conveyer, means for rotating said strike-off, a fluid actuated unit connected to said strike-off and said support for moving said strike-off, first means disposed in the path of movement of said flask responsive to movement of said flask for directing fluid to said fluid actuated unit whereby said strike-off is moved in an upward direction, and second means responsive to movement of said flask in position underneath said strike-off for restricting the flow of fluid to and from said actuating unit whereby said helicoid strike-off is maintained in operative relation relative to molding sand projecting upwardly above the upper edges of a flask.

16. A strike-off device in accordance with claim 15, wherein said first means includes a first valve communicating with a source of fluid under pressure for directing fluid to said actuating unit, and said second means including a second valve communicating with said first valve.

17. A strike-off device for operation with a conveyer including means for moving a filled flask into operative relation with respect to said strike-off device comprising; a support, a strike-off movably positioned on said support for movement with respect to a flask on said conveyer, a fluid actuated unit connected to said strike-off and said support for moving said strike-off, first means disposed in the path of movement of said flask and responsive to movement of said flask for directing fluid to said fluid actuated unit whereby said strike-off is moved relative to a flask, and second means responsive to movement of said flask into position underneath said strike-off for restricting the flow of fluid to and from said actuating unit whereby said strike off is maintained in operative relation relative to molding sand projecting upwardly above the upper edges of a flask.

18. A strike-off device for operation with a conveyer including means for moving a filled flask into operative relation with respect to said strike-off device comprising; a support, a strike-off movably positioned on said support for movement, a power actuated unit connected to said strike-off and said support for moving said strike-off, first means disposed in the path of movement of said flask responsive to movement of said flask for directing power to said power actuated unit whereby said strike-off is moved relative to a flask, and second means responsive to movement of said flask in position underneath said strike-off for restricting the flow of power to and from said actuating unit whereby said strike-off is maintained in operative relation relative to molding sand projecting upwardly above the upper edges of a flask.

19. A strike-off device for striking excess molding sand from a flask as it is conveyed to said strike-off device comprising; a support, a frame vertically movable on said support, said frame including a screw type strike-off member rotatably mounted thereon and being adapted to engage sand projecting upwardly from a filled flask, a leveling blade positioned on said frame for leveling portions of remaining projecting sand as a flask is moved from the strike-off member, and power means connected to said frame and support for raising said frame, said power means including means responsive to variable height flasks for raising said frame and strike-off member to accommodate a variety of flasks.

20. A strike-off device for striking excess molding sand from a flask as it is conveyed to said strike-off device comprising; a support, a frame movable on said support, said frame including a screw type strike-off member rotatably mounted thereon and being adapted to engage sand projecting upwardly from a filled flask, and power means connected to said frame and support for moving said frame, said power means including means responsive to variable height flasks for raising said frame and strike-off member to accommodate a variety of flasks.

21. A strike-off device for striking excess molding sand from a flask as it is conveyed to said strike-off device comprising; a support, a strike-off member moveably mounted on said support and being adapted to engage sand projecting upwardly from a filled flask, and power means associated with said support and strike-off member for raising and positioning said strike-off member, said power means including means responsive to variable height flasks for actuating said power means to position said strike-off member to accommodate a variety of flasks.

22. A strike-off device for striking excess material from the top of a flask comprising; a support, a normally horizontally extending strike-off member movably positioned on said support and adapted to be moved into strike-off relation with respect to a flask positioned beneath said

strike-off member, and power actuated means connected to said strike-off member and including means responsive to different height flasks moving into position beneath said strike-off member for actuating said power means for moving and maintaining said strike-off member in operative relation with respect to said different flasks.

References Cited in the file of this patent

UNITED STATES PATENTS

1,794,334 Haskins ---------- Feb. 24, 1931

FOREIGN PATENTS

479,058 Canada ---------- Dec. 4, 1951