June 6, 1933. L. A. CAMEROTA 1,912,361

MOLD DISENTEGRATING STATION

Original Filed Jan. 13, 1932 3 Sheets-Sheet 1

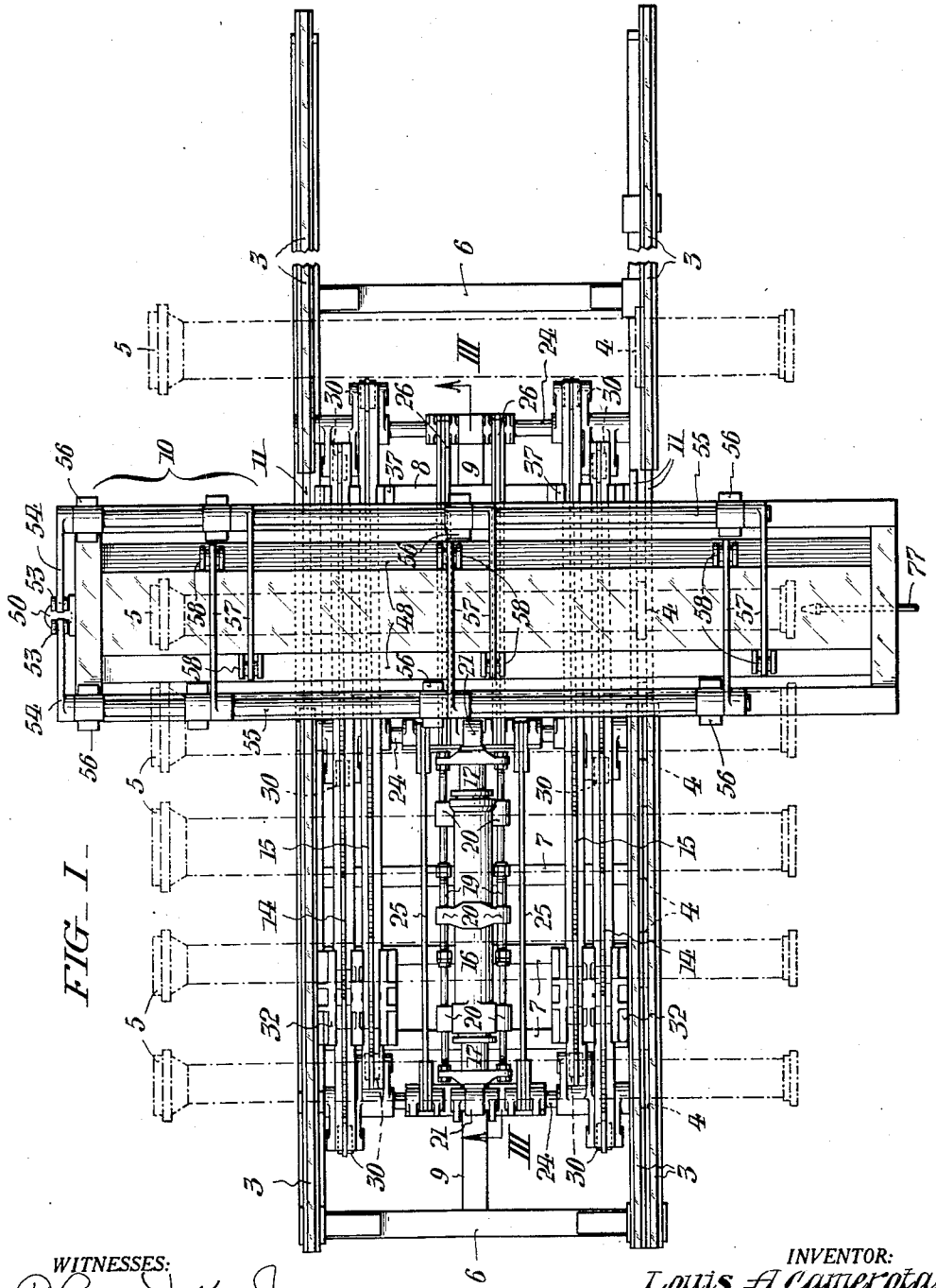


FIG. 1.

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FIG. II.

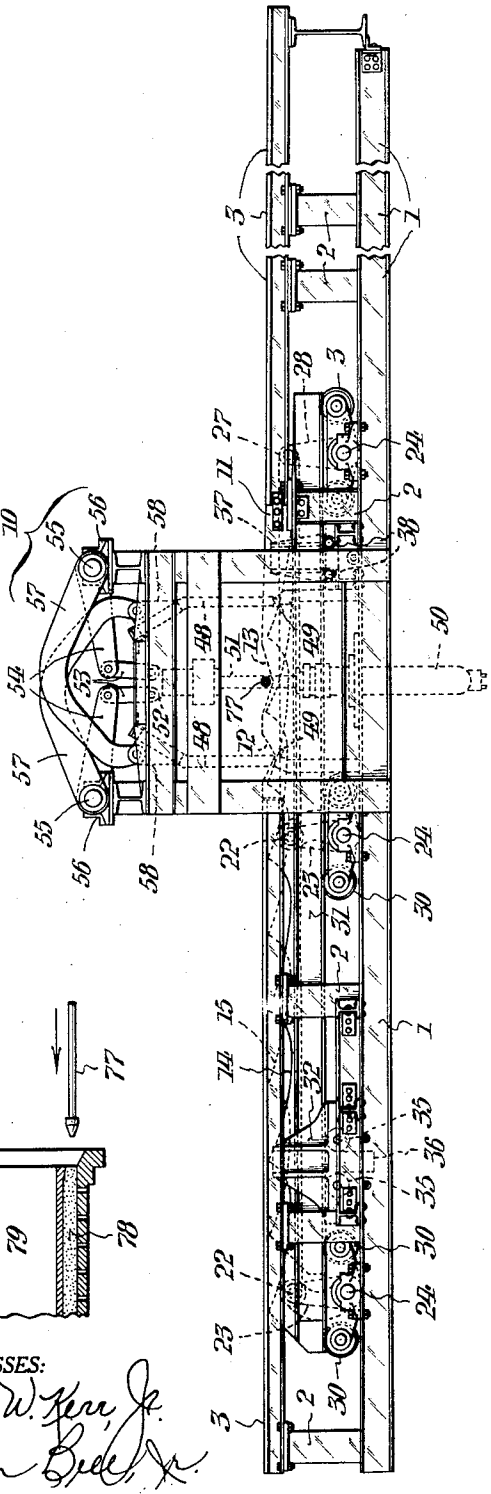


FIG. III.

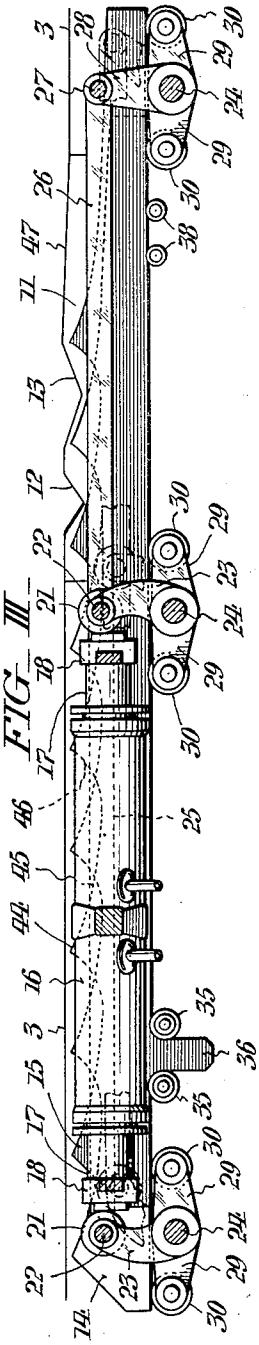


FIG. V.

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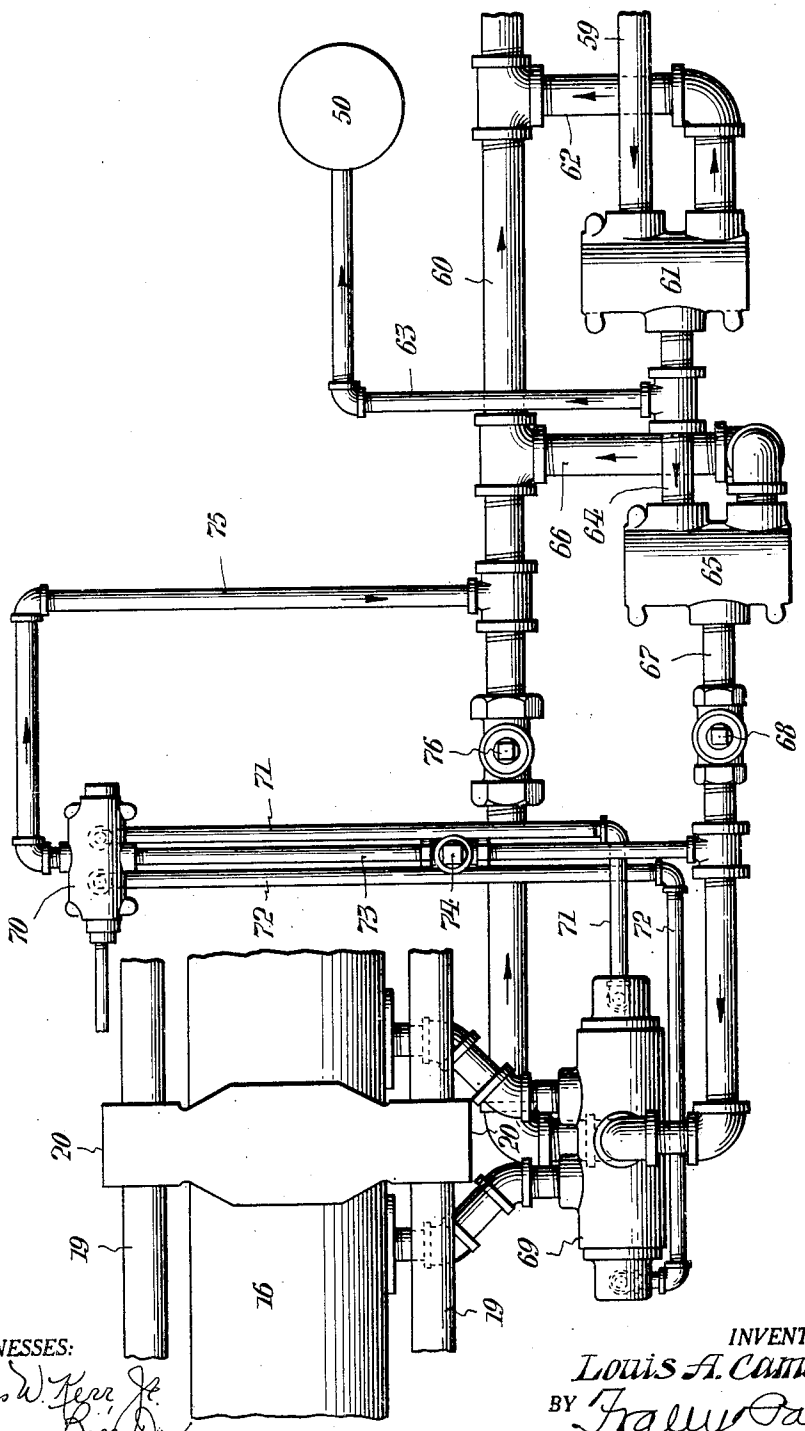
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MOLD DISENTEGRATING STATION

Original Filed Jan. 13, 1932 3 Sheets-Sheet 3

FIG. IV.



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UNITED STATES PATENT OFFICE

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MOLD DISINTEGRATING STATION

Original application filed January 13, 1932, Serial No. 586,316. Divided and this application filed July 7, 1932. Serial No. 621,188.

My invention relates to mold disintegrating stations, and more particularly to a dust collecting enclosure to which pipe flasks or like objects are admitted by means of a conveyor, and subsequently subjected to a mold disintegrating operation which partially or wholly frees the casting from its flask. The present application constitutes a division of my pending application for U. S. Letters Patent, Serial Number 586,316, filed January 13, 1932.

The object of the invention is to provide, in combination with such a dust collecting enclosure and conveyor, means for controlling the opening and closing of the doors through which the flasks are admitted, whereby the doors are operated in timed relation with the progression of the flasks on the conveyor, thus avoiding danger of the flasks striking the doors in entering or leaving the enclosure.

Other objects and advantages characterizing my invention will become more fully apparent from the description hereinafter of one embodiment or example of the practice thereof, having reference to the accompanying drawings. Of the drawings:

Fig. I represents a plan view of a mold disintegrating station including a conveyor adapted for the progression of pipe flasks in a foundry and a dust box in the path of the conveyor.

Fig. II represents a side elevation of the same.

Fig. III represents a longitudinal section of the same, taken as indicated by the lines III—III of Fig. I.

Fig. IV represents the arrangement of the controls for the conveyor actuating cylinder; and,

Fig. V represents a cross section of the end of a pipe flask, showing the manner in which a blow pipe is applied thereto to disintegrate the sand mold preparatory to the removal of the pipe.

In the drawings, with particular reference to Figs. I and II, there is shown a stationary framework or table comprising I-beams 1 resting on a foundry floor and arranged in parallel spaced relation, pedestals 2 mounted thereon, and parallel rails 3 supported on and secured to the pedestals 2. At one side of the table, two such rails 3 are preferably employed so as to accommodate between them flanges 4 on the pipe flasks 5, whereby the pipe flasks may be guided in their rolling movement along the rails. To stiffen the table, as well as to provide a suitable support for the operating mechanism of the conveyor, transverse beams 6, 7 and 8, and a longitudinal center beam 9, are provided.

It may be assumed for the purpose of illustration that the rails 3 receive pipe flasks 5 from a transfer car at that end of the table which is shown at the left hand of Figs. I and II, and that the conveyor is used for mechanically progressing the flasks to a dust collecting enclosure, designated comprehensively at 10, where their movement is momentarily arrested, and from thence to a pipe stripping station at the other end of the table. At the mold disintegrating station, rail sections 11 of special formation, as clearly shown in Figs. II and III, are provided, and these sections are notched at 12 and 13 with V-shaped grooves, one set of notches 12 being at the entrance to the dust collecting enclosure 10 of the mold disintegrating station and the other set 13 being at the center of this enclosure. The notches 12 and 13 are employed for accurately centering each flask before its admission to the enclosure 10 and while it is within the enclosure 10. The necessity of maintaining the flasks with their axes truly perpendicular to the rail sections 11 at the mold disintegrating station will become apparent from the description of the preferred method and apparatus used for performing the mold disintegrating operation which is to be found in U. S. Letters Patent No. 1,774,082, granted to me August 26, 1930.

The apparatus for imparting movement to the flasks 5 to cause their intermittent progression along the rails 3 comprises, generally, movable skids 14, 15 arranged in pairs at opposite sides of the table, and an actuating cylinder 16 having plungers 17 and as-

sociated mechanism for causing reciprocatory movement of the skids 14, 15.

The cylinder 16, in which any suitable hydraulic or pressure medium may be employed, is mounted on the transverse beams 7 centrally of the table with its plungers 17 disposed at opposite ends. Crossheads 18 at the ends of the plungers 17 are connected together by guide rods 19 bearing in stationary guides 20. Each crosshead 18 bears upon a roller 21 mounted on an auxiliary shaft 22 which in turn is carried by a crank arm 23 on a main rock shaft 24. Connecting rods 25 joining one auxiliary shaft 22 with the other cause simultaneous rocking movement of the crank arms 23. Additional connecting rods 26 join one auxiliary shaft 22 with a corresponding shaft 27 carried by crank arms 28 on a third rock shaft 24 disposed at a distance from the cylinder 16. Accordingly, the three rock shafts 24 rotate simultaneously with reciprocatory movement of the plungers 17, first in one direction, and then in the other direction.

Each rock shaft 24 carries at the ends thereof pairs of oppositely disposed crank arms 29 with bifurcated ends provided with rollers 30. When the plungers 17 of the cylinder 16 are in their normal positions of rest, the top surfaces of the rollers 30 lie in a common horizontal plane beneath the base portions of the skids 14, 15.

Secured to the transverse beams 7 at opposite sides of the conveyor table, near its receiving end, are guide brackets 32 which have vertical surfaces between which the base portions 31 of the skids 14, 15 are accommodated. On the guides 32, idle rollers 35 are mounted in pairs. Between the pairs of rollers 35 depending projections 36 of the skids 14, 15 are engaged, as shown in Fig. III. The rollers 35 thus serve to prevent longitudinal shifting of the skids 14, 15 while allowing the skids to be reciprocated vertically within the guides 32. Additional guide brackets 37 carrying rollers 38 are secured near the discharge end of the conveyor table upon the transverse beams 8. The latter guide members 37, which have vertical surfaces between which the base portions of the skids 14, 15 are accommodated, serve merely to prevent lateral shifting of the skids 14, 15 incident to their elevation and depression.

Each skid 14, 15 comprises a flat plate having a succession of curved recesses at its top edge, as shown clearly in Fig. III. From each pointed hump 44 there is an inclined surface 45 leading downward and forward with a gradual curve and merging with an inclined surface 46 leading upward and forward with more abrupt inclination to the next succeeding hump 44. When the plungers 17 of the cylinder 16 are at rest, the skids occupy the position shown in Fig. III. In this position the bottom flanges of the skids 14, 15 rest on the idle rollers 35 at the guide brackets 32 and on the idle rollers 38 on the guide brackets 37. The movable rollers 30 on the crank arms 29 are in this position disposed in alignment with each other in a horizontal plane, and are also in contact with the base flanges of the skids 14, 15. The pointed humps 44 of the skids 14, 15 are beneath the top surface of the rails 3, and no portion of their curved surfaces 45 and 46 extends above the notches 12 and 13 at the mold disintegrating station. As pressure is admitted to the cylinder 16, each double stroke of the plungers 17 causes reciprocating movement of a skid 14, 15. First one skid is lifted so that its top surface extends above the rails 3 and is depressed, and then the other skid is elevated and depressed in the same manner.

The alternate reciprocation of the skids 14 and 15 causes a progression of the flasks 5 along the rails in an obvious manner. It will be noted, however, that the vertical movement of the skids 14, 15 does not transfer the weight of the flasks 5 from the rails but merely imparts to the flasks a rolling movement causing the same to travel along the rails in spaced relation to each other. With each double stroke of the plungers 17, a new flask is first brought to the notch 12 at the entrance to the dust collecting enclosure 10 and then to the notch 13 in the center of the dust collecting enclosure.

As a flask is rolled into the notches 12 at the entrance to the mold disintegrating station, its position on the rails 3 will be corrected so that its axis is truly perpendicular to the rails. This perpendicular relation between the flask and the rails will be maintained with further movement of the flask into the notches 13 where the flask is centered within the enclosure 10 of the mold disintegrating station. At the notches 12 and 13, the skids 14 and 15 serve to lift the flasks out of the notches and then to continue their rolling movement. In the example shown in the drawings, the rail sections 11 at the mold disintegrating station are provided with downwardly and forwardly inclined surfaces 47 beyond the notches 13. After the flasks are progressed beyond the notches 13, they are caused to roll by gravity towards the discharge end of the table.

Accordingly, the reciprocation of the skids 14 and 15 effects an intermittent rolling movement of the flasks 5 along the table in spaced relation to each other, and this movement is temporarily arrested at the notches 12, and thereafter at the notches 13 where the flasks are accurately centered for a mold disintegrating operation, before further rolling movement to the end of the table. Any tendency of a flask to swerve in its movement on the rails 3, and thus to occupy a position not truly transverse to the rails, is cor-

rected as the flask finishes its downward movement on the gradually inclined surfaces 45 of the skids 14, 15 and strikes the abruptly inclined surfaces 46 at the back of the next succeeding hump 44.

The dust collecting enclosure 10, or "blow box" as it is conveniently called, wherein the refractory molds of the pipe flasks are disintegrated, includes movable doors 48 which, as shown in Fig. II, normally rest upon sills 49. To operate the doors 48, a pressure cylinder 50 is employed, the cylinder having a plunger 51 with a head 52 to which links 53 are pivoted. The links 53 are in turn pivoted to the arms 54. Each arm 54 is attached to a shaft 55 extending along the top of the blow box from one end to the other and supported in bearings 56. To the shaft 55 there are attached at spaced intervals additional arms 57, the ends of which are pivoted to brackets 58 on the doors 48. In an obvious manner, movement of the plunger 51 will cause the doors 48, through the above described linkage, to be opened or closed together, by vertical movement away from the sills 49.

In Fig. IV the control means for regulating the admission of the pressure medium to the skid actuating cylinder 16 and to the door operating cylinder 50 are shown. The main pressure line is indicated at 59, and the exhaust line at 60. The pressure medium enters a three-way valve 61 which has a connection 62 to the exhaust line 60. From the three-way valve 61, the pressure medium divides and passes through one line 63 to the blow box cylinder 50 and through another line 64 to a second three-way valve 65. The latter three-way valve 65 has a connection 66 to the exhaust line 60. From the three-way valve 65, the pressure medium passes through a line 67 including an orifice 68 to a pilot-controlled four-way valve 69 from whence it is admitted to either end of the skid actuating cylinder 16. A pilot valve 70 controls the operation of the four-way valve 69 and has pipe connections 71 and 72 thereto. There is a pipe connection 73 to the pilot valve 70 leading from the pressure line 67 and including a check valve 74. There is also a pipe connection 75 leading from the pilot valve 70 to the exhaust line 60. The exhaust line 60 includes an orifice 76.

The pressure medium from the three-way valve 61 cannot enter the pilot-controlled valve 69 of the skid actuating cylinder 16 without prior admission to the blow box cylinder 50, for the orifice 68 introduces a time lag retarding its flow. The orifice 68 is so proportioned that the door operating cylinder 50 completes its movement, causing the doors 48 to swing to fully open position, before the skid actuating cylinder effects a progression of the pipe flasks 5 toward the blow box. In like manner the provision of the orifice 76 in the exhaust line 60 introduces a time lag in the flow in the exhaust line and insures that the door operating cylinder 50 will operate prior to the operation of the skid actuating cylinder 16. Accordingly, the operation of the conveyor is made dependent upon the operation of the blow box doors, and there is no danger of pipe flasks striking the blow box doors, either in entering or leaving the blow box.

At the dust collecting enclosure or blow box 10, according to the preferred method, a blow pipe 77 is employed for the purpose of disintegrating the refractory molds of the pipe flasks preparatory to the removal of the pipe castings from their flasks. Such a method of freeing pipes from molds is described in by patent, U. S. Letters Patent No. 1,774,-082, issued August 26, 1930, referred to above. As shown in Fig. V, the blow pipe 77, which is adapted to pass through the end wall of the blow box 10 and to be progressed in the direction of the axis of the flask 5 which is stationed within the blow box, is directed toward the refractory mold or sand lining 78, at the bead end of the pipe casting 79, and is forced through the annular mold or lining toward the opposite end of the flask 5. The boring or slotting of the mold serves to free the pipe casting 79 to the extent that it may be easily extracted at a pipe stripping station located beyond the blow box 10.

While I have described a particular mechanism for effecting alternate reciprocation of the conveyor skids, it will be apparent that various changes may be made in the form of this mechanism, as well as of other parts of the conveyor and the dust collecting enclosure, without departing from the spirit of my invention.

Having thus described my invention, I claim:

1. In combination with a conveyor for cylindrical objects of the character described, including reciprocatory skids for intermittently progressing said objects, and pressure means for actuating said skids, a dust collecting enclosure in the path of said skids having a movable door through which said objects pass into the enclosure, pressure means for operating said door, and control means whereby the admission of the pressure medium to said skid actuating means is dependent upon the admission of the pressure medium to said door operating means.

2. In combination with a conveyor for cylindrical objects of the character described, including reciprocatory skids for intermittently progressing said objects, and pressure means for actuating said skids, a dust collecting enclosure in the path of said skids having a movable door through which said objects pass into the enclosure, pressure means for operating said door, and control means including an orifice in the line to said

skid actuating means whereby the admission of the pressure medium to said skid actuating means is dependent upon the prior admission of the pressure medium to said door operating means so that said skids cannot be operated until said doors of the dust collecting enclosure have opened.

3. In combination with a conveyor for cylindrical objects of the character described, including reciprocatory skids for intermittently progressing said objects, and a pressure cylinder for actuating said skids, a dust collecting enclosure in the path of said skids having a movable door through which said objects pass into the enclosure, a pressure cylinder for operating said door, and control means whereby the admission of the pressure medium to said skid actuating pressure cylinder is dependent upon the admission of the pressure medium to said door operating pressure cylinder.

4. In combination with a conveyor for cylindrical objects of the character described, including reciprocatory skids for intermittently progressing said objects, and a pressure cylinder for actuating said skids, a dust collecting enclosure in the path of said skids having a movable door through which said objects pass into the enclosure, a pressure cylinder for operating said door, and control means including an orifice in the line to the skid actuating pressure cylinder whereby the admission of the pressure medium to said latter cylinder is dependent upon the prior admission of the pressure medium to said door operating pressure cylinder.

In testimony whereof, I have hereunto signed my name at Florence, New Jersey, this 2nd day of July, 1932.

LOUIS A. CAMEROTA.