Dec. 23, 1930. S. D. MOXLEY 1,786,218

FLASK HANDLING DEVICE

Filed Oct. 7, 1927 2 Sheets-Sheet 1

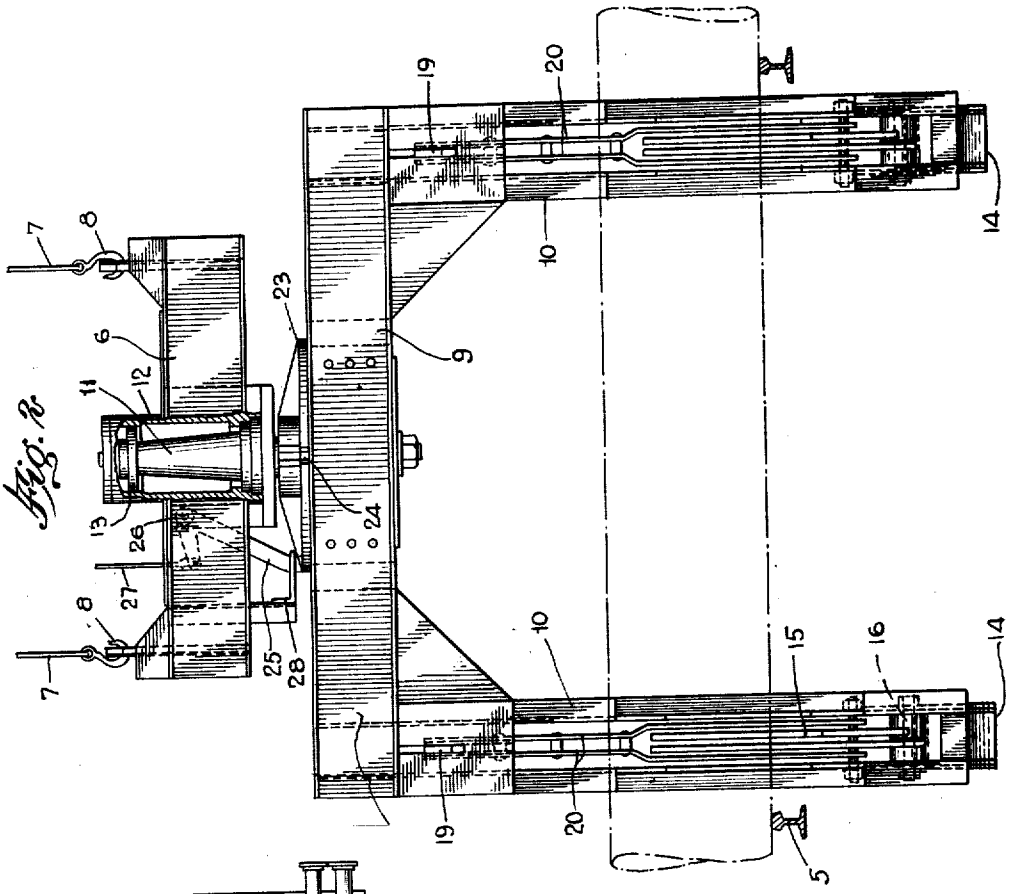


Fig. 2.

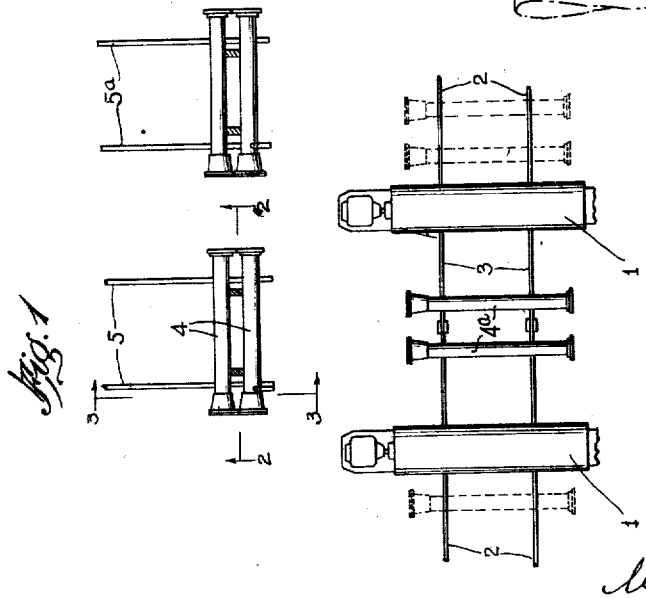


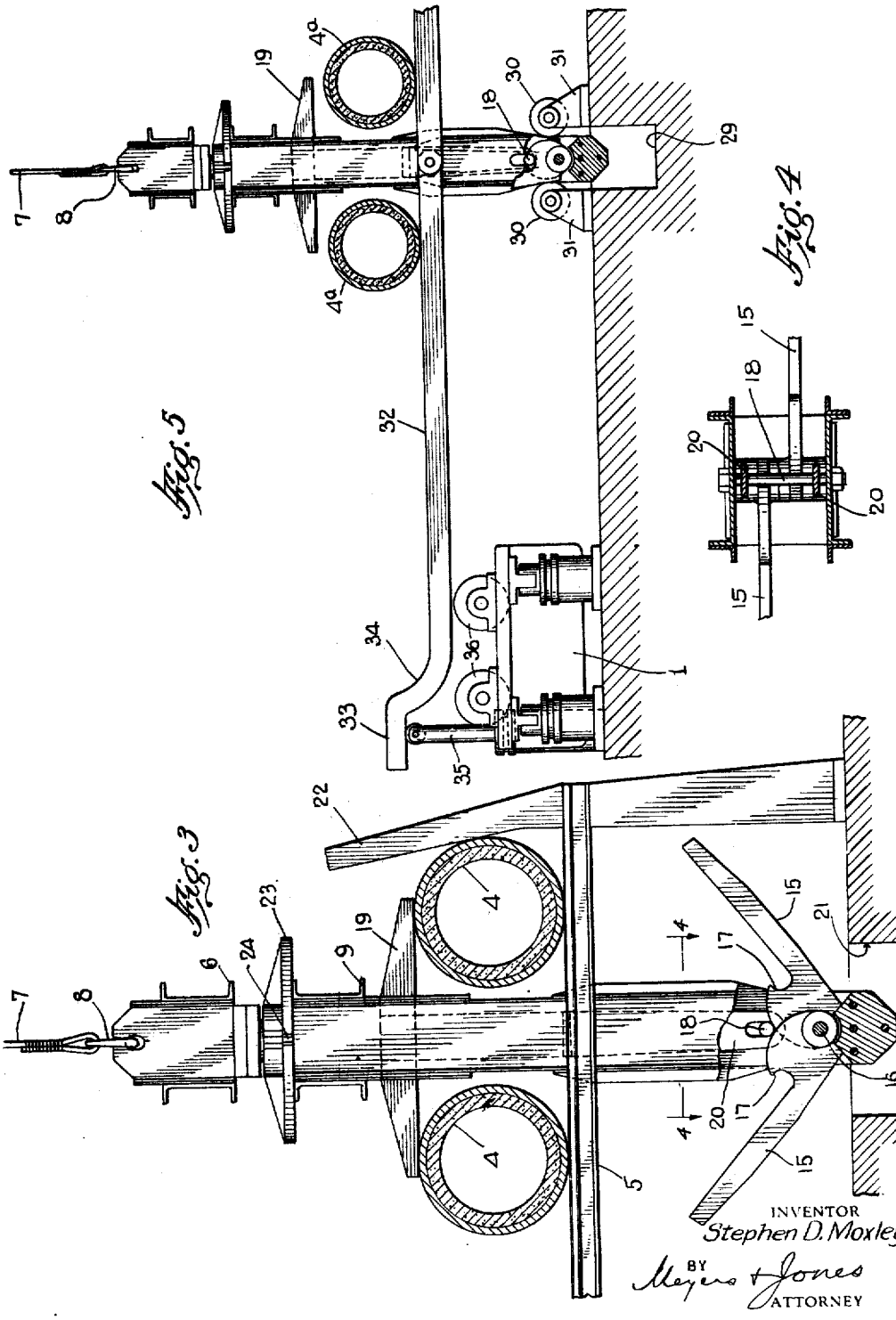
Fig. 1.

INVENTOR
Stephen D. Moxley
BY
Meyers & Jones
ATTORNEY

Dec. 23, 1930. S. D. MOXLEY 1,786,218

FLASK HANDLING DEVICE

Filed Oct. 7, 1927 2 Sheets-Sheet 2



Patented Dec. 23, 1930 1,786,218

UNITED STATES PATENT OFFICE

STEPHEN D. MOXLEY, OF BIRMINGHAM, ALABAMA, ASSIGNOR TO SAND SPUN PATENTS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

FLASK-HANDLING DEVICE

Application filed October 7, 1927. Serial No. 224,583.

This invention is an improvement in flask handling devices, and more particularly in such devices especially adapted for use in connection with the plant layout, forming the subject matter of application No. 128,443, filed on August 10, 1926.

In casting centrifugally the casting machines are preferably arranged in batteries, with the individual machines alongside each other, in substantially parallel and spaced relation, suitable runs or runways being provided upon which the flasks may roll toward and from the battery and between the individual machines of the battery.

The runways for the rammed flasks to be cast, and for the cast flasks as they come from the machines to be taken to the shakeout machines are usually arranged substantially perpendicular to the runs between the individual machines for receiving the rammed and the cast flasks respectively.

The rammed flasks coming from the ramming machines must be given a quarter turn in order that they may be deposited upon the runways between the individual machines in proper relation with respect to such machines, and the discharged flasks must be given a quarter turn for the same reason, before they are deposited on the runways leading to the shakeout machines.

Preferably the flasks are handled in pairs, a pair of rammed flasks being simultaneously lifted from the depositing runway, and delivered to a position on the machine runways between a pair of adjacent machines. From this position they are rolled in opposite directions into the two machines, the flasks already cast in such machines being rolled out at the opposite sides. Thus in a battery of machines, the alternate spaces between adjacent machines will be devoted to the reception of rammed flasks to be cast and to the reception of cast flasks respectively.

One of the primary objects of the present invention is the provision of mechanism for handling the flasks in pairs, and for engaging and releasing the pairs automatically.

A further object is the provision of means in connection with the handling mechanism for imparting thereto a quarter turn as the rammed flasks are lifted from the appropriate runway to properly position such flasks for position on the other runway.

A further object is the provision of means in connection with such mechanism for locking the handling mechanism in either of the positions stated, thereby to prevent accidental disarrangement in depositing.

With these and other objects in view the invention consists in the construction and novel combination of parts fully described hereinafter, illustrated in the accompanying drawings, and pointed out in the claims appended hereto, it being understood that various changes in the form proportion, size and minor details of construction within the scope of the claims, may be resorted to without departing from the spirit of the invention.

In the drawings forming a part hereof:—

Fig. 1 is a diagrammatic view of a part of the plant layout showing the relative arrangement of the casting machines and the runways.

Figs. 2 and 3 are enlarged sections taken on the lines 2—2 and 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is an end view of a tilting frame of the casting machine with the handling device partly in section.

In the embodiment of the invention shown in the drawings, the casting machines 1, which may be of any selected type, are arranged in a battery of any desired number, as for instance 12. Runways indicated respectively at 2 and 3 are arranged between the adjacent pairs of casting machines, the runways 2 being adapted to receive rammed flasks or molds, and the runways 3 to receive cast flasks or molds.

The rammed flasks indicated at 4 travel from the ramming machines to a position near the battery, along a runway 5, traveling on the runway in a direction substantially perpendicular to the direction in which they travel on the runways 2 and 3.

Preferably the casting machines are so arranged and constructed that access may be had to both sides thereof for the insertion and removal of flask and mold. The flasks are handled in pairs, a pair of rammed flasks

being picked up together from the runway 5 and deposited on the runway 2. When the casting operation is finished, the cast flask is discharged into the runway 3, and a rammed flask is rolled into the machine from the runway 2. The handling mechanism is then operated to pick up the two cast flasks 4*a*, and they are removed to another runway 5*a*, along which they are rolled to the shake-out mechanism for dislodging the casting.

The handling mechanism shown more particularly in Figs. 2, 3 and 4 includes a spreader bar 6 suspending by cables 7 from a standard overhead crane, the cables having hooked engagement with the bar as indicated at 8. A yoke comprising a body 9 and depending legs to be described, has a swivel connection with the spreader bar, the yoke having secured to the body thereof a pivot pin 11, which engages a hub 12 in the spreader bar. The journal pin is tapered as shown, and suitable bearings 13 are arranged between the pin and the hub 12. The arrangement is such that the yoke may rotate freely on a vertical axis with respect to the spreader bar.

Each leg is composed of a pair of plates 10, spaced apart longitudinally of the yoke body, and connected at their lower end by a block 14. A pair of arms 15 is pivoted to each leg at the lower end thereof, between the plates, on a common pivotal connection indicated at 16, the arms being mounted to swing into the leg or into a position substantially 45°. The arrangement is such that the arms cannot swing downwardly beyond a position at 45° to the leg, and each is provided with a catch 17, adapted to engage a pin 18 supported by a link to be described, for vertical movement in the legs.

When the arms are swung upwardly into position between the plates 10 of the leg, the latches are positioned to be simultaneously engaged by the pin 18, thus to be held in inoperative position until released. A latch bar 19 is secured to the upper member of the link, which as shown in Fig. 2 is composed of spaced connected straps 20, spaced at their lower ends far enough to enable the arms 15 to swing in position between the straps.

The latch bar extends transversely of the legs on opposite sides thereof, and is designed to engage a pair of flasks on one of the runways, to lift the pin 18, thereby to release the arms 15. In the present instance the latch bar is shown in engagement with a pair of flasks 4 on the runway 5. When the arms are in contracted position, the legs of the yoke are of a size to pass between two flasks arranged with their ends abutting, and to pass below the runway and into a pit 21 at the floor level. Just before the lower ends of the legs enter the pit the latch bar engages the flasks 4, lifts the pin 18, and the arms 15 swing outwardly. When now the yoke is raised, the flasks are lifted on the arms of the two legs, each flask being supported by two arms.

Since the direction of travel of the flasks on the runway 5 is longitudinal to the axis of the machines 1, it is necessary to give the flasks a quarter turn to properly position them on the runway 3 with respect to the machines. The yoke is as before stated pivotally connected with the spreader bar, and in order to impart to the yoke a quarter turn, a cam or deflecting bar 22 is secured to one of the rails of the runway 5. Referring to Fig. 1, it will be seen that the bell ends of the flask are at the ends of the machines toward which the metal is charged. Hence, the cam bar 22 is at that side of the runway toward which the bell ends of the flasks extend. As the flasks move upward with the yoke, that is as they leave the runway 5, one of them engages the cam bar 22, and the yoke with its load is swung, the impetus being sufficient to cause the yoke to move through an arc of at least 90°.

In order to stop the yoke in the proper position, mechanism is provided for limiting the swinging movement of the yoke to an angle of 90°. This mechanism includes a disk 23 secured to the top of the yoke body, and provided with radial notches 24, arranged at angular intervals of 90°, and so positioned that two of the notches are in alinement longitudinally of the yoke while two are in alinement transverse to the yoke.

An elbow lever 25 is pivoted at 26 to the spreader bar, and one arm of the elbow lever is adapted to engage by gravity in the notches, when it is in register therewith. The other arm has suitable operating means 27 connected therewith for releasing the latch, and a guide 28 is provided for that arm of the latch which engages the disk. The said latch arm bears by gravity against the periphery of the disk, so that when a notch comes into register therewith, gravity will cause the arm to engage the notch.

In order to release the flasks when they have been deposited in the appropriate runway, the mechanism shown in Fig. 5 is provided. This mechanism is arranged at a pit 29 in the floor level, and includes a pair of rollers 30 for each leg, the rollers being journaled in brackets 31 at opposite sides of the pit. They are so spaced that when the lower end of the leg moves between the rollers, the outer edges of the arms will be engaged by the rollers, and the arms will be swung up into the position of Fig. 5. This occurs before the latch bar engages the flasks, and the latches 17 of the arms have cam edges for engagement with the pin 18 to move the same upward before the notches 17 come into position to be engaged by the pin, that is into register therewith.

In this construction, each runway has piv-

oted to the end thereof adjacent the machine, what may be considered as a switch rail 32. This rail extends transversely of the machine, and has the free end thereof upwardly offset, as shown at 33, the offset portion being connected to the body of the rail by a curved stop 34. The portion 33 of the rail is in position for engagement by a hydraulic piston 35 for lifting the rail to the position shown in Fig. 5. When the hydraulic mechanism is in exhaust position, the rail descends so that a flask in engagement with the stop 34 will rest upon the rollers 36 of the casting machine 1.

While the construction shown including the switch rails 32 provides a convenient mechanism for discharging the cast flasks, the construction shown in the application of Moore and Morgan, Serial No. 224,635, of even date herewith, is also suitable for use with the improved handling device.

It will be apparent from the drawing that the support for the flasks is of a size to pass between two adjacent flasks, and that the supporting arms are normally operative. They are held in contracted position by mechanism released by engagement with the flasks, when the arms are at a selected distance below the flasks. The holding means is normally operative when set, that is when it is lifted to position to engage the notches, and it is set by the contracting movement of the arms. That is the cams on the arms lift the locking pin to set position.

It will be noticed referring to Fig. 3, that the openings in the strap 20 for the pin 18 are elongated, that is they are slots, to obviate the necessity of raising the straps with the corresponding latch bars 19 when the arms are collapsed.

What is claimed as new is:—

1. In mechanism of the class described, means for simultaneously lifting a plurality of flasks, said means pivotally mounted to rotate on a vertical axis, means to impart angular movement to said lifting means, and means to limit such movement to a selected arc, the angular movement imparting means including a cam for engaging the flasks supported by the supporting means.

2. In mechanism of the class described, means for simultaneously lifting a plurality of flasks, said means pivotally mounted to rotate on a vertical axis, means to engage the flasks when they are moved upward by the lifting means to impart angular movement thereto, and means to limit such movement to an arc of 90°, said limiting means including a normally operative fixed latch, and catches on the lifting means for engagement by the latch spaced at angles of 90°.

3. In mechanism of the class described, means for simultaneously lifting a plurality of flasks, said means pivotally mounted to rotate on a vertical axis, means to engage the flasks when they are moved upward by the lifting means to impart angular movement thereto, and means to limit such movement to a selected arc, the lifting means of a size to pass between two flasks lying alongside each other and having arms normally within the support and arranged to extend laterally therefrom on opposite sides to engage beneath the flasks, normally operative locking mechanism to hold the arms in contracted position, and means connected therewith operated by relative movement of the supporting means and the flasks to release the locking means.

4. In mechanism of the class described, a support adapted to pass downwardly between adjacent flasks, and provided with arms to extend beneath the flasks, thereby to lift the same when the support is raised, said arms normally extended, and means to hold the arms contracted, released by engagement with the flasks when the arms are positioned below the flasks, the holding means normally operative when set and moved to set position by the contracting movement of the arms.

5. In mechanism of the class described, a support adapted to pass downwardly between adjacent flasks, and provided with arms to extend beneath the flasks, thereby to lift the same when the support is raised, said arms normally extended, and means to hold the arms contracted, released by engagement with the flasks when the arms are positioned below the flasks, said support pivoted to swing on a vertical axis, means to engage the flasks during the upward movement of the support to impart angular movement to the support and means to limit the said movement to an angle of 90°.

6. In mechanism of the class described, a support adapted to pass downwardly between adjacent flasks, and provided with arms to extend beneath the flasks, thereby to lift the same when the support is raised, said arms normally extended, and means to hold the arms contracted, released by engagement with the flasks when the arms are positioned below the flasks, said support pivoted to swing on a vertical axis, means to engage the flasks during the upward movement of the support to impart angular movement to the support and means to limit the said movement to an angle of 90°, said means including a normally operative fixed latch, and catches on the support for engagement by the latch.

7. In mechanism of the class described, runways for supporting cast and uncast flasks, a support adapted to pass downwardly between adjacent flasks and provided with normally operative means to engage the flasks at each side thereof, means to hold the engaging means in operative position released by the downward movement of the support, and means below the runways and operated by further downward movement of the

support to move the engaging means to inoperative position.

8. Mechanism for simultaneously handling a plurality of flasks including a support of a size to pass between two flasks lying along side each other with their corresponding ends abutting, and provided at each side with a pair of arms contractible into the support or extensible at right angles thereto to engage beneath a flask, locking mechanism for holding all of the arms contracted, and a latch bar connected with the locking mechanism and movable with respect to the support and adapted to engage above the flasks, thereby to release the locking mechanism by relative movement of the latch bar with respect to the support.

9. In mechanism of the class described, means to simultaneously shift a plurality of flasks, including supporting arms for the flasks, a support to which the arms are pivoted to swing in opposite directions, means to hold the arms in substantially horizontal position, means to lock the arms in inoperative position in the support, and releasing means for the locking means operated by relative movement of said releasing means and the support, said support pivoted to swing on a vertical axis, runways for the flasks to be shifted, and means for engagement by the flasks during the movement of the flasks from the runways to impart angular movement to the flasks through a selected arc.

10. In mechanism of the class described, means to simultaneously shift a plurality of flasks, including supporting arms for the flasks, a support to which the arms are pivoted to swing in opposite directions, means to hold the arms in substantially horizontal position, means to lock the arms in inoperative position in the support, and releasing means for the locking means operated by relative movement of said releasing means and the support, said support pivoted to swing on a vertical axis, runways for the flasks to be shifted, and means for engagement by the flasks during the movement of the flasks from the runways to impart angular movement to the flasks through a selected arc, said means including an inclined cam for imparting initial movement to the flasks.

11. In mechanism of the class described, means to simultaneously shift a plurality of flasks, including supporting arms for the flasks, a support to which the arms are pivoted to swing in opposite directions, means to hold the arms in substantially horizontal position, means to lock the arms in inoperative position in the support, and releasing means for the locking means and the support, said support pivoted to swing on a vertical axis, runways for the flasks to be shifted, and means for engagement by the flasks during the movement of the flasks from the runways to impart angular movement to the flasks through a selected arc, said means including an inclined cam for imparting initial movement to the flasks, and means to limit the angular movement to the selected arc.

12. In mechanism of the class described, a support adapted to pass downwardly between a pair of adjacent flasks, arms pivoted to the support and normally biased to swing outwardly away from each other, means to limit the swinging movement of the arms to a position substantially at right angles to the support, a pin, the arms having catches for engaging the pin, a latch bar slidable on the support and adapted to engage the flasks after the arms have been moved beyond the same, and a connection between the latch bar and the pin.

13. Flask transporting mechanism comprising a pivoted frame having a pair of spaced apart depending members each carrying a pivoted outwardly swinging flask supporting arm, means co-operating with the pivoted end of the arms for holding them retracted and means carried by the frame above and spaced from the arms for engaging a flask when the frame is lowered adjacent a flask to release the arm holding means and permit the arms to swing outwardly beneath a flask.

14. Flask transporting mechanism comprising a pivoted frame having a pair of spaced apart depending members each carrying a pair of oppositely arranged outwardly swinging arms, means co-operating with the pivoted end of each pair of arms for holding them normally retracted and means carried by the frame above and spaced from the arms for engaging a flask when the frame is lowered between a pair of flasks to release the arm holding means and permit the arms to swing outwardly beneath a pair of flasks.

Signed at Birmingham in the county of Jefferson and State of Alabama this 15th day of Sept., A. D. 1927.

STEPHEN D. MOXLEY.