This invention relates to an apparatus for shaking out the sand and castings from conventional foundry flask, knocking out cores from castings, and further cleaning the flask walls and surfaces during such shakeout operations.

One of the prime objects of the invention is to design a shakeout unit including, a resiliently-mounted, vibrated deck plate, and a vertically adjustable lift plate assembly on which the flasks are mounted and secured, so that they will not feed off or bounce off the unit when the flask handling means is disconnected, and the unit lowered onto the deck plate and vibrated to discharge the flask load.

Another object of the invention is to design a sectional flask shakeout unit comprising, a lower spring-mounted, vibrating unit, and a hydraulically-supported, upper lift plate unit on which the flask is mounted, and provide means for raising and lowering the upper lift plate unit onto and away from the vibrating unit.

A further object of the invention is to provide a resiliently-mounted shakeout, including a flask lift plate assembly on which the flasks are clamped and then vibrated to discharge the flask load, making it unnecessary to strike them with a heavy instrument or object to discharge the sand and castings and clean the flask, thus eliminating battering and deforming the side edges of the flask and breakage or other damage during the shakeout operation.

Still a further object is to provide a mechanism by means of which the shakeout of the sand and castings and cleaning of the flasks is speedily accomplished with no heavy impact battering of the flasks; thus minimizing replacement, labor and general operating costs, and providing an installation that will operate efficiently and satisfactorily for a long period of time.

A further object still is to design a sectional flask shakeout unit which includes a lower vibrating assembly and an upper flask lift plate assembly on which the flasks are mounted and provide means for clamping the flask on the lift plate, together with means for raising and lowering said lift plate independently of the vibrating means, so that the lift plate may be lowered onto and raised from said vibrating assembly when the sand and castings and/or cores have been discharged.

Another object is to design a flask shakeout unit of rugged, practical and economical construction, which can be readily manufactured and assembled, which is easy to operate and maintain and which is adaptable to either limited or large scale production.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion and details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawings:

FIG. 1 is a front elevational view of the shakeout.

FIG. 2 is a side elevational view thereof.

FIG. 3 is a top plan view.

FIG. 4 is a perspective view showing the sway snubbing means, the cylinder being broken away to show the spring plate in raised position.

FIG. 5 is a view similar to FIG. 1 showing the lift plate in raised position.

FIG. 6 is a sectional view showing the vibrator snubbing means.

Referring now more particularly to the drawings in which we have shown the preferred embodiment of our invention.

The letter B indicates the base frame of the shakeout unit and comprises a pair of spaced-apart, preferably fabricated main frame members 10—10 on which a plurality of spring assemblies 5 are mounted. A deck plate 11 is mounted on and carried by the spring assemblies "S" and upper and lower spring seats 12 and 14 are secured to the members 10 and 11 respectively to accommodate said springs. The center section of the plate 11 is cutaway at 15 to form a rectangular-shaped, discharge opening to permit free flow of the sand, castings and cores, (not shown), and side plates 16 are secured to and depend from the lower face of the deck plate 11. A vibrating mechanism V is secured to plate 11 and includes a horizontally-disposed, cylindrical housing 17 secured to the side plates and in which an eccentric shaft 18 is journaled. We do not deem it necessary to show or describe this vibrating mechanism in detail, as it is substantially the same as shown and described in Patent No. 2,311,814, granted February 23, 1943 to Messrs. Behnke, Westcott and Sandula.

A shield plate 19, V-shaped in cross section, spans the opening 18 in the deck 11, and shields the vibrating mechanism from discharging sand, castings or cores when the machine is operating.

End baffle plates 20 are secured to and depend from the lower face of the deck plate 11 directly adjacent the ends of the opening 18, and brackets 21 are mounted on the face of the frame members 10 by means of bolts 22 or the like; and a horizontally-disposed, cylindrical extension 23 is secured to each bracket. A spring 24 is mounted in each extension 23, and a threaded bolt 25, having a disk end 26 provided on the end thereof bears against one end of said spring, the outer end of the spring bearing against the plates 20 provided on the side wall of plate 20 to limit sway and for general snubbing purposes.

An upstanding rim 27 is welded to the face of the deck plate 11 around the opening 18 and strip pads 28 are secured to the upper edge of said rim and for a purpose to be presently described.

The vibrator V is driven from a motor M connected to a suitable source of power, said motor being mounted on an adjustable motor base 29; and a flexible drive means 30 is geared to the drive pulley 31 on the motor and to a drive pulley 32 provided on the eccentric shaft 18, with a flywheel provided on the opposite end.

Raced, inwardly-extending, fabricated corner members 34 are secured to the ends of the members 10—10, and a hydraulic cylinder H is mounted on each corner member and has a piston 35 as usual, a pad section 36 being provided on the end of each piston. The pads 36 are engageable with the lower face of a flask lift plate 37 which forms a part of the unit, the plate having a central discharge opening 38 in vertical alignment with the opening 15 in the deck plate and being formed with a depending rim 39 surrounding said opening. The rim is loosely and telescopically accommodated in the upstanding rim 27 provided on the deck plate.

Spaced-apart, overhanging, U-shaped, flask clamp brackets U are mounted on the upper face of the lift plate 37, and a spacer channel 40 reinforces said brackets. A hydraulic cylinder 41 is secured to an overhanging pad 42 and to the face of each bracket U by means of bolts.
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or the like, each cylinder being provided with a piston 44 as usual. Hydraulic lines 45 and 46 are connected to said cylinders and to a main line (not shown) which connects to a source of hydraulic supply with suitable control valves, similar hydraulic lines 47 and 48 being connected to the respective hydraulic cylinders H and main lines 49 being connected to a control mechanism (not shown) associated therewith. When a flask F is spotted in position on the lift plate and the hydraulic pistons 44 are actuated, the flasks F will be clamped firmly in position on the plate, and plate. The flasks F can be handled by crane or conveyor (not shown) and each flask is provided with locating pins 50 for centering as usual.

The operation of the unit is as follows:
A flask F is first spotted in position on the lift plate 37, and the pistons 44 are then actuated to clamp the flask over the discharge openings 15 and 38. With the vibrating mechanism V in operation, the pistons 35 are actuated to lower the flask lift plate 37 onto the deck plate 11 and loose engagement of the telescopic rim sections 27 and 39 during this lowering movement; jolts the flask and lift plate producing unidirectional vibration until such time as they come to rest on the deck plate 11. At this time they vibrate in unison with the deck plate, which is termed directional vibration. Continued vibration shakes out the sand, castings or cores which flow through the openings 15 and 38, thence onto a screen or other device (not shown), the pistons 35 then retracting to allow the flask lift plate 37 to rise and setting up the flask into and out of supporting engagement with the deck plate.

After discharge of the load, the cylinders H are again energized to raise the lift plate clear of the vibrating deck plate, and the pistons 44 are retracted to release the flask which is then removed for a repetition of the sequence of operations.

The yieldable pads 28 and 36 cushion the release and engagement of the pistons, lift plate and deck plate and minimize wear, etc.

It is to be understood that the above described mechanism and method are merely illustrative of the application of the principles of the invention. Other arrangements may be devised which will embody the principles of the invention and fall within the spirit and scope thereof.

What we claim is:
1. A molding flask shakeout unit comprising, stationary, rigid frame means, a deck plate supported for vibratory movement thereon; a vibratory mechanism connected with said deck plate for vibrating the deck plate; a flask receiving plate mounted to overlie said deck plate and on which a molding flask is to be received; means mounted by said frame means for supporting said flask receiving plate above said deck plate in position to receive a flask; said means being operable for moving said flask receiving plate onto and moving it out of engagement with said deck plate, centrally disposed, aligned discharge openings provided in the deck plate and flask receiving plate respectively and telescopically engageable rims surrounding each opening to maintain said openings in substantially vertical alignment when the flask receiving plate is raised and lowered.

2. A flask shakeout and cleaning unit comprising, a base, a resiliently supported deck plate mounted thereon and formed with a centrally-disposed discharge opening; a driven vibratory mechanism mounted on and depending from said deck plate; a flask receiving plate mounted over said deck plate and formed with a discharge opening therein, means on said base for raising and lowering said flask receiving plate and driving said flask receiving plate with the deck plate, and resilient snubbing means mounted on said base and engaging with said vibrated mechanism for limiting end sway thereof.

3. The combination set forth in claim 2 in which wear strips are provided on the upper edge of the deck plate and wear pads are provided on said lift plate raising means, telescopically engageable rims surrounding the deck plate opening and lift plate opening in substantially vertical alignment when the flask receiving plate is raised and lowered.

4. A flask shakeout mechanism comprising, a lower spring-mounted deck plate and vibratory unit; an upper independently-supported lift plate unit over said deck plate and on which a flask is to be received, vertically aligned discharge openings in said deck plate and lift plate respectively, a V-shaped shield spanning said openings, and independent means for raising and lowering said lift plate into and out of supporting engagement with the deck plate.

5. A molding flask shakeout unit comprising, spaced-apart frame beams; resilient means mounted thereon; a deck plate with a generally central opening carried by said resilient means; a vibratory mechanism suspended from the deck plate; an independently-supported lift plate with a generally central opening mounted over said deck plate; perimetrically arranged, vertically disposed fluid pressure cylinders on said frame beams having pistons supporting said lift plate and moving it into and out of carrying engagement with said deck plate, and resilient snubbing means mounted on said frame beams for limiting end sway thereof.

6. The combination specified in claim 5 in which centrally-disposed discharge openings are provided in said lift plate and deck plate respectively, and a V-shaped shield substantially spans but does not close off the discharge opening in the deck plate directly over said vibratory mechanism.

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