May 21, 1957 R. J. ANDERSON 2,792,603

SHIFTING MECHANISM FOR MOVING JACKETS AND WEIGHTS TO AND FROM MOLDS

Filed July 15, 1955 3 Sheets-Sheet 1

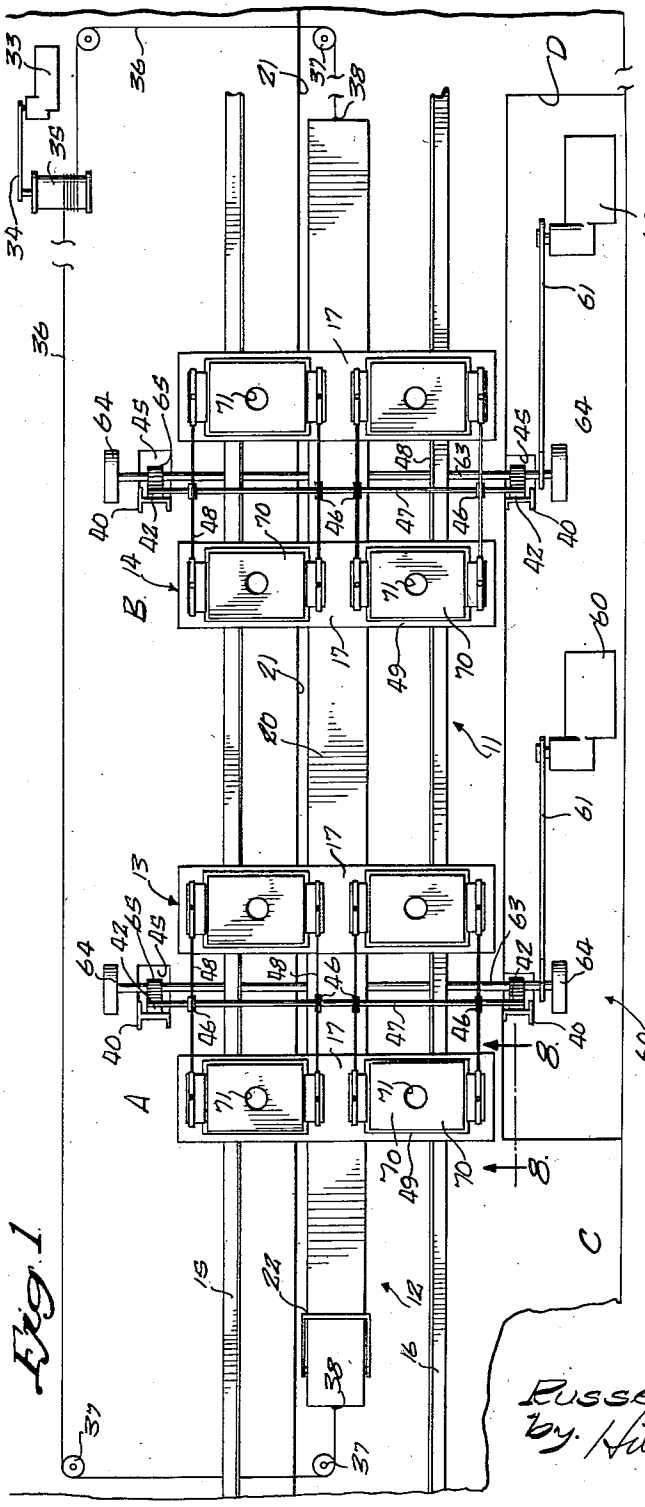


Fig. 1

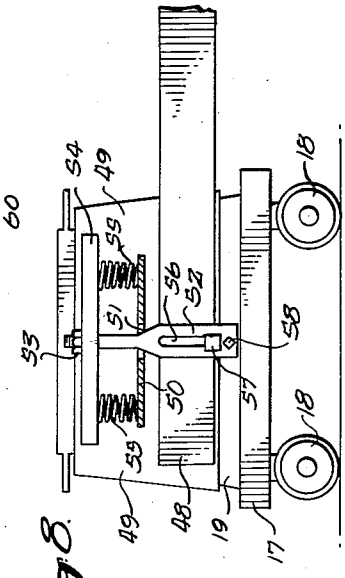


Fig. 8

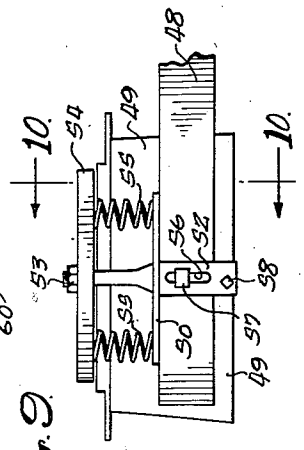


Fig. 9

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Fig. 3.

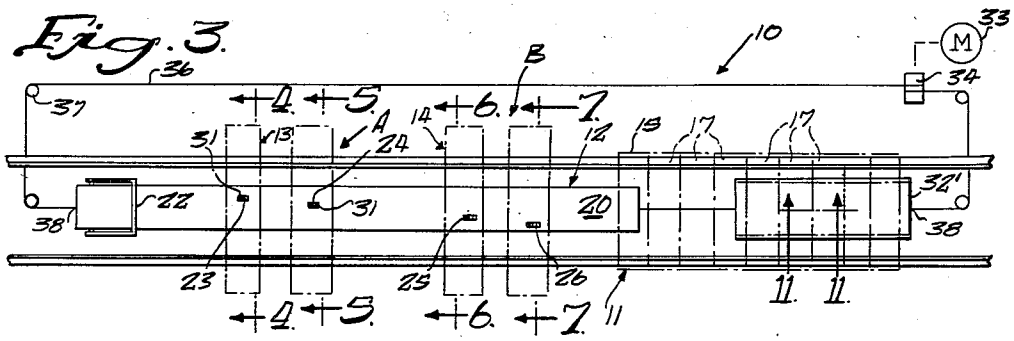


Fig. 10.

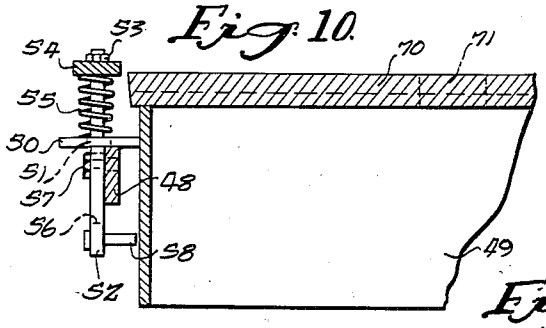


Fig. 11.

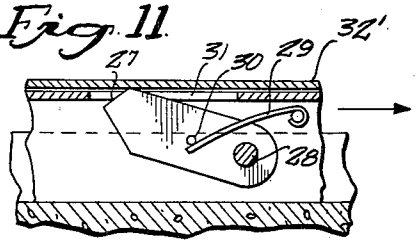


Fig. 12.

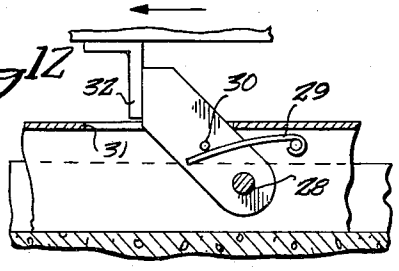


Fig. 7.

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SHIFTING MECHANISM FOR MOVING JACKETS AND WEIGHTS TO AND FROM MOLDS

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Fig. 4.

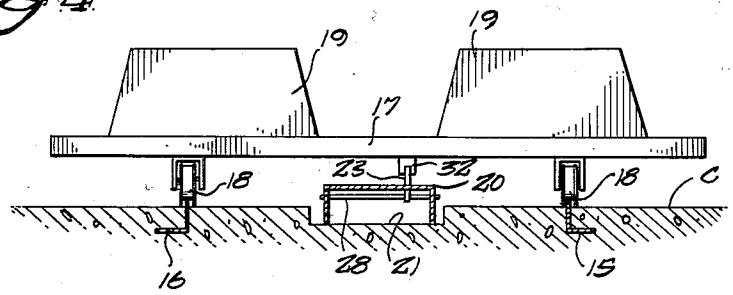


Fig. 5.

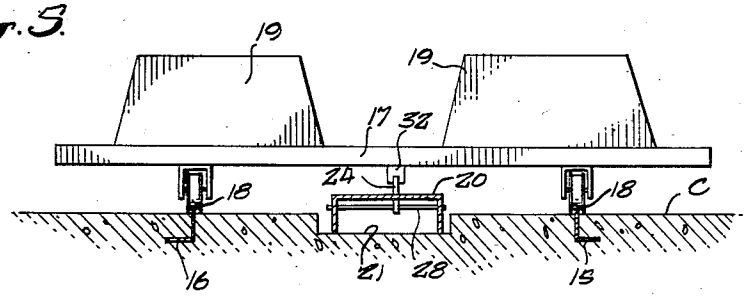


Fig. 6.

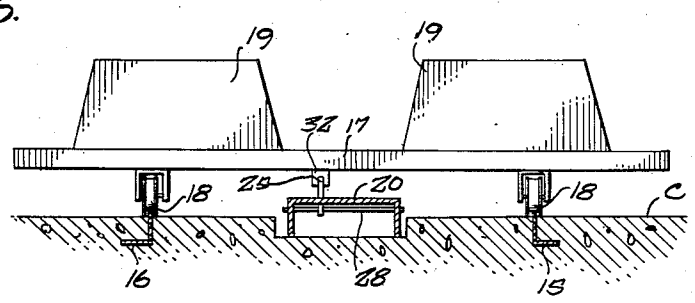
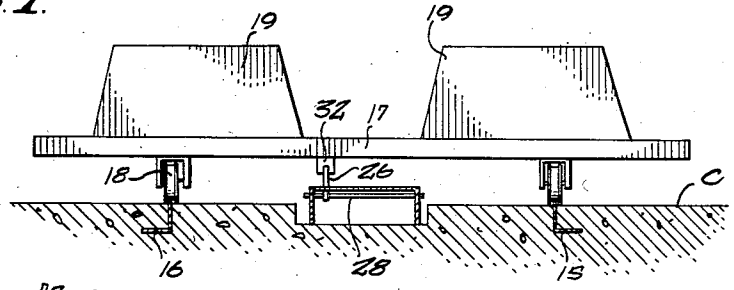


Fig. 7.



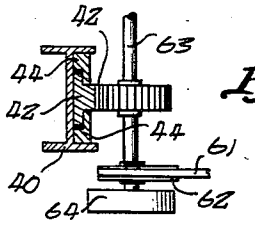


Fig 13.

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2,792,603

SHIFTING MECHANISM FOR MOVING JACKETS AND WEIGHTS TO AND FROM MOLDS

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Application July 15, 1955, Serial No. 522,294

7 Claims. (Cl. 22—112)

This invention relates to a foundry mold-handling apparatus. More particularly, this invention relates to a device for handling mold jackets and weights in connection with the pouring of casting metal into conventional foundry molds.

In conventional foundry practices, molds, after they have been formed by suitable mold-forming machines, are usually transported on dollies, or tracks, to a pouring station where the foundryman then places mold jackets over each mold prior to pouring. The jackets generally comprise a connected rectangular wall structure of box-like shape, with upper and lower open ends. The jackets are slipped over the molds, and, during metal pouring, they serve to reinforce the sides of the mold to prevent the molten metal from breaking out from the said sides. In order to hold the upper and lower halves of the mold together, it is also a customary practice to place a weight on top of the mold. This shifting of the jackets and weights to and from the molds, by this manual effort, is exceedingly tedious, and requires the efforts of many operators in order to secure any reasonable production. It is a prime object of this invention, therefore, to provide an improved production-handling device for the shifting of jackets and weights at a mold-pouring station.

Still another object is to provide an improved mechanical jacket and weight-shifting mechanism for the placing of a jacket and weight on a mold when it is in a mold-pouring station, and for removing the jacket and weight from the mold when the casting has been formed.

A still further object is to provide an improved jacket-shifting mechanism for a mold carrier-conveyor track; the shifting mechanism being adapted to mechanically handle jackets during a production-casting operation.

A still other object is to provide an improved conveyor mechanism and a plurality of jacket-shifting mechanisms; the mechanisms being disposed along the conveyor, and the conveyor including a movable device adapted to place a plurality of molds disposed on a carrier in position for receiving jackets prior to the pouring of cast metal.

Another object is to provide an improved conveyor, or track means, having a device adapted to place a plurality of mold carriers simultaneously in position relative to a jacket-shifting mechanism during one movement of the said device.

A still further object is to provide an improved jacket-shifting mechanism for shifting jackets to and from molds, prior to and after pouring; the mechanism including resilient means for maintaining the jackets over said molds during pouring.

These and further objects will become more readily apparent from a reading of the specification when examined in connection with the accompanying sheets of drawings.

In the drawings:

Figure 1 is a plan view of a portion of a mold-conveyor track and a jacket-shifting mechanism;

Figure 2 is a side-elevational view of a jacket-shifting mechanism located at a pouring station, the view having certain portions broken away to show details of a raising and lowering mechanism;

Figure 3 is a schematic plan view showing a track, and jacket-shifting stations located thereon with a plurality of mold carriers in position prior to their being conveyed to the stations;

Figure 4 is a detail view of a mold carrier taken substantially on line 4—4 of Figure 3;

Figure 5 is a detail view taken substantially along line 5—5 of Figure 3;

Figure 6 is a detail view taken substantially along line 6—6 of Figure 3;

Figure 7 is a detail view taken substantially along line 7—7 of Figure 3;

Figure 8 is a side-elevational view, enlarged, of a detail portion of a jacket-shifting mechanism taken along the line 8—8 of Figure 1;

Figure 9 is a side-elevational view, similar to Figure 8, showing another position of the jacket-shifting mechanism;

Figure 10 is an enlarged sectional view of a mold jacket and a portion of a shifting means taken along the line 10—10 of Figure 9;

Figure 11 is a detail view of a conveyor mechanism taken along the line 11—11 of Figure 3;

Figure 12 is a view similar to Figure 11, showing a different position of a conveyor mechanism; and

Figure 13 is a sectional view of a portion of a raising and lowering mechanism taken along the line 13—13 of Figure 2.

Referring now particularly to Figures 1 and 3, a mold-handling apparatus is generally designated by the reference character 10. The apparatus 10 comprises, essentially, a track 11, a conveyor mechanism 12, and a pair of jacket-shifting mechanisms 13 and 14 located at pouring stations designated as A and B.

The track 11 comprises track sections 15 and 16 located on the floor C of a typical foundry plant. The floor C is provided with a pit D, best shown in Figures 1 and 2. A plurality of mold carriers 17, carried on wheels 18, are positioned for movement on the sections 15 and 16. Each of the mold carriers is adapted to carry two molds 19, as best shown in Figures 4 through 7.

The conveyor mechanism 12 comprises, essentially, an indexing, or actuating, member in the form of an elongated channel 20, which is reciprocally positioned within an elongated recess 21 in the floor C.

The channel 20 is provided with a front dog 22. In addition, the channel 20 is also provided with dogs 23, 24, 25, and 26. These latter dogs are all alike in construction, and, as best shown in Figures 11 and 12, comprise an engaging surface 27. They are pivoted by means of pins 28, which are connected to the channel 20. A leaf spring 29, connected to the channel, engages a pin 30 for normally urging the dogs to project outwardly through slots 31 in the channel 20. The dogs 23 through 26 are, however, positioned in staggered, or off-set, relation, and are adapted to engage lugs 32, on dog engaging means, which are connected to the underneath sides of the carriers 17; the lugs also being positioned in relative staggered relation. At one end of the track 11, as shown in Figure 3 and in Figure 11, there is provided a channel-shaped depressing housing 32', which normally has positioned above it a plurality of carriers 17 awaiting movement into the stations A and B for pouring.

Reciprocation of the channel 20 is provided by means of a power unit 33 which drives, by means of a belt 34, a drum 35 on which a tension cable 36 is wound. The tension cable 36 is wound around suitable idler pulleys 37, which are suitably located, and opposite ends of the cable 36 are connected, as indicated at 38, to the channel 20.

Thus, upon reversal of movement of the drum **35**, reciprocation of the channel **20** may be accomplished.

Each of the jacket-shifting mechanisms **13** and **14** comprise the same elements, and like reference characters will be employed. Each of the mechanisms **13** and **14** comprise a pair of laterally spaced upright supports **40**; the lower ends of which are suitably supported in the concrete construction at the lower end of the pit D, as indicated at **41**. A rack **42**, having conventional teeth **43**, is slidingly supported on the supports **40** by means of guide elements **44**, best shown in Figure 13; these elements being suitably connected to the supports **40** and being substantially coextensive therewith. As indicated at **45**, suitable depressions are provided in the concrete construction of the floor C and pit D to permit the retraction, or lowering, of the racks **42**. The upper end of each rack **42** is connected by means of gussets **46** to a transversely extending frame member **47**. The frame member has connected thereto a plurality of longitudinally extending arms **48**. The forward and rearward ends of the arms **48** carry a plurality of longitudinally and laterally spaced mold jackets **49**. The jackets **49** may be conventional in shape, consisting of four rectangularly disposed sides and being open at their upper and lower ends.

As best shown in Figures 8, 9, and 10, opposite sides of the jackets **49** are provided with attached plates **50** having a slot **51**. Vertical members **52** are connected by means of nuts **53** to the brackets **54**. Each bracket **54** is normally held up in position against the nuts **53** by means of spaced springs **55**, suitably connected to the plate **50** and bracket **54**. The member **52** also, in each case, is provided with a slot **56**, through which a bolt **57** projects; the said bolt **57** being rigidly connected to an arm **48**. Thus, in this manner, each end of each arm **48** is resiliently connected to each jacket **49**. A stop **58** also is provided on each member **52**.

Raising and lowering of the racks **42** is accomplished by means of a reversible power unit **60** located in the pit D, as indicated. The power units **60** are provided with drive belts **61**, which drive pulleys **62**, best shown in Figure 13, for rotating a transverse shaft **63**, suitably journalled on spaced supports **64**. The shaft **63**, in turn, rotates a plurality of gears **65** which, in turn, mesh with the racks **42** for raising and lowering the frame members **47** with their associated structure.

The operation

Molds on the carriers **17** are pushed into position on the right-hand side of the track **11**, as best shown in Figure 3. These mold carriers come from the molders' end of the lines, where the molds are prepared and placed on the carriers. The operator may manually place them in the position indicated or suitable automatic provisions may be provided. The motor **33** now moves the channel **20** to the right, and the dogs **23**, **24**, **25**, and **26** are depressed as they move under the depressing housing **32'**. Four carriers **17** are now in position to be moved, as indicated in Figure 3. These four carriers to be moved are also exemplified by the carriers shown in Figures 4, 5, 6, and 7. As the motor **33** reverses, the channel **20** then moves to the left and the first dog **23** engages the lug **32** of the first carrier to move the same to the left. The dogs **24**, **25**, and **26**, likewise, upon continued movement of the channel **20** to the left, successively pick up each of the carriers, until all are being moved, and they are simultaneously moved into the positions, or stations, A and B. Since the dimensional spacing, or longitudinal location, of the dogs **23** through **26** is the same as the longitudinal spacing of the jackets, the carriers are moved with the molds into perfect vertical alignment with said jackets.

After the carriers are placed in position at stations A and B, suitable switching (not shown) actuates the motors **60** to move the racks downwardly, whereupon the jackets **49** are lowered over the molds. Each jacket **49** also carries one or more weights **70**, which may comprise several pieces, or which may be one single member, provided with a pouring or clearance opening **71** which registers with the sprue opening of a conventional mold. Generally, one or more of these weights are provided with the conventional jacket. The jackets **49** all move downwardly over the molds **19**, and the sides of the molds are well reinforced.

As best shown in Figures 8, 9, and 10, the jackets **49** are resiliently supported on the arms **48**. When the arms **48** are lowered to the downwardmost position, shown in Figure 8, they have moved below the plates **50**, and the springs **55** are placed under compression by the member **54**, so that they react against the plates **50** to force the jackets completely over the molds and to resiliently restrain the jackets from moving upwardly during pouring of cast metal into the molds. The weights also place a downward pressure on the jackets and support the upper surface of the molds.

The operator now pours the molten metal into the molds, and he may start at either station A or B. After a period of time to allow the molds to cool, he then actuates the motor **60**, whereupon the racks **42** and frames **48** are moved upwardly to free the jackets from the molds.

The channel **20** is now again moved to the right and another four carriers are engaged by the dogs. Now, as the channel moves again to the left, the dog **22** is effective to engage the carrier **17**, which is positioned on the right of the station B; and as this carrier is moved to the left, it moves the other carriers at the stations to clear said stations.

It is, of course, obvious that numerous stations may be provided and that the channel will accommodate additional dogs for moving the carriers into said stations. Thus, it can be seen that an improved jacket-shifting mechanism has been provided which will fully accomplish the objects set forth, and that changes and modifications may be made which do not depart from the spirit of the invention disclosed nor the scope thereof as defined in the appended claims.

What is claimed is:

1. A mold-handling apparatus comprising: a track, a plurality of metal-pouring stations located in longitudinally spaced relation on said track, each station comprising a jacket-shifting mechanism, each mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation on opposite sides of said track, a frame mounted for vertical movement on said supporting members, said frame including a pair of laterally spaced arms extending substantially horizontally and parallel to said track, a plurality of mold jackets, means resiliently supporting said mold jackets on said arms whereby said jackets may be vertically moved with said frame, said jackets being relatively longitudinally spaced, a plurality of weights carried on said jackets, a plurality of mold carriers supported on said track, each carrier including a dog engageable means, said dog engageable means being relatively positioned in staggered relation, means for moving said carriers with molds carried thereon underneath said jackets, comprising a longitudinally extending actuating member disposed between said tracks beneath said carriers, said actuating member including a first dog connected thereto for engaging carriers disposed at said pouring station, second, third, fourth, and fifth dogs on said actuating member, said second, third, fourth, and fifth dogs being longitudinally spaced relatively a distance equal to the longitudinal spacing of said mold jackets, said second, third, fourth and fifth dogs being relatively staggered to complement said dog engageable means, means for moving said actuating member longitudinally whereby said first dog engages mold carriers at said pouring station and moves the same from said stations, said second, third, fourth, and fifth dogs being engageable with the dog engageable means of said carriers on said track for moving said carriers to said stations and underneath said jackets, and means connected to said frame for moving said frame to lower

said jackets and weights over said molds during the metal-pouring operation and for raising said frame upon completion of pouring.

2. A mold-handling apparatus comprising: a track, a plurality of metal-pouring stations located in longitudinally spaced relation on said track, each station comprising a jacket-shifting mechanism, each mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation, a frame mounted for vertical movement on said supporting member, said frame including a pair of laterally spaced arms extending substantially horizontally and parallel to said track, a plurality of mold jackets, means resiliently supporting said mold jackets on said arms whereby said jackets may be vertically moved with said frame, said jackets being relatively longitudinally spaced, a plurality of weights carried on said jackets, a plurality of mold carriers supported on said track, each carrier including a dog engageable means, said dog engageable means being relatively positioned in staggered relation, means for moving said carriers with molds carried thereon underneath said jackets, comprising a longitudinally extending actuating member disposed between said tracks beneath said carriers, said actuating member including a first dog connected thereto for engaging carriers disposed at said pouring station, second, third, fourth, and fifth dogs on siad actuating member, said second, third, fourth, and fifth dogs being longitudinally spaced relatively a distance equal to the longitudinal spacing of said mold jackets, said second, third, fourth and fifth dogs being relatively staggered to complement said dog engageable means, means for moving said actuating member longitudinally whereby said first dog engages mold carriers at said pouring station and moves the same from said stations, said second, third, fourth, and fifth dogs being engageable with the dog engageable means of said carriers on said track for moving said carriers to said stations, and means connected to said frame for moving said frame to lower said jackets and weights over said molds during the metal-pouring operation and for raising said frame upon completion of pouring.

3. A mold-handling apparatus comprising: a track, a plurality of metal-pouring stations located in longitudinally spaced relation on said track, each station comprising a jacket-shifting mechanism, each mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation, a frame mounted for vertical movement on said supporting members, a plurality of mold jackets, means supporting said mold jackets on said frame whereby said jackets may be vertically moved with said frame, said jackets being relatively longitudinally spaced, a plurality of weights carried on said jackets, a plurality of mold carriers supported on said track, each carrier including a dog engageable means, said dog engageable means being relatively positioned in staggered relation, means for moving said carriers with molds carried thereon underneath said jackets, comprising a longitudinally extending actuating member disposed between said tracks, said actuating member including a first dog connected thereto for engaging carriers disposed at said pouring station, second, third, fourth, and fifth dogs on said actuating member, said second, third, fourth, and fifth dogs being longitudinally spaced relatively a distance equal to the longitudinal spacing of said mold jackets, said second, third, fourth and fifth dogs being relatively staggered to complement said dog engageable means, means for moving said actuating member longitudinally whereby said first dog engages mold carriers at said pouring station and moves the same from said stations, said second, third, fourth, and fifth dogs being engageable with the dog engageable means of said carriers on said track for moving said carriers to said station, and means connected to said frame for moving said frame to lower said jackets and weights over said molds during the metal-pouring operation and for raising said frame upon completion of pouring.

4. A mold-handling apparatus comprising: a track, a plurality of metal-pouring stations located in longitudinally spaced relation on said track, each station comprising a jacket-shifting mechanism, each mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation, a frame mounted for vertical movement on said supporting members, a plurality of mold jackets, means supporting said mold jackets on said frame whereby said jackets may be vertically moved with said frame, said jackets being relatively longitudinally spaced, a plurality of weights carried on said jackets, a plurality of mold carriers supported on said track, each carrier including a dog engageable means, said dog engageable means being relatively positioned in staggered relation, means for moving said carriers with molds carried thereon underneath said jackets, comprising a longitudinally extending actuating member disposed adjacent said tracks, said actuating member including first, second, third, and fourth dogs, said first, second, third, and fourth dogs being longitudinally spaced relatively a distance equal to the longitudinal spacing of said mold jackets, said dogs being relatively staggered to complement said dog engageable means, means for moving said actuating member longitudinally whereby said first, second, third, and fourth dogs engage said dog engageable means on said carriers on said track for moving said carriers to said stations, and means connected to said frame for moving said frame to lower said jackets and weights over said molds during the metal-pouring operation and for raising said frame upon completion of pouring.

5. A mold-handling apparatus comprising: a track, a plurality of metal-pouring stations located in longitudinally spaced relation on said track, each station comprising a jacket-shifting mechanism, each mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation, a frame mounted for vertical movement on said supporting members, a plurality of mold jackets, means supporting said mold jackets on said frame whereby said jackets may be vertically moved with said frame, said jackets being relatively longitudinally spaced, a plurality of mold carriers supported on said track, each carrier including a dog engageable means, said dog engageable means being relatively positioned in staggered relation, means for moving said carriers with molds carried thereon underneath said jackets, comprising a longitudinally extending actuating member disposed between said tracks, said actuating member including first, second, third, and fourth dogs, said first, second, third, and fourth dogs being longitudinally spaced relatively a distance equal to the longitudinal spacing of said mold jackets, said dogs being staggered relatively to conform to said dog engageable means, means for moving said actuating member longitudinally whereby said first, second, third, and fourth dogs engage said dog engageable means of said carriers on said track for moving said carriers to said station, and means connected to said frame for moving said frame to lower said jackets over said molds during the metal-pouring operation and for raising said frame upon completion of pouring.

6. A mold-handling apparatus comprising: a track, a metal-pouring station located on said track, said station comprising a jacket-shifting mechanism, said mechanism including a pair of vertically extending supporting members positioned in laterally spaced relation on opposite sides of said track, a frame mounted for vertical movement on said supporting members, a plurality of mold jackets supported on said frame in longitudinally spaced relation, a plurality of mold carriers on said track, dog engaging means on each carrier, said dog engaging means being relatively staggered, means for moving said carriers on said track, comprising a longitudinally movable member disposed between said track beneath said carriers, a plurality of dogs carried on said movable member, said dogs being spaced longitudinally, the said spac-

ing being substantially equal to the longitudinal spacing of said mold jackets, said dogs being relatively staggered to conform to said dog engaging means, means for moving said movable member toward said station whereby said dogs engage said dog engaging means of said carriers for moving the same to said station with molds carried thereon being disposed beneath the jackets, and means for shifting said frame vertically whereby said jackets are lowered over said molds during pouring and removed from said molds after pouring.

7. A mold handling apparatus comprising: a track, a metal-pouring station located on said track, said station comprising a jacket shifting mechanism, said mechanism including a supporting member adjacent said track, a frame movably connected to said supporting member for vertical movement, a plurality of mold jackets supported on said frame in longitudinally spaced relation, a plurality of mold carriers on said track, dog engaging means on each carrier, said dog engaging means being relatively staggered, movable means for moving said carrier, said movable means including a plurality of dogs, said dogs being spaced longitudinally substantially equal to the longitudinal spacing of said mold jackets, said dogs also

being relatively staggered to conform to said dog engaging means, means for moving said movable means toward said metal-pouring station whereby said dogs engage said dog engaging means of said carriers for moving the same to said station with molds carried thereon being disposed beneath said jackets, and means for shifting said frame vertically whereby said jackets are lowered over said molds during pouring and removed from said molds after pouring.

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