Nov. 12, 1957 G. H. FRANK 2,812,859

CAST STEEL DECK FOR FOUNDRY SHAKEOUTS

Filed July 5, 1951 3 Sheets-Sheet 1

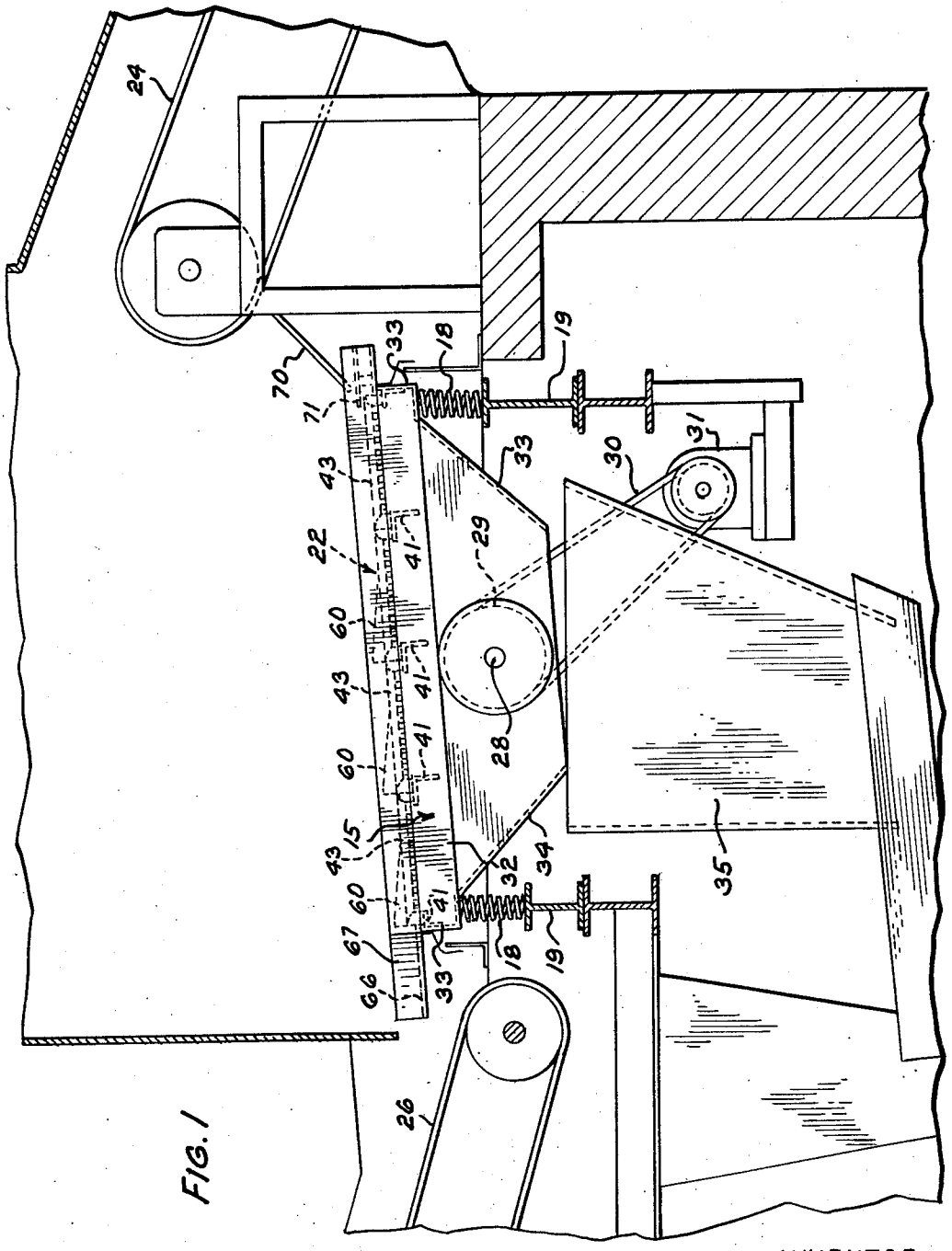


FIG. 1

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CAST STEEL DECK FOR FOUNDRY SHAKEOUTS

Filed July 5, 1951 3 Sheets-Sheet 2

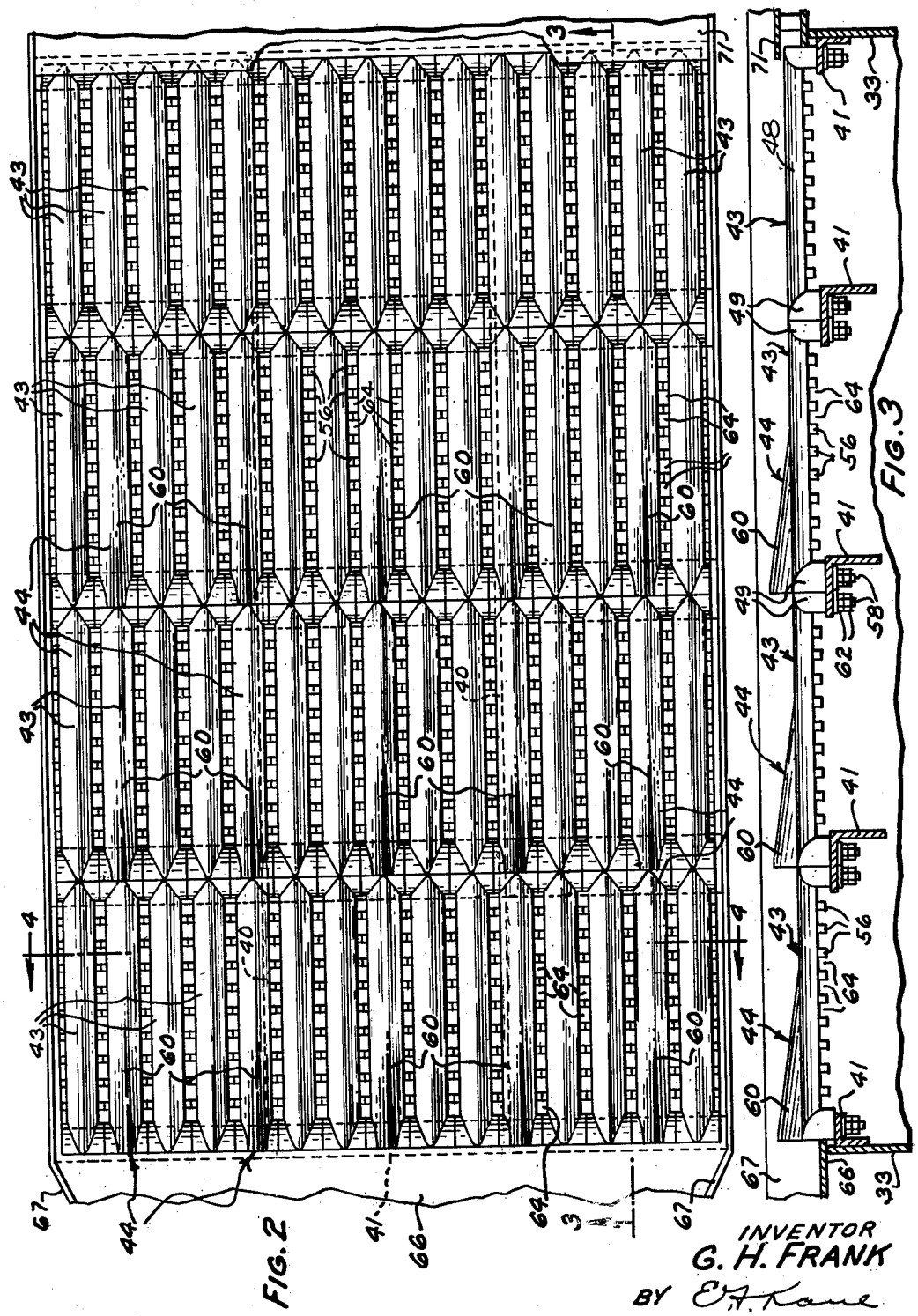


FIG. 2

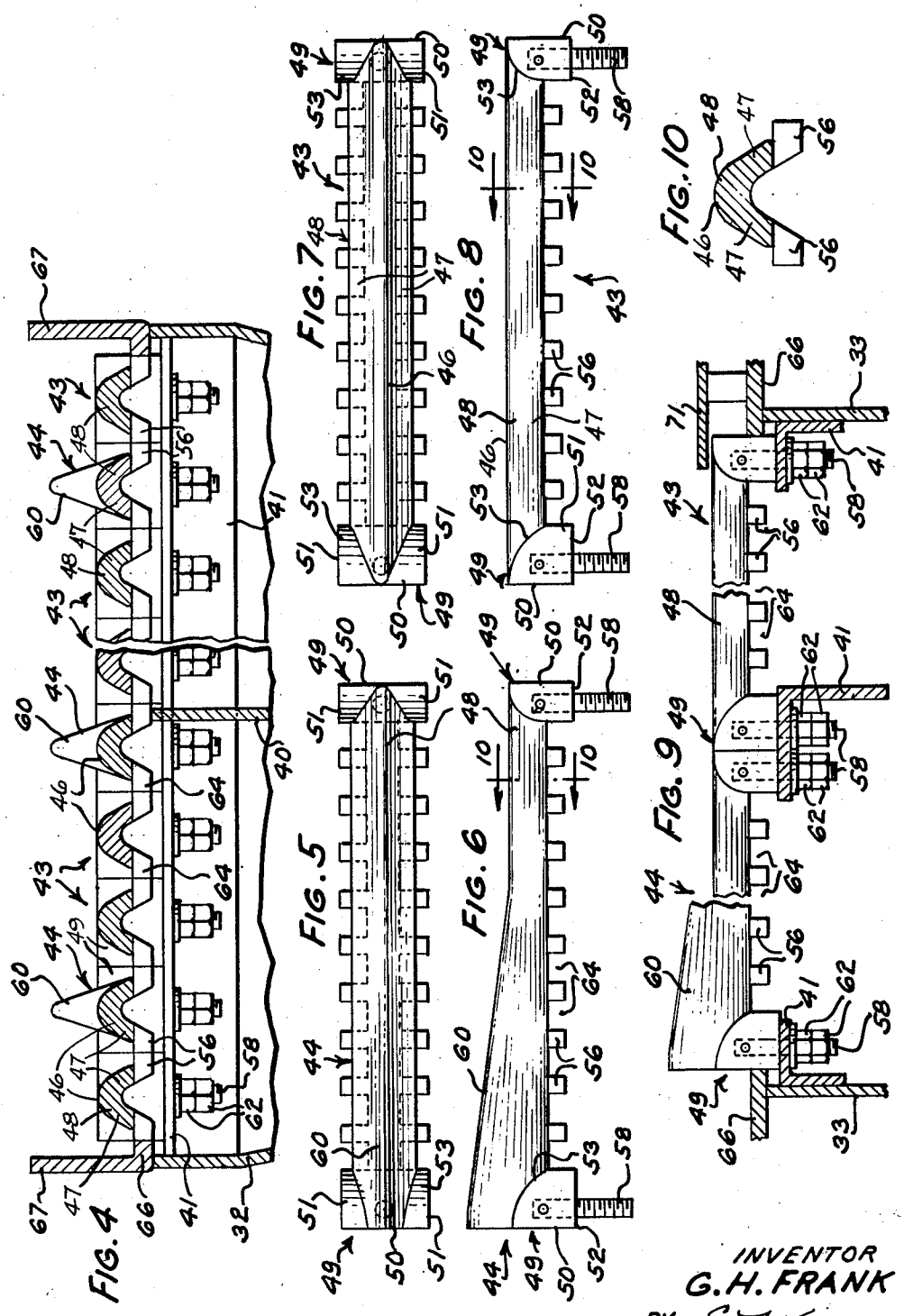
FIG. 3

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CAST STEEL DECK FOR FOUNDRY SHAKEOUTS

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Application July 5, 1951, Serial No. 235,243

9 Claims. (Cl. 209—393)

This invention relates to decks for foundry shakeouts.

In foundry shakeouts used heretofore the decks were usually made from relatively heavy plates of steel in which a plurality of apertures were formed to permit the passage therethrough of the sand which was removed from the castings. There were many objections to this type of deck construction. Frequently when flat plate-like parts were cast and shaken out on the shakeout, they would lie flat on the deck and be advanced thereon as the deck vibrated and would carry a quantity of sand along with it as it was discharged from the deck onto the receiving conveyor. Cast metal scrap parts formed by the overflow of the molten metal in the mold would frequently become lodged in the apertures in the deck and as the deck vibrated the scrap parts would ream the apertures and cause them to enlarge to the point where small molded castings would pass therethrough and be lost. Sprues and casting projections would also become trapped in the enlarged holes, resulting in frequent jams of the castings. The enlarged holes in the deck would be patched up, but after several patchings the shakeout had to be shut down and the entire deck replaced. In some forms of deck construction iron bars were secured to the deck to provide vertically extending rails, but this construction was objectionable in that the walls of the rails extended perpendicularly to the face of the deck in parallel relation to each other and caused castings to lodge and jam therein.

It is an object of the present invention to provide an improved deck construction for foundry shakeouts.

In accordance with one embodiment of the invention as applied to a foundry shakeout having a deck-supporting framework including a plurality of spaced apart transversely extending frame members, there is provided a plurality of sectional elongated deck-forming elements removably secured to the frame members in abutting relation to each other in lateral and longitudinal rows to form a deck. The deck-forming elements comprise elongated bar-like members, each having a central ridge with sloping side walls and a plurality of lugs extending downwardly and laterally from the bottom of the side walls of the elements, which, when, the elements are assembled, abut lugs on adjacent elements and cooperate to form rows of openings in the valleys between the ridges, and the elements have shoulders extending laterally from the ends thereof which form barriers across the valleys to impede the free movement of lumps of sand longitudinally in the valleys between the ridges. Some of the elements have a sloping cam surface extending upwardly at one end thereof and are assembled in spaced relation to each other across the width of the deck and at intervals longitudinal of the deck to provide a plurality of cam elements or peaks for tilting the casting as they are advanced along the deck.

Other objects and advantages of the invention will become apparent by reference to the following detailed description thereof when considered in conjunction with

the accompanying drawings illustrating a preferred embodiment of the invention, in which

Fig. 1 is a vertical longitudinal sectional elevational view of a foundry shakeout showing the improved deck structure embodying the present invention thereon;

Fig. 2 is a plan view of the deck;

Fig. 3 is a vertical longitudinal sectional view of the deck taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical cross-sectional view of the deck taken on the line 4—4 of Fig. 2;

Figs. 5 and 6 are plan and side elevational views, respectively, of one type of deck-forming element having an inclined ridge thereon;

Figs. 7 and 8 are plan and side elevational views, respectively of a straight deck-forming element;

Fig. 9 is an enlarged fragmentary sectional elevational view of portions of the structure shown in Fig. 3; and

Fig. 10 is a detailed sectional view through the deck-forming elements indicated by the lines 10—10 on Figs. 6 and 8.

Referring to the drawings, particularly Fig. 1, the shakeout 15 is of a conventional design being disposed at a slight angle to the horizontal and mounted at each end on a plurality of springs 18 for free floating movement. The springs 18 are supported on a pair of horizontal I-beam frame members 19 which in turn may be supported in a suitable manner as from the side walls of a concrete pit in which a portion of the shakeout is housed. An apertured deck 22 on the upper portion of the shakeout 15 has one end thereof disposed below and adjacent the inclined end of a conveyor 24 onto which the sand molds and the castings therein are placed after the molding operation. The sand molds and the castings therein are carried by the conveyor 24 and dropped over the end thereof onto the deck 22, and the shakeout 15 and the deck 22 are vibrated to shake the castings free of the molding sand as the castings advance longitudinally along the deck and the sand drops through the openings therein. The clean castings are discharged from the deck 22 onto a sorting conveyor 26 which carries the castings away from the shakeout and supports the castings in an accessible position where an operator may sort them into various containers.

The shakeout 15 is provided with a suitable mechanism for imparting a slight oscillatory or vibratory movement thereto which comprises a shaft 28 mounted for rotation in the shakeout 15. The shaft 28 has a pair of eccentrically weighted fly wheels 29 which are rotated by a belt and pulley drive 30 from a motor 31. The shakeout 15 has side walls 32 and end walls 33, the lower portions of which are directed inwardly to form a hopper-like chute 34 for directing the sand into a hopper 35 from which the sand is conveyed for re-use. In addition to the side and end walls the shakeout 15 has a pair of longitudinally extending frame members 40 (Fig. 4) disposed in spaced relation to each other and the side walls, and has a plurality of transverse members 41 secured in spaced relation to each other to the longitudinal frame members and side walls to form a lattice-like framework for supporting the deck 22. The cross frame members 41 are in the form of angle bars having one of their flanges disposed in a plane parallel with the top of the deck for supporting a plurality of elements or sections 43 and 44 (Figs. 5–8) which make up the deck 22.

Each of the deck-forming elements 43 (Figs. 7 and 8) comprises an elongated member having a central longitudinally extending ridge 46 and downwardly sloping side walls 47 forming an inverted channel-shaped shank 48 substantially V shaped in cross-section. At opposite ends of the elements 43 heads 49 are formed by shoulders extending laterally from the shank 48. The heads 49 have flat end, side, and bottom surfaces 50, 51, and 52, respec-

tively, and a top surface which is flush with the top of the ridge **46** and has curved surfaces **53** sloping inwardly and downwardly on the shoulder portions thereof. Lugs or fingers **56** are formed on the lower edge of the walls **47** of the shank **48** in spaced relation to each other and extend laterally outwardly with their end surfaces substantially in a plane with the side surfaces **51** of the heads **49**. Threaded studs **58** are secured in the heads **49** and project downwardly from the lower surface **52** thereof.

The elements or sections **44** are similar to the elements **43** except that a portion **60** of the ridge **46** of the elements **44** slopes upwardly toward one end of the elements (Figs. 5 and 6) to form inclined cams for tilting the castings as they slide along the deck. A plurality of the elements **43** and **44** are arranged in laterally and horizontally disposed rows as shown in Figs. 2, 3, and 4 with the flat surfaces **52** of the heads **49** resting on the transverse frame members **41** and the threaded studs **58** extending through apertures in the frame member **41**. A pair of lock nuts **62** secured to each threaded stud **58** serves to anchor the elements **43** and **44** onto the frame members.

In the deck **22** the elements **43** and **44** are arranged in longitudinally extending rows with the flat end surface **50** of the heads **49** in abutting engagement so that the ridge portions **46** thereof form rails extending longitudinally from end to end of the deck. The elements **43** and **44** are arranged side by side with the side surfaces **51** of the heads **49** in abutting engagement with each other to form grooves or valleys between the ridges which valleys are intersected by the lateral shoulders or surfaces **53** on the heads **49** of the elements to form barriers against which lumps of sand may be crushed. With the elements **43** and **44** thus arranged the lugs **56** thereon constitute the bottom portion of the valleys or channels between the ridges to prevent the passage therethrough of small castings and other objects larger than a predetermined size and the lugs in cooperation with the side walls of the shanks **48** form rows of apertures **64** between the deck elements for the passage of sand therethrough. Thus, while sand and objects smaller than the size of the apertures **64** may readily pass through the deck, other objects larger than the apertures **64** will be supported by lugs **56** and advanced by the deck as it vibrates. It will be noted that below the bottom of the side walls of the shank **48** the apertures **64** are defined by the transversely disposed parallel lugs **56** and that an object disposed in an aperture between a pair of lugs **56** is free to move in a direction laterally of the element as well as downwardly. This design of the portions of the elements forming the apertures **64** aids in preventing the packing or clogging of the apertures.

The elements **44** with their inclined cams **60** may be variously positioned in the deck and as shown herein are arranged in rows with three elements **44** in succession in a longitudinal row at the lower end of the deck and with the rows of elements **44** separated from each other laterally by two rows of elements **43** and separated from the sides of the deck by one row of the elements **43**. It will thus be seen that the elements **43** and **44** form a composite deck having a flat supporting surface formed by the upper edges of the ridges **48** and the heads **49** and that the inclined or cam portions **60** of the ridges project upwardly above this supporting surface to engage and tilt the castings several times as the castings are advanced along the deck to aid in removing the sand from the castings.

A deck sheet **66** is secured to the shakeout **15** and has a rectangular aperture for receiving the composite deck formed by the elements **43** and **44**. The sheet **66** is supported with the upper surface thereof substantially in the plane of the upper surface of the lugs **56** and has side flanges **67—67** for confining the sand and castings on the deck. The forward portion of the deck sheet **66** extends above and over a portion of the conveyor **26** for guiding the castings advanced by the deck onto the conveyor and the other end of the deck sheet extends rearwardly beneath the conveyor **24** to receive the castings and sand molds transferred from the conveyor **24** onto the deck. If desired a deflector plate **70** (Fig. 1) may be provided to insure that the castings and the mold sand falling from the conveyor **24** do not drop off the rear edge of the deck. An auxiliary deck plate **71** (Figs. 1, 2, and 3) is mounted on the rear portion of the deck plate **66** in spaced relation thereto and above the level of the top surface of the rear elements **43** to guide the castings and sand onto the top of the composite deck **22**.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A deck for a foundry shakeout comprising a supporting framework having a plurality of spaced apart longitudinal members, a plurality of spaced apart transverse members connecting the longitudinal members, a plurality of elongated sectional bar-like deck-forming members extending between adjacent transverse members and supported thereon to form a deck, said deck-forming members having a central longitudinally extending straight ridge with downwardly sloping sides and having downwardly and laterally extending lugs spaced along the bottom portion of the sides thereof, and means for removably securing the elements onto the frame members in end-to-end relation to form continuous rails extending longitudinally of the deck and in close proximity laterally and with the lugs of laterally adjacent members in abutting relation to form channels between the rails with rows of openings in the bottom of the channels for the passage of sand therethrough.

2. A deck for a foundry shakeout comprising a supporting framework having a plurality of parallel frame members, a plurality of elongated sectional bar-like, deck-forming elements extending between adjacent frame members and supported thereon to form a deck, said deck-forming members having a central longitudinally extending ridge with downwardly sloping sides and having downwardly and laterally extending lugs spaced along the bottom portion of the sides thereof, means for removably securing the elements onto the frame members in end-to-end and side-to-side relation with the lugs thereof in abutting relation to form said deck with continuous ridges extending longitudinally thereof and with grooves between said ridges and apertures in the bottoms of said grooves, and laterally extending shoulders on said elements cooperating with shoulders on adjacent elements to form barriers across said grooves at spaced points longitudinally thereof.

3. A deck for a foundry shakeout comprising a supporting framework having a plurality of parallel frame members, a plurality of elongated sectional bar-like, deck-forming elements extending between adjacent frame members and supported thereon to form a deck, said deck forming members having a central longitudinally extending ridge with downwardly sloping sides and having downwardly and laterally extending lugs spaced along the bottom portion of the sides thereof, means for removably securing the elements onto the frame members in end-to-end and side-to-side relation with the lugs thereof in abutting relation to form said deck with continuous ridges extending longitudinally thereof and with grooves between said ridges and apertures in the bottoms of said grooves, laterally extending shoulders on said elements cooperating with shoulders on adjacent elements to form barriers across said grooves at spaced points longitudinally thereof, and cams on some of said elements having surfaces sloping upwardly from the ridges thereof for tilting castings advanced therealong and having steep end surfaces permitting the castings to fall from said cams as they are advanced on said deck.

4. In a foundry shakeout having a deck-supporting frame including a plurality of spaced apart transversely disposed frame members, the combination therewith of a plurality of deck-forming elements, each comprising a bar having an inverted substantially V shaped cross-section and downwardly sloping side walls, heads on the ends of said bars forming shoulders projecting laterally from said bar, a plurality of fingers projecting downwardly and laterally from said bar along the lower portion of the side walls thereof in spaced relation to each other, and means for removably securing said elements on said frame members in transverse rows with the shoulders and fingers on adjacent elements in abutting relation to each other, respectively, and in longitudinal rows with the heads thereof on adjacent elements in abutting relation to each other, said elements cooperating to form continuous longitudinally extending ridges and grooves between the ridges and with the shoulders forming transverse barriers in said grooves and said fingers forming the bottom portion of said grooves and defining rows of apertures in the bottom thereof for the passage of sand therethrough.

5. In a foundry shakeout having a deck-supporting frame including a plurality of spaced apart transversely disposed frame members, the combination therewith of a plurality of deck-forming elements, each comprising a bar having an inverted substantially V shaped cross-section and downwardly sloping side walls, heads on the ends of said bars forming shoulders projecting laterally from said bar, a plurality of fingers projecting downwardly and laterally from said bar along the lower portion of the side walls thereof in spaced relation to each other, means for removably securing said elements on said frame members in transverse rows with the shoulders and fingers on adjacent elements in abutting relation to each other, respectively, and in longitudinal rows with the heads thereof on adjacent elements in abutting relation to each other, said elements cooperating to form longitudinally extending ridges and grooves with the shoulders forming transverse barriers in said grooves and said fingers forming the bottom portion of said grooves and defining rows of apertures in the bottom of said grooves, and upwardly inclined cam portions on some of said bars for tilting castings being advanced on said deck.

6. In a foundry shakeout having a plurality of spaced apart deck-supporting frame members having apertures therein, the combination therewith of a sectional deck comprising a plurality of elongated sections supported on said frame members in longitudinal rows and in lateral rows, said sections having central longitudinally extending ridges with downwardly sloping side walls forming longitudinally extending rails and grooves between the rails, heads on the ends of said sections forming laterally extending shoulders thereon cooperating with shoulders on adjacent sections to form longitudinally spaced transverse barriers in said longitudinal grooves, lugs extending downwardly and laterally from the lower portion of the side walls of said sections in longitudinally spaced relation to each other and in abutting relation to the lugs on laterally adjacent sections to form rows of apertures in the bottom portion of the grooves between the rails, and means including studs extending from said heads through the apertures in said frame members for removably securing said sections onto said frame members with the heads of adjacent sections in the longitudinal and the lateral rows in abutting relation to each other.

7. In a foundry shakeout having a plurality of spaced apart deck-supporting frame members having apertures therein, the combination therewith of a sectional deck comprising a plurality of elongated sections supported on said frame members in longitudinal rows and in lateral rows, said sections having central longitudinally extending ridges with downwardly sloping side walls forming longitudinally extending rails and grooves between the rails, heads on the ends of said sections forming laterally extending shoulders thereon cooperating with shoulders on adjacent sections to form longitudinally spaced transverse barriers in said longitudinal grooves between said rails, lugs extending downwardly and laterally from the lower portion of the side walls of said sections in longitudinally spaced relation to each other and in abutting relation to the lugs on laterally adjacent sections to form rows of apertures in the bottom portion of the grooves between the rails, means including studs extending from said heads through the apertures in said frame members for removably securing said sections onto said frame members with the heads of adjacent sections in the longitudinal and the lateral rows in abutting relation to each other, and cams on some of said sections having surfaces sloping upwardly from the ridges thereof for tilting castings advanced therealong and having steep end surfaces permitting the castings to fall from said cams as they are advanced on said deck.

8. A deck for a foundry shakeout comprising a plurality of longitudinally extending rails of substantially V shaped cross-section having downwardly sloping side walls, said rails being spaced apart to form V shaped channels between said rails and having a plurality of fingers extending downwardly and laterally from the bottom portions thereof to form the bottom of said channels and a plurality of apertures in said channels for the passage of sand therethrough, a plurality of barrier members formed on said rails and extending laterally thereof in said channels in spaced relation to each other, said rails and said barriers having a top surface disposed substantially in a plane, and cam members on some of said rails having upwardly sloping surfaces engageable with castings advancing on said deck for tilting said castings laterally and longitudinally as the castings are advanced along said deck.

9. A deck forming element for use in fabricating a foundry shakeout deck comprising an elongated straight member of inverted substantially V-shaped cross section having a central longitudinally extending ridge with downwardly sloping side walls, heads on the ends of said member having portions thereof extending downwardly and laterally therefrom and having an upper surface substantially flush with the upper surface of said ridge and having substantially flat end surfaces forming parallel end walls for said element and having substantially flat parallel side surfaces, said side walls having flat lower surfaces, a plurality of lugs extending downwardly from the lower surfaces of the side walls of said member and laterally therefrom in parallel relation to each other and in longitudinally spaced relation to each other between the heads and having end surfaces disposed substantially in the planes of the side surfaces of the heads, and fastening means on said heads, whereby said elements may be mounted on supporting members in longitudinal and in lateral rows with the heads and the lugs in abutting relation to each other respectively.

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