Oct. 7, 1958 A. S. BEECH 2,855,092

MOULD CONVEYORS

Filed Dec. 23, 1955 4 Sheets-Sheet 1

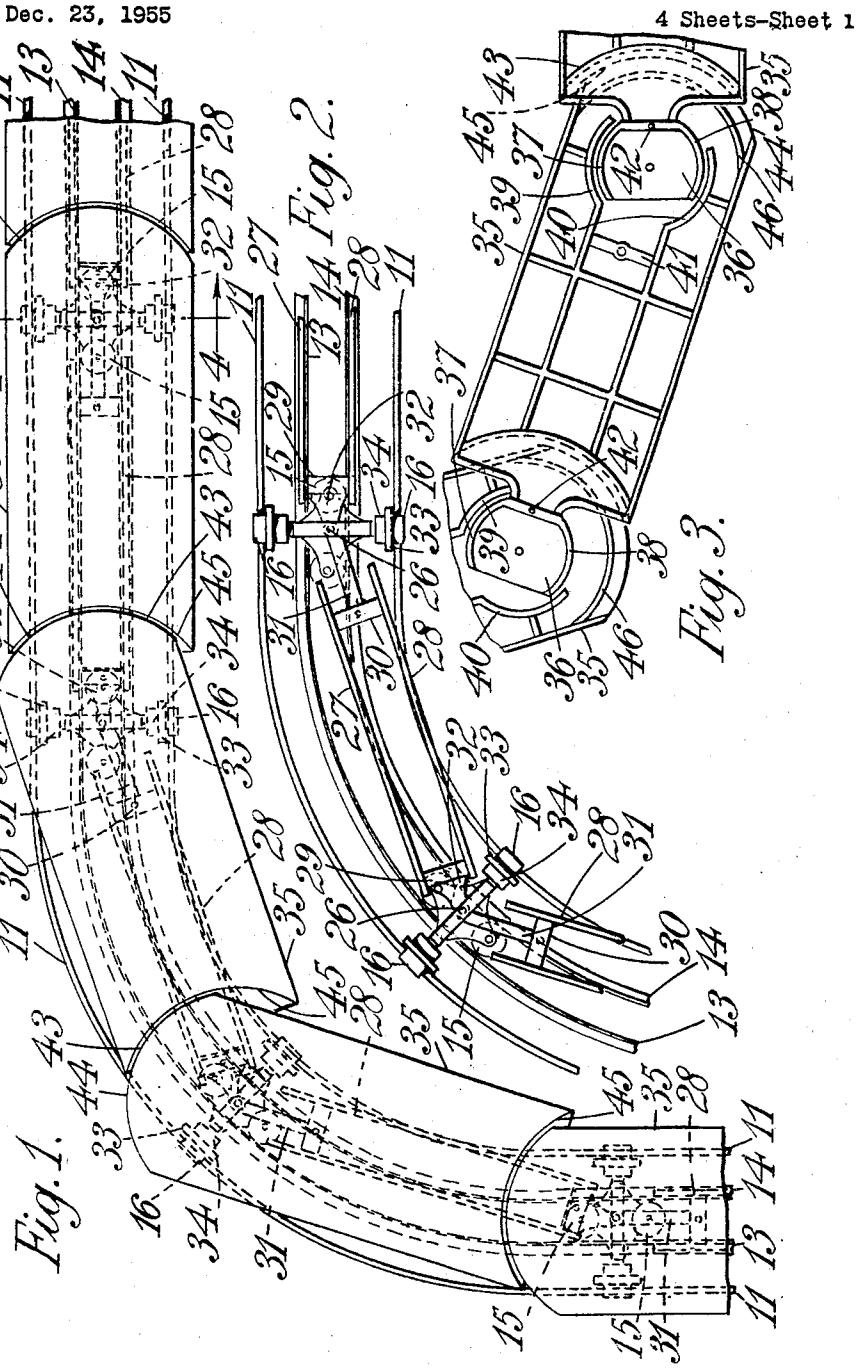


Fig. 1.

Fig. 2.

Fig. 3.

Oct. 7, 1958 A. S. BEECH 2,855,092

MOULD CONVEYORS

Filed Dec. 23, 1955 4 Sheets-Sheet 2

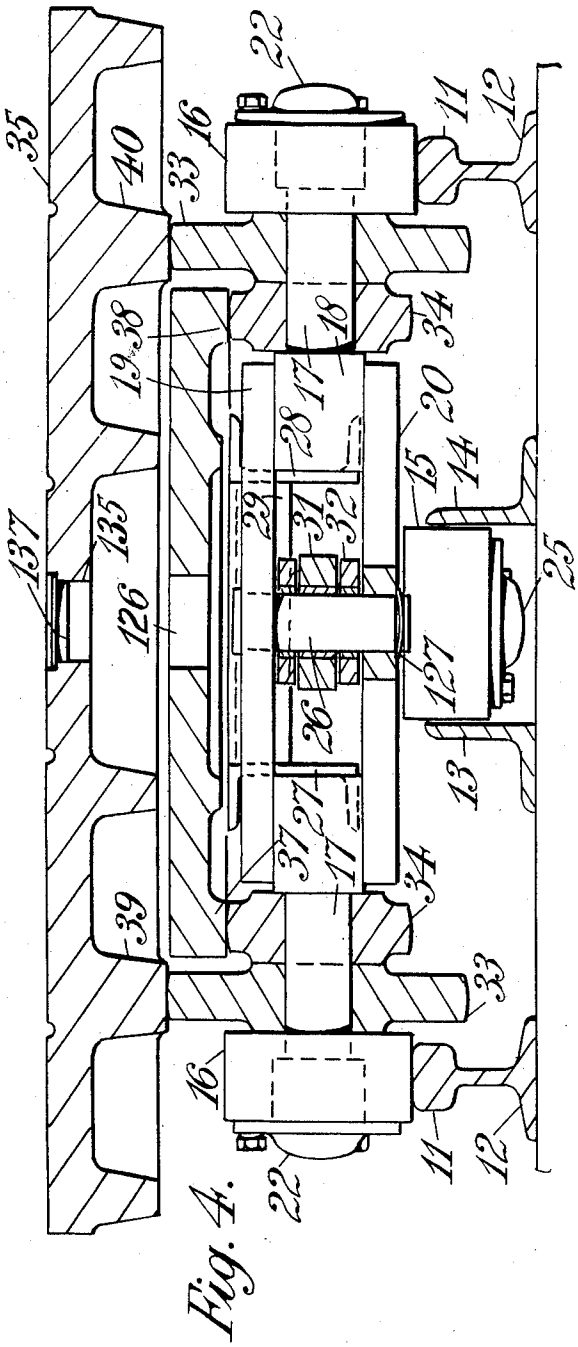


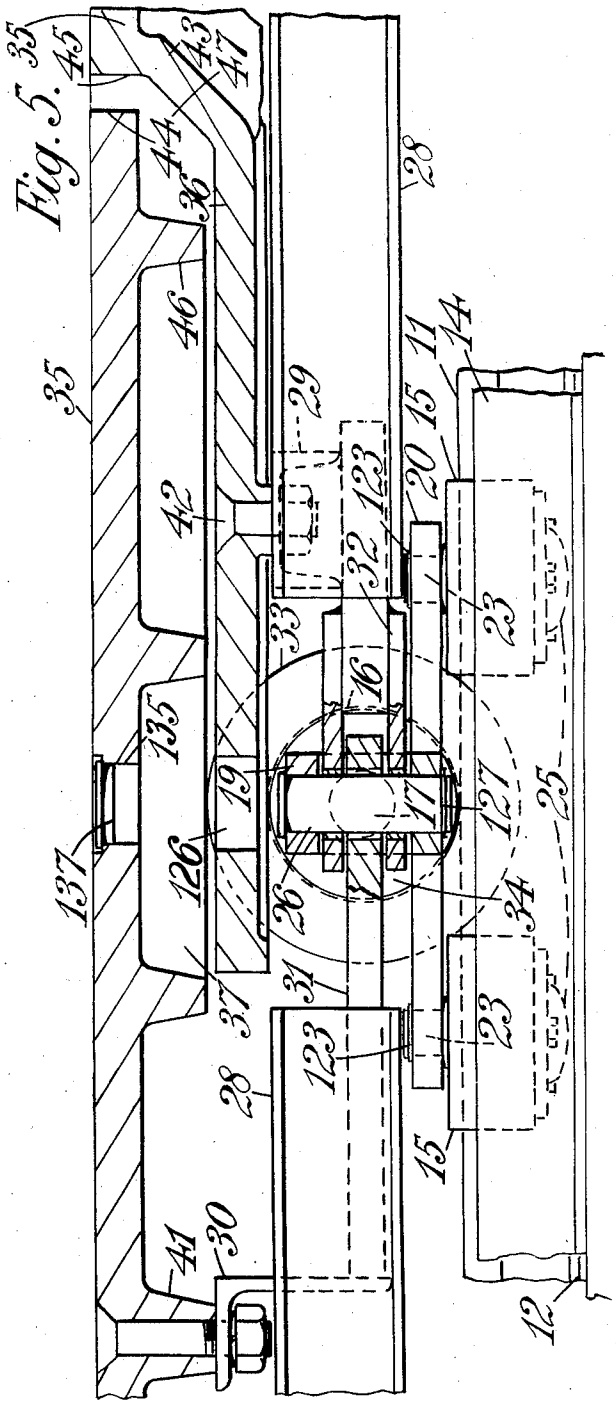
Fig. 4.

Oct. 7, 1958 A. S. BEECH 2,855,092

MOULD CONVEYORS

Filed Dec. 23, 1955 4 Sheets-Sheet 3

Fig. 5.



Oct. 7, 1958 A. S. BEECH 2,855,092

MOULD CONVEYORS

Filed Dec. 23, 1955 4 Sheets-Sheet 4

Fig. 6.

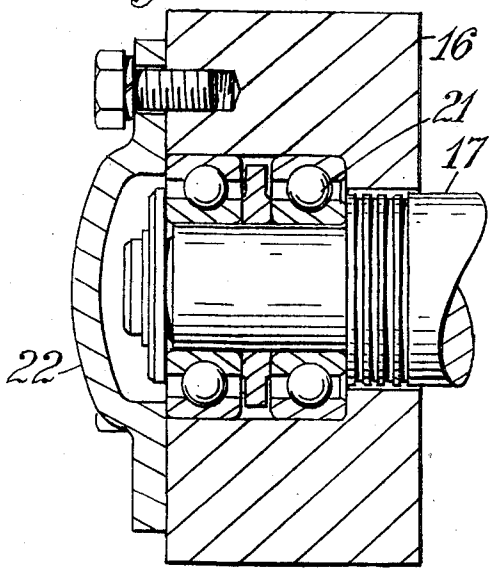
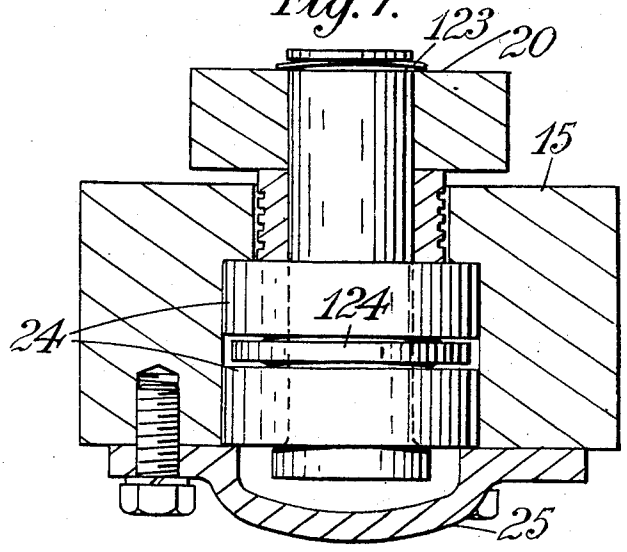


Fig. 7.



United States Patent Office 2,855,092 Patented Oct. 7, 1958

2,855,092

MOULD CONVEYORS

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Application December 23, 1955, Serial No. 555,143

3 Claims. (Cl. 198—181)

This invention comprises improvements in or relating to mould conveyors.

Mould conveyors are conveyors used in foundries for carrying mould boxes from one operation to another. They have a flat upper surface free of obstructions, consisting of a series of metal plates fitting as nearly as possible flush with one another and supported by wheels running on a track. Frequently, moulds are filled with moulding sand at one station, transported by the conveyor to a pouring station, poured while on the conveyor and carried through a cooling chamber to a knock-out station, after which the conveyor (which is endless) carries the moulds back to the filling station for re-use.

Such conveyors need to be particularly smooth-running in order not to shake down sand into their moulded cavities and spoil the castings, and they need to be able to work for long periods without stoppages, but the rough foundry conditions under which they operate militate against satisfactory service. The top plates tend to warp, due to the irregular heat they receive from the poured moulds, while spilt molten metal may enter the joints between the plates and cause them to jam. The general prevalence of sand around and upon them is detrimental to working parts. Again, the moulds are very heavy, especially when poured, and as they are not likely to be disposed accurately along the centre-line of the conveyor, unless the conveyor plates are very firmly supported, they may not stand the strain.

It is an object of the present invention to provide an improved construction of mould conveyor which has a nearly continuous top surface, easily renewed in the event of damage but not easily jammed if molten metal is spilt on to the plates. It is a further object to provide a conveyor which is smooth in operation, stable under irregular loading, and well protected in its working parts.

The present invention comprises, in a conveyor of the character described, the combination of an axle at each junction between the sections, means to keep it at right angles to the track, track wheels thereon, a pair of frame-carrying rollers thereon, a carrier plate resting on the rollers, longitudinal frame members secured to the carrier plate and extending therefrom toward the next axle, means to link the frame members to the axles, and a conveyor plate (which may be in one piece with the carrier plate) resting directly on and secured to the longitudinal frame members of the section.

Preferably, the frame members of each section consist of two parallel members spaced apart which each extend beneath the conveyor plate between the frame-carrying rollers.

This construction, in which the conveyor plates are directly secured to the frame members is not only rigid and simple but it also saves weight and driving power and thus improves the running of the conveyor.

The invention also comprises an improved form of joint between the plates as hereinafter described.

The following is a description by way of example of one construction in accordance with the invention:

In the accompanying drawings,

Figure 1 is a plan of a conveyor in accordance with the invention;

Figure 2 is a plan of a part of the same with the conveyor plates removed;

Figure 3 is an underside plan view of a conveyor plate;

Figure 4 is a section upon the line 4—4 of Figure 1;

Figure 5 is a longitudinal section of a portion of the conveyor at a joint;

Figure 6 is a section through a track wheel showing the bearing construction; and

Figure 7 is a similar section through a guide wheel.

The conveyor consists of a track **11** and a chain of units running upon the track.

The track is built up from a number of cross bearers or sleepers (not shown) resting on either a floor or longitudinal bearers or otherwise, as requisite, which support rails **11** having flanged bases **12** which are spaced apart by an appropriate track width. In the centre of the track there are secured to the sleepers two angle members **13, 14** spaced apart by a short distance and arranged back-to-back so that they form between them a guide-channel in which guide rollers **15** (Figures 4 and 5) for the conveyor can operate. The guide rollers **15** are arranged on the conveyor on vertical axes and are of such a diameter as to fit between the backs of the angle members **13, 14**, and they therefore keep the conveyor centralised with relation to the track and avoid the necessity of having flanged wheels to run on the rails. This arrangement is well known in itself.

The conveyor runs on this track on a number of rollers **16** which are carried on horizontal axles **17**. Each axle is built up from two lengths of square section material which are welded at **18** between top and bottom plates **19, 20**, and project therefrom in line with each other so that the top and bottom plates **19, 20**, form the centre of the axle with the square section projecting from them in opposite directions. The ends of the axle are turned into circular form and carry ball bearings **21** (Figure 6), held apart by spacer rings **121**, on which bearings the rollers are mounted. The spacers **121** are made large enough to retain the rollers in place if the balls of the bearings fail. The bearings are preferably lubricated by packing them with molybdenum disulphide base lubricant so that they require no attention for long periods. On the outer face of the rollers there are secured caps **22** to keep out dust. The plates **19, 20**, which constitute the central portion of the axle are horizontal. The upper plate **19** is simply a length of flat bar, a little wider than the square end portions to which it is welded. The lower plate **20** is of a diamond configuration as viewed in plan and is somewhat thicker than the other, extending fore-and-aft from the axle. At its end points it has securely fixed in place (by a spring retaining ring **123**) vertical stub axles **23** (Figure 7) which carry ball bearings **24** on which are the aforesaid vertical guide rollers **15**. The bearings **24** are spaced apart by a spacer disc **124**. The disc **124** is large enough to ensure, in the event of the balls failing, that the parts are kept together. These guide rollers **15** also keep the axles **17** at right angles to the track. Below the axles **23** the rollers **15** carry cover plates **25**.

In the centre of each axle **17** is a vertical pin **26**, held in place by a head **126** and spring ring **127**, which extends between the top and bottom plates **19, 20**.

The axles **17** are connected together by chassis frames, best seen in Figure 2. Each chassis frame consists of two channel-shaped parallel longitudinal members **27, 28**, which are spaced apart from one another by cross members **29, 30**, near their ends. The cross members are

welded to the channel members and the flanges of the channel members point outwards. To the cross members are welded connecting elements, 31, 32, which are pivoted to the vertical pins 26 in the centres of the axles 17. Thus each chassis frame is pivoted at each end to an axle and the pins 26 form pivotal connections between each pair of chassis frames. The axles 17 can swing relatively to the chassis frames, and the chassis frames can swing relatively to each other. For this purpose the connecting member 31 at one end of each chassis frame is made of a single stout plate to embrace the pin 26, and at the other end it comprises two plates 32 spaced apart from one another so that the single plate 31 at the end of one chassis frame can enter between the two plates 32 at the end of the next and both can embrace the same pin 26. The total thickness of the plates 32, 31, 32 at each joint is equal to the space between the upper and lower plates 19, 20, which form the centre of the axle 17.

Each of the axles 17 carries, between its squared portions and the rollers 16, two carrier rollers 33, 34, which are intended to support the superincumbent weight of the conveyor plates 35. As can be seen from Figure 1 of the drawing, the track 11 may go round sharp curves. The conveyor plates at the curves lie at a marked angle to each other and if each conveyor plate were directly supported upon the frame members 27 only, the overhang at each end would have to be considerable and the lateral stability would be small. According to the present invention however the conveyor plates at one end are supported upon carrier plates 36, which are formed integral with them and which rest on the inner rollers 34. At the other end of the conveyor plates rest on larger intermediate rollers 33. Thus each conveyor plate has four points of support and even when going round curves these points of support are substantially spaced and symmetric with the centre-line of the conveyor plate.

The carrier plates 36 have curved ribs 37, 38 on their underside which are concentric with the axis of the pivot pin 26 and which are small enough to run in the spaces between the rollers 33. At the underside of the other end of the conveyor plate 35 there are curved ribs 39, 40, to rest upon the rollers 33. When the plates are assembled, the ribs 37, 38, are concentric with the ribs 39, 40. The conveyor plates have other stiffening ribs which interconnect the ribs described. Each conveyor plate is made of a casting having a flat upper face. One of the ribs 41 on the underside of each conveyor plate 35 overlies and is secured to the cross-member 30 between the frame members 27, 28. It will be noted that the plate 38 overhangs from this attachment point by rib 41 by a considerable distance but the ribs 37, 38, resting on the rollers 33 afford the overhanging portion support. At the other end of the conveyor plate 35 the extension which forms the carrier plate 36 is at a lower level than the main surface of the plate 35 and is bolted at 42 to the cross-member 29 (see Figure 5). The plate 35 is joined to the carrier plate 36 by an inclined portion 43 which, as seen in the underside plan Figure 3, is curved concentrically with the axis of the pin 26. At one end as shown at 44 the conveyor plates 35, as viewed in plan, are rounded concentrically with the axes of the connecting pins 26 between the chassis sections. At the other end they are hollowed, as shown at 45, to fit against the rounded end of the next conveyor plate. As each conveyor plate 35 is bolted to the cross-members 29, 30, of the chassis frame at two points only, it can be rapidly removed in the event of replacement becoming necessary.

At the junctions between the conveyor plates it is highly desirable to prevent entry of molten metal which may be spilt in pouring the moulds. Accordingly, the concave end where it is joined to the carrier plate 36 forms a wide horizontal flange which underlies the convex end 44 of the next plate. The outer edge of the end 44 carries downwardly projecting lip 46. The concave end of the next plate 35 which underlies the end 44 and lip 46 just described may have a corresponding upwardly projecting lip if desired. The wedge-shaped space 47 formed between the two plates by the sloping portion 43 between the upper surface of 35 and the carrier plate 36, and limited by the lip 46, can be filled with loose sand. In the result, the sand catches any spilt metal and prevents it from becoming jammed between the conveyor plates as it solidifies.

The conveyor plates 35, 36 have apertures 135, 136 axially in line with the pivot pins 26; the upper aperture 135 is closed by a removable plug 137, removal of which affords access to the pin 26.

I claim:

1. In a conveyor the combination of a series of conveyor plates each curved outwardly at one end about a center lying near that end and curved hollow correspondingly at the other end, an axle beneath the center of curvature of the outwardly curved end of each plate, an extension from each said plate at its hollow-curved end forming a carrier plate which lies beneath the neighboring plate of the conveyor, spaced rollers on each axle engaging contact surfaces on the underside of said carrier plate, further spaced rollers on each axle engaging contact surfaces on the underside of each conveyor plate, rollers on each axle to run on a track and means on each axle to keep the axle at right angles to the track.

2. In a conveyor the combination as claimed in claim 1, wherein contact surfaces on the underside of each carrier plate and on the underside of each conveyor plate consist of concentric circular ribs carried by the plates.

3. A conveyor having the features set forth in claim 1, wherein the means on each axle to keep the axle at right angles to the track consist of projections from the axle in a fore and aft direction which support rollers on vertical axes adapted to run in guides laid between the two sides of the track.

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