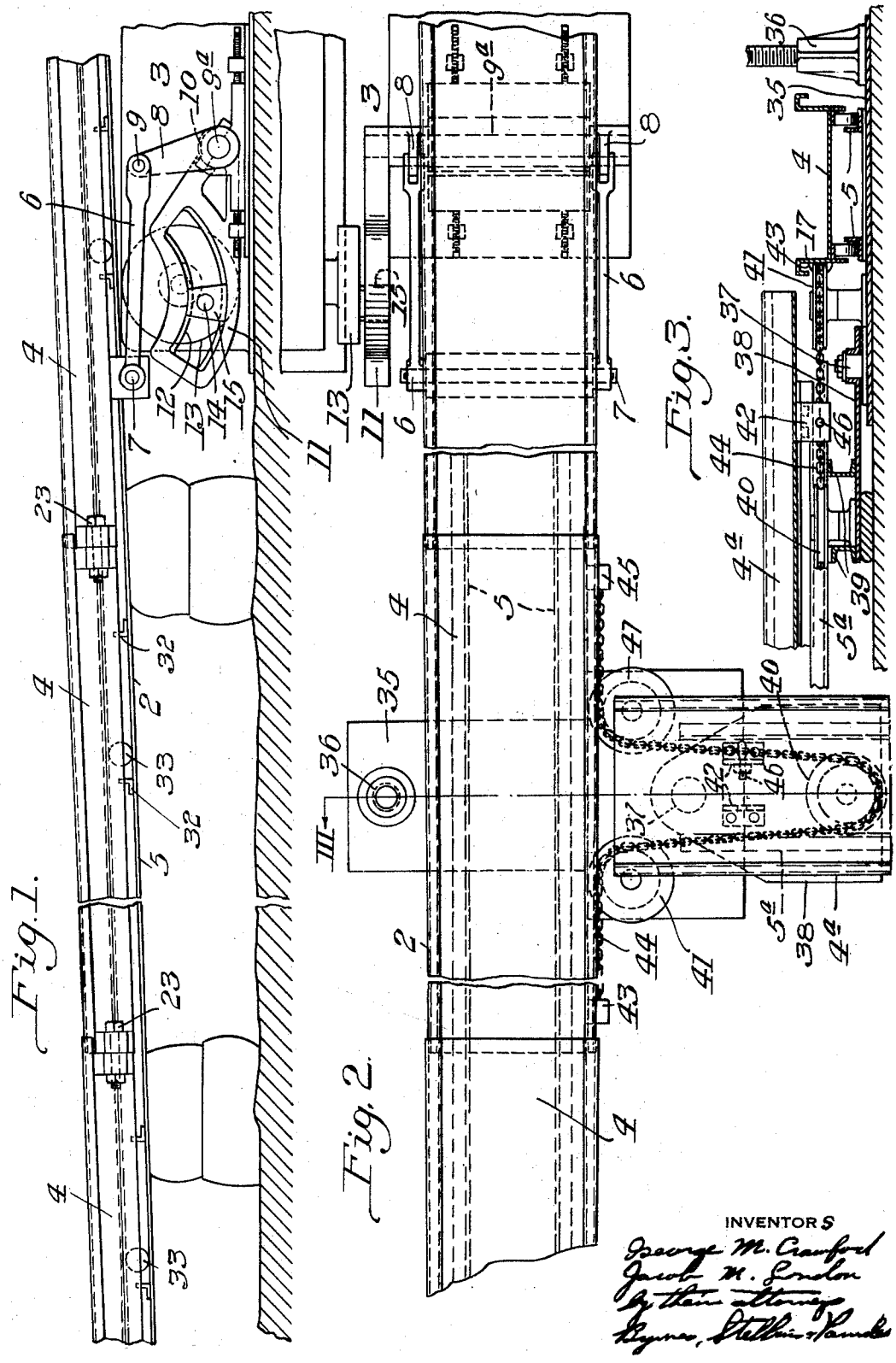
Aug. 15, 1933. G. M. CRAWFORD ET AL 1,922,198

CONVEYER

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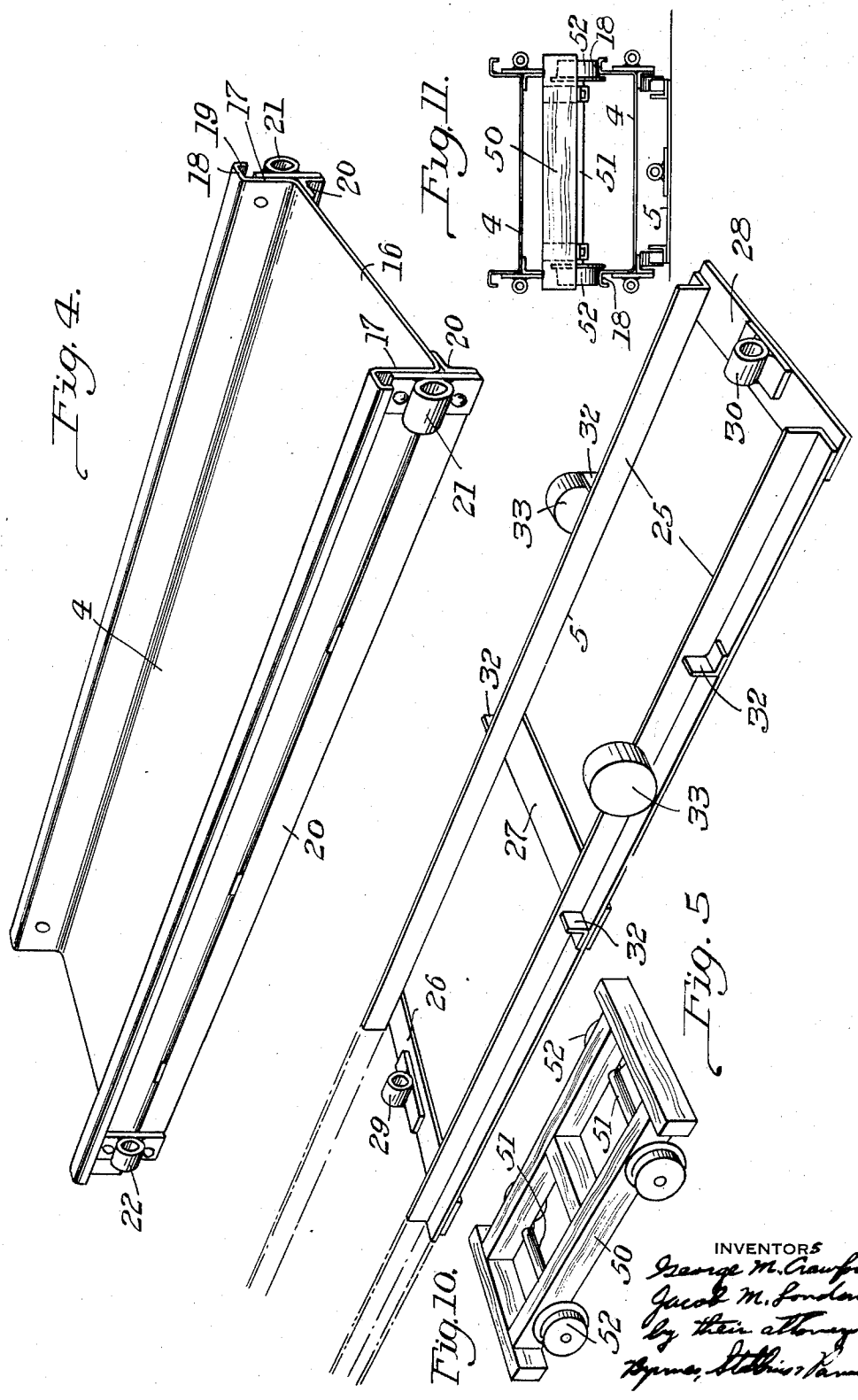
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CONVEYER

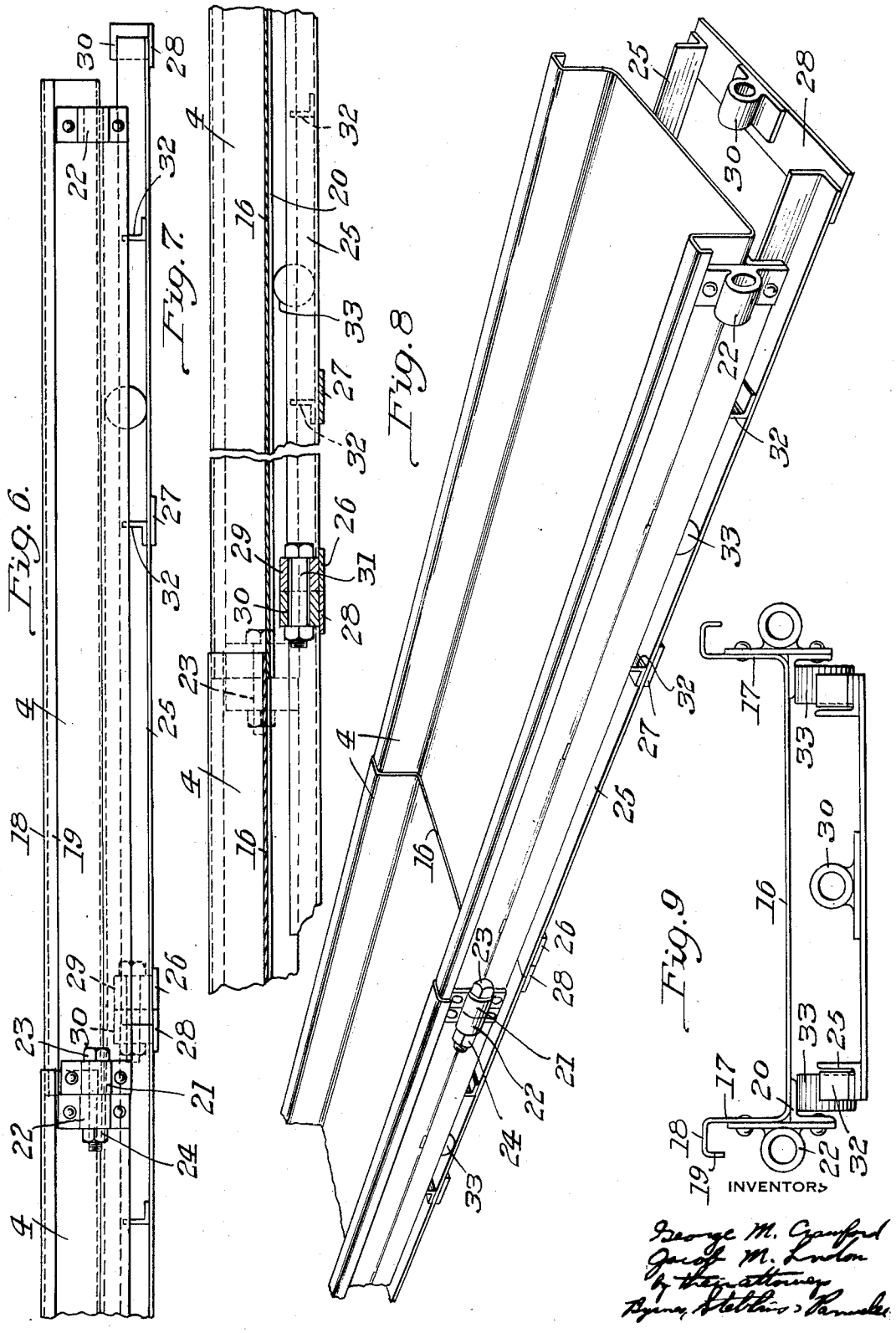
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CONVEYER

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1,922,198

CONVEYER

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Application April 26, 1928. Serial No. 272,905

11 Claims. (Cl. 198—220)

This invention relates to conveyers, and is for a conveyer of the vibratory or shaking type in which the material is moved along the conveyer by means of a reciprocating motion imparted to the conveyer.

Conveyers of this kind are commonly used in mines for the handling of coal and other material, but their use is, of course, not confined to mines. As heretofore generally constructed, the conveyer requires a special mounting at regular intervals, which mounting must be firmly anchored in order to give proper support to the conveyer.

According to the present invention there is provided a conveyer of novel construction which can be cheaply manufactured and which is made up in convenient lengths. Each length is provided with a separate track section which serves as a support therefor. The conveyer sections are so constructed that they can be rigidly connected together, and the track sections may also be rigidly connected. By reason of this arrangement special foundations and anchors for the conveyer are not required.

The present invention furthermore contemplates the provision of a novel arrangement for operating a feeder conveyer by reciprocation of the main conveyer.

The invention may be better understood by reference to the accompanying drawings which illustrate a preferred embodiment of our invention, in which

Figure 1 is a side elevation of a portion of a conveyer constructed in accordance with our invention;

Figure 2 is a plan view of the conveyer shown in Figure 1, and in addition there is shown a transverse feeder for delivering material to the main conveyer;

Figure 3 is a vertical transverse section in the plane of line III—III of Figure 2;

Figure 4 is a perspective view of one of the conveyer sections;

Figure 5 is a similar view of one of the track sections;

Figure 6 is a detail side elevation of the conveyer and track assembly;

Figure 7 is a longitudinal vertical section through the conveyer and track assembly;

Figure 8 is a perspective view of the conveyer and track assembly;

Figure 9 is an end view of the assembly shown in Figure 8;

Figure 10 is a perspective view of a truck or dolly adapted to be used on the conveyer; and

Figure 11 is an end view of the truck mounted on the conveyer and having a trough section set thereon for a body or for transportation.

In the drawings, 2 designates the conveyer generally and 3 is an operating unit therefor. The conveyer is in the form of a trough made up of sections of suitable length and designated 4 operating on track sections 5.

The driving unit may comprise any suitable mechanism for imparting a reciprocable shaking or vibrating movement to the trough, but we prefer to use a unit of the type disclosed in our copending application Serial No. 272,906 filed April 26, 1928 wherein a link 6 having one end attached to the conveyer at 7 and its other end attached to a crank arm 8 at 9 is employed. The crank arm 8 is carried on a shaft 9a mounted in a bearing 10, and carried on the shaft 9a is a second arm 11 having a curved slot 12 therein. At 13 is a power driven crank disc having a crank pin 14 thereon on which is a block 15 adapted to operate in the curved slot 12.

Rotation of the crank disc 13 oscillates the arm 8 to reciprocate the conveyer, and by reason of the curvature of the slot 12 the conveyer is moved forwardly with a constantly accelerated motion and moves rearwardly with a substantially constant decelerated motion. It will be understood, however, that any other suitable driving unit can be substituted for that shown.

Each conveyer section 4 is preferably pressed from a sheet of heavy gauge metal and has a flat bottom portion 16 and vertical sides 17. Each of the vertical sides 17 has an outwardly turned flange 18 thereon with a depending lip 19.

We have found that the material is transferred with greater efficiency along a trough having straight vertical sides than it is in a trough of the usual construction wherein the sides are outwardly sloped. The laterally turned flanges 18 which reinforce the trough form convenient means for handling the conveyer, and in addition avoid any sharp edge which might injure a workman falling against or over the rapidly reciprocating trough.

Each of the conveyer sections 4 is made with a slight taper so that one end is slightly larger than the other end. This permits one section to overlap the next, as clearly shown in Figures 1 and 8. Secured to the bottom of each section along each edge thereof is an angle bar 20 with the horizontal leg thereof set against the bottom of the trough to reinforce it and with the downwardly turned leg thereof substantially flush with the vertical side 17 of the trough. At the wider end of the trough and on each side thereof is se-

cured an eye 21. Near the narrower end of the trough, but not at the extreme end of the section, is a similar eye 22. The eyes 22 are set back from the end a distance equal to the distance which the trough sections overlap in the assembled conveyer.

The conveyer sections are joined together by overlapping the ends as shown and passing bolts 23 through the registering eyes 21 and 22 of the respective sections. Nuts 24 on the bolts are screwed up tight to bring the eyes 21 and 22 into contact, as clearly shown in Figure 8. This coupling in addition to the overlapping of the pans with the interfitting lateral flanges 18 provides a tight rigid joint between the sections.

The track sections 5 are conveniently made substantially the same length as the conveyer sections. The track is co-extensive with the conveyer. The construction of the track sections is best shown in Figure 5. Each section is comprised of parallel rails in the form of angle bars 25 arranged just oppositely to the angle bars 20 on the trough sections. They are preferably formed of structural metal, and are laid in spaced relation by means of cross bars 26, 27 and 28 which are preferably secured thereto by spot welding.

The cross bar 26 is preferably set inwardly from the ends of the rails 25 while the cross bar 28 projects a slight distance beyond the ends of the rails. On the cross bar 26 is an eye 29 and on the cross bar 28 is an eye 30. The track sections fit together, as clearly shown in Figure 8. The rails 25 of one section project over onto the cross bar 28 of the next section by reason of the fact that the cross bar 26 is set a slight distance inwardly from the ends of the rails. A bolt 31 passes through the registering eyes 29 and 30 of the respective sections, holding the sections tightly together in abutting relation.

On the horizontal leg of each of the rails 25 are a pair of spaced apart stop elements 32. Set on each of the rails between the stop elements 32 is a roller 33. There are just two rollers 33 on each track section, one at each side of the conveyer. The rollers 33 are confined against lateral movement by the angle bars 25 and 20, and the horizontal legs of the angle bars provide bearing surfaces for the rollers. With this arrangement one end of each trough section is supported on the rollers and one end is supported on the preceding section.

As the conveyer reciprocates, the rollers 33 provide an anti-friction mounting for the trough. Since the rollers are confined between the vertical legs of the angle bars 20 and 25, they guide the conveyer and prevent the trough from moving laterally relatively to the track. Due to the rigid connection between the respective trough sections and the rigid connection between the respective track sections, the conveyer is rigid throughout its entire length, which may be several hundred feet, and it has been found that the track does not require any special mounting or anchoring to hold it against shifting. Additional sections can be conveniently added merely by removing bolts 23 and 31 and slipping in an additional section.

Where desired, a feeder conveyer may be provided operated from the main conveyer and arranged to deliver material into the main conveyer. In mining operations particularly it is desirable to have such a transverse conveyer extending along the working face in the mine so that coal may be transferred directly from the working face to such feeder, and the feeder advanced as the face of the rim is advanced.

In Figures 2 and 3 we have shown one arrangement for a feeder conveyer.

The feeder conveyer is of the same structure as the main conveyer, having a reciprocating trough 4*a* and a track 5*a*. Passing under the track 5 of the main conveyer is a plate 35 which may be secured in position by any suitable anchoring means such, for instance, as one or more jacks 36. Pivotally mounted on the plate 35 to swing about the pivot 37 is a second plate 38 having channels 39 thereon which support one end of the track section 5*a* of the cross feeder. Mounted on the plate 38 is a sheave 40. Mounted on the plate 35 are two spaced apart sheaves 41 so located that the peripheries thereof bear against the side of the main conveyer 5. Secured to the underside of the trough section 4*a*, one on each side of the center line thereof, are depending ears 42. Secured to the side of the main conveyer at 43 is one end of a chain 44 which passes around the sheaves 41 and the sheave 40 and has its other end secured to the main conveyer at 45. A bolt 46 clamps the chain 44 to one of the depending ears 42.

With this arrangement it will be seen that as the main conveyer moves back and forth, the chain 44 will move back and forth. By reason of the connection between the chain and the ear 42 the cross conveyer will be reciprocated with the main conveyer and to the same extent as the main conveyer. Since the ears 42 are positioned adjacent the center line of the feeder conveyer, it will be seen that the pull exerted by the chain on the cross conveyer will have little tendency to swing the cross conveyer about its pivot 37. However, the cross conveyer may be adjusted to different angular positions with respect to the main conveyer by moving the outer end of the conveyer, the entire conveyer with its supporting plate 38 swinging about the pivot 37. The sheaves 41 bearing against the side of the main conveyer take up the lateral thrust or pull of the chain 44, and provide a rolling bearing therefor.

The cross conveyer has its inner end at sufficient elevation that it can reciprocate back and forth over the edge of the main conveyer and discharge material into the main conveyer.

The feeder conveyer can be located at any point along the main conveyer, or several feeders may be provided with a single main conveyer. Also the feeder conveyers may operate from either side of the main conveyer.

In operating the conveyer it is preferable that the forward end of one section, considered in the direction of travel of material along the conveyer, is set into the rear end of the section ahead of it, as in this way the overlapping of the sections will not present any obstruction which will resist the forward movement of the coal or other material being handled by the conveyer.

The conveyer embodying the present invention can be conveniently made in relatively short sections, and the sections may be of such light construction that they can be conveniently handled by one or two workmen. This is also true of the track sections, which are extremely light and can be very conveniently handled.

Where the conveyer is used in a mine, and possibly in other uses, it is sometimes desirable to move additional trough sections, props, construction materials, etc., from the discharge end of the conveyer to the receiving end. For this purpose, a truck or dolly (see Figures 10 and 11) is

provided which has a frame 50, axles 51 and flanged wheels 52. The width between the wheels is substantially equal to the distance between the sides of the conveyer so that the truck can be set right on the conveyer with the flanges 18 providing a track along which the truck may be rolled. The flanged wheels of the truck engage the side faces of the trough to guide the truck. The truck can be set on the trough when the conveyer is stationary and rolled along it to transfer construction material and additional trough sections from the unloading end of the conveyer to the working or receiving end. It can be rolled along the trough, even when the trough be full of coal, so that it is not necessary to empty the conveyer before using the truck.

In Figure 11 we have shown a trough section 4 set onto the truck to either form a body therefor or to be moved on the truck to the forward end of the conveyer.

While we have specifically illustrated and described a particular embodiment of our invention, it will be understood that the invention is not limited to the particular construction shown, but may be otherwise embodied within the scope of the following claims.

We claim:

1. In a reciprocating conveyer, a conveyer section comprising a trough member and a track member, said trough member comprising a trough having a pair of spaced apart angle bars attached thereto extending therealong, said track member comprising spaced apart angle bars extending longitudinally thereof, and rollers operatively disposed between the angle bars of the trough member and the angle bars of the track member.

2. In a reciprocating conveyer, a conveyer section comprising a trough member and a track member, said trough member comprising a trough having a pair of spaced apart angle bars attached thereto extending therealong, said track member comprising spaced apart angle bars extending longitudinally thereof, rollers operatively disposed between the angle bars of the trough member and the angle bars of the track member, means on the trough member for rigidly connecting it to the ends of similar trough members, and means on the track member for rigidly connecting it with similar track members.

3. In a reciprocating conveyer, a conveyer trough comprised of a plurality of sections rigidly secured together, a sectional track substantially co-extensive with the trough and comprising rigidly connected sections, and rollers operatively disposed between one end of each trough section and the track, the other end of each trough section being supported on a preceding section.

4. A conveyer of the reciprocating trough type comprised of a plurality of rigidly connected trough sections and a plurality of connected track sections, each trough section comprising a trough member having a pair of spaced apart angle bars extending therealong, each track section comprising a pair of angle bars extending therealong, the angle bars on the trough having the horizontal leg thereof turned inwardly and the vertical leg turned downwardly, the angle bars of the track section being oppositely disposed, and a roller on each angle bar of the track section cooperating with the angle bars on the trough member.

5. A conveyer of the reciprocating trough type comprised of a plurality of rigidly connected trough sections and a plurality of connected track sections, each trough section comprising a trough member having a pair of spaced apart angle bars extending therealong, each track section comprising a pair of angle bars extending therealong, the angle bars on the trough having the horizontal leg thereof turned inwardly and the vertical leg turned downwardly, the angle bars of the track section being oppositely disposed, and a roller on each angle bar of the track section cooperating with the angle bars on the trough member, the trough member of one section overlapping the end of the next succeeding trough member.

6. A conveyer of the reciprocating trough type comprised of a plurality of rigidly connected trough sections and a plurality of connected track sections, each trough section comprising a trough member having a pair of spaced apart angle bars extending therealong, each track section comprising a pair of angle bars extending therealong, the angle bars on the trough having the horizontal leg thereof turned inwardly and the vertical leg turned downwardly, the angle bars of the track section being oppositely disposed, and a roller on each angle bar of the track section cooperating with the angle bars on the trough member, the trough member of one section overlapping the end of the next succeeding trough member, the track sections also overlapping one another.

7. In a reciprocating conveyer, a main conveyer, means for reciprocating the same, said main conveyer comprising a reciprocating trough and a track substantially co-extensive therewith, and a conveyer comprising a reciprocating trough and a track therefor, an anchor plate for the feeder conveyer passing under the track of the main conveyer, sheaves on the anchor plate bearing against the main conveyer, another sheave mounted on the anchor plate, a chain passing around said sheaves and having its opposite ends secured to the main conveyer, and a connection between said chain and the trough of the feeder conveyer.

8. The combination with a main conveyer having a reciprocating trough and a track therefor, of a feeder conveyer adapted to deliver material thereto comprising an anchor plate fixed with relation to the track of the main conveyer, an adjustable plate mounted for movement in a horizontal plane on the anchor plate, a feeder conveyer comprising a track and a reciprocating trough supported on the adjustable plate, the trough of the feeder being above the trough of the main conveyer, and means for reciprocating the trough of the feeder upon reciprocation of the trough of the main conveyer.

9. The combination with a main conveyer having a reciprocating trough and a track therefor, of a feeder conveyer adapted to deliver material thereto comprising an anchor plate fixed with relation to the track of the main conveyer, an adjustable plate mounted for movement in a horizontal plane on the anchor plate, a feeder conveyer comprising a track and a reciprocating trough supported on the adjustable plate, the trough of the feeder being above the trough of the main conveyer, a pair of sheaves on the anchor plate, a sheave on the adjustable plate, the sheaves on the anchor plate bearing against the side of the main conveyer trough, and a chain having its opposite ends secured to the main conveyer trough passing around said three sheaves, and a connection between said chain and the said feeder trough whereby the feeder trough is reciprocated upon reciprocation of the main conveyer.

10. The combination with a shaking conveyer comprising a trough formed of a continuous series of connected trough sections, each of which has substantially vertical sides with outwardly turned flanges along the edges thereof, and a car removably set on the trough having flanged wheels thereon, the said stiffening flanges of the trough sections providing a track surface for the wheels.

11. The combination with a conveyer trough having flanged side walls, of a car adapted to traverse said conveyer, having flanged wheels for riding on said walls.

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