May 19, 1964 C. J. DAVIS ETAL 3,133,365

TRENCHER CHAIN DIGGER BUCKET ASSEMBLY

Filed Oct. 22, 1962

Fig. 1

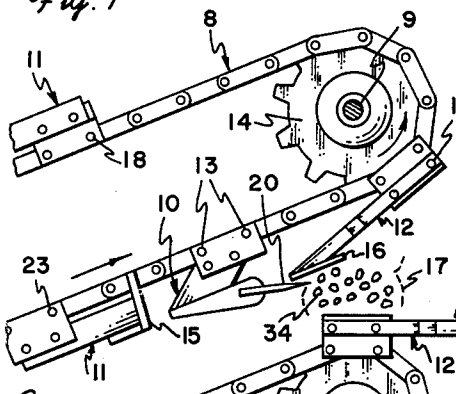


Fig. 2

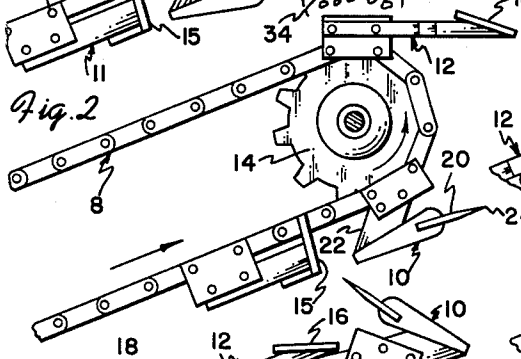


Fig. 3

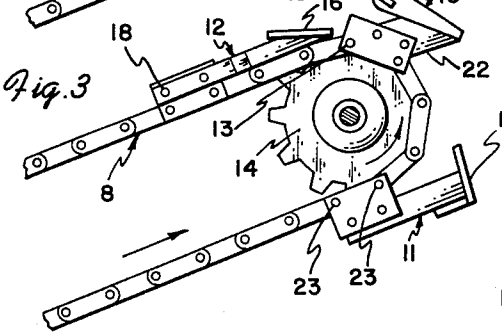


Fig. 4

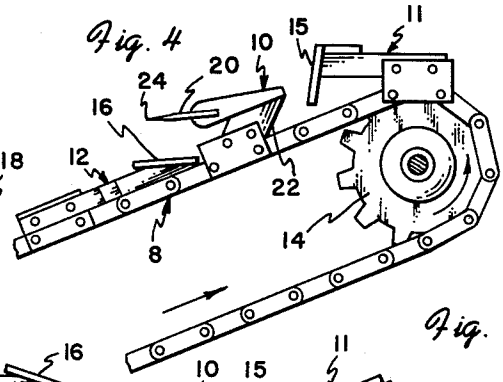


Fig. 5

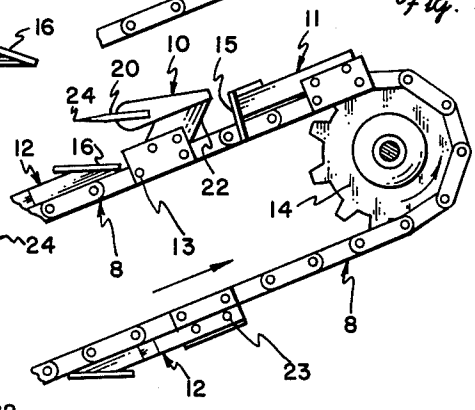


Fig. 6

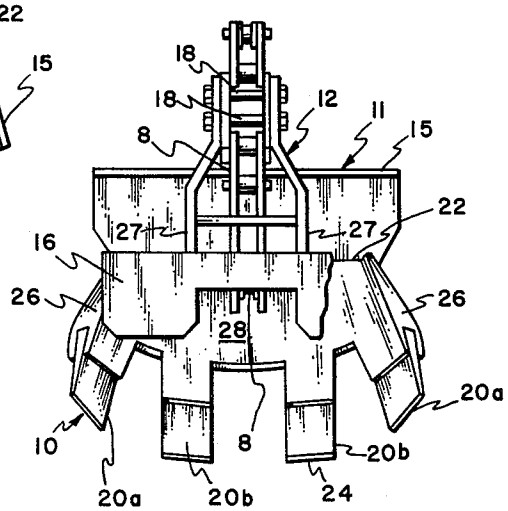
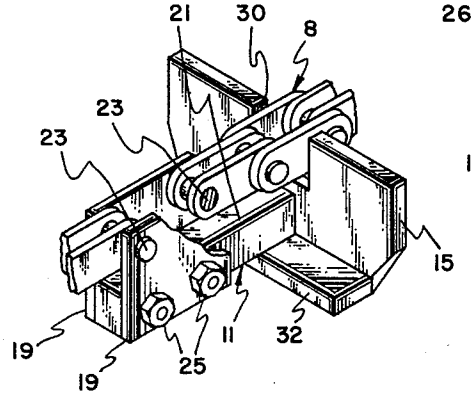


Fig. 7



INVENTORS

JOSEPH J. LESHER

CHARLES J. DAVIS

BY Hubert J. Miller

ATTORNEY

United States Patent Office 3,133,365 Patented May 19, 1964

3,133,365

TRENCHER CHAIN DIGGER BUCKET ASSEMBLY

Charles J. Davis, 1500 S. McLean Blvd., Wichita, Kans., and Joseph J. Lesher, Wichita, Kans.; said Lesher assignor to said Davis

Filed Oct. 22, 1962, Ser. No. 231,914
2 Claims. (Cl. 37—86)

This invention relates to chain-type trench digging machines in which the trench digging unit comprises a driven endless chain trained over upper and lower sprockets, with spaced links of the chain carrying earth-digging scoops or buckets.

More particularly, my invention relates to a digger bucket assembly which includes a scoop or bucket open at both its forward and rear ends and carried by one link of the chain, a separate rear-end plate for the bucket carried by a following link of the chain, and a bucket clean-out member carried by a preceding link of the chain.

A primary object of the invention is to provide a chain-carried bucket assembly which is so constructed and so mounted on the digging chain as to assure emptying of the bucket during each circuit of its travel.

The invention will be more clearly understood when the following description is read in connection with the accompanying drawings in which:

FIGURES 1–5 illustrate a bucket assembly embodying separate clean-out member, bucket, and rear-end plate elements mounted on the upper portion of a trencher chain, which chain is shown trained around the upper sprocket of a trench-digging machine;

FIGURE 6 is a perspective view of the bucket assembly constituting the instant invention, and is taken ahead of the assembly as it travels upward along the lower run of the chain on which the assembly is mounted; and

FIGURE 7 is an isometric view from the rear, showing the attachment of the bucket rear-end plate to the chain.

More particularly in the drawing, the trenching chain 8 of a trench-digging machine consists of an endless chain having upper and lower flights, and being trained over upper and lower sprockets of the machine, of which the upper sprocket is indicated at 14. The sprocket 14 is driven by a power shaft 9 carried by the machine, whereas the lower sprocket, and any intervening sprockets, not shown, serve as idler sprockets.

The chain 8 carries one or more bucket assemblies, each including a scoop or bucket 10 linked by the two pins 13 to the links of the chain, a separate rear-end plate structure 11 for the bucket and carried by a following link of the chain 8, and a bucket clean-out structure generally indicated at 12 and carried by a preceding link of the chain. The bucket 10 constitutes the central element of each assembly, whereas the other elements automatically cooperate with the bucket during the major turns in the chain path to assure emptying of the bucket at the proper point in each circuit of its travel.

As shown in FIGURES 1–6 inclusive, the bucket 10 is open at both its forward and rear ends, and has a forwardly extending, toothed digging edge 24 at the forward end. A set 20 of spaced-apart bucket teeth carried by the digging edge includes two outside teeth 20*a* and several intervening teeth 20*b*; there is usually a total of four or more teeth per bucket. Each bucket 10 has spaced-apart side walls 26 which are integrally joined by a bottom wall 28.

In FIGURES 1–5 and particularly FIGURE 7, the end plate structure 11 includes spaced-apart mounting plates 19 which intervene between the links of the chain 8 and which are pivotally secured thereto by chain link

pins 23. A forwardly extending spacer arm 21, which is normally disposed parallel to the flight of the chain 8, is secured by bolts 25 between the plates 19 and carries a rear-end plate 15 in a transversely disposed position closing the rear end of the bucket 10. The plate 15 is formed with a slot 30 to fit against the chain without interference, and carries an outside plate 32 which is secured to the arm 21 to reinforce the plate 15.

The bucket clean-out structure 12 includes a generally transversely disposed, C-shaped, flat clean-out plate 16 and a pair of rearwardly extending, longitudinally disposed, and laterally separated clean-out plate supporting arms 27 (FIGURE 6) secured to the chain 8. The arms 27 are secured at their forward ends to a chain link by means of bolts 18 at a point forwardly of the bucket, and in such position that the clean-out plate 16 normally lies adjacent the chain and extends partially into the forward end of the bucket 10.

Rotation of the sprocket 14 is indicated by an arrow in FIGURE 1 and in other figures, and in the resulting operation each bucket assembly discharges material 34 into a crosswise disposed, disposal conveyor 17.

More particularly when, according to FIGURES 1 and 2, the chain link which carries the clean-out structure 12 reaches and starts around the sprocket 14, it turns and moves the clean-out plate supporting arms 27 and the clean-out plate 16 rapidly outwardly from the chain 8. The clean-out plate 16 thus scrapes across the open forward end of the bucket 10 and forcibly removes material therefrom in the desired manner.

When, in accordance with FIGURES 2 and 3, the bucket-carrying link reaches and starts around the sprocket 14, the link turns and the rear or aft end of the bucket as generally indicated at 22 is moved rapidly outwardly from the following rear-end plate 15. The remaining material in the bucket 10 is caused to be thrown or gravitates from the open rear end thereof.

After the bucket of each assembly is thus emptied, the assembly is realigned in the upper flight of the chain for an idle pass to and around the lower sprocket, not shown, whereupon it circulates upwardly for another trenching and emptying pass.

When in accordance with FIGURES 3 and 4, the bucket 10 moves around the sprocket 14 and into the upper flight of chain, it realigns itself with the clean-out structure 12 and the clean-out plate 16 lies adjacent the chain so as to resume its position extending partially into the forward end of the bucket.

When, in accordance with FIGURES 4 and 5, the rear-end plate structure 11 moves around the sprocket 14 and into the upper flight of the chain 8, the rear-end plate 15 is realigned in transversely disposed, confronting relation to the open rear or aft end 22 of the bucket so as to reclose it.

Because the bucket 10 and its clean-out and end plate elements composing each assembly are located separately at spaced intervals on the chain, the unloading is accomplished in two controlled stages which are separate, spaced in time, and which provide a more positive and reliable action than heretofore. In other words, unloading is handled individually from each of the opposite ends of the bucket and occurs automatically as it moves around a major turn in the chain path.

Variations within the spirit and scope of the invention described are equally comprehended by the foregoing description.

What is claimed is:

1. In combination with a driven trenching machine, an endless sprocket supported and power driven trench digging chain including a plurality of articulate links, a generally U-shaped bucket carried by a link of the chain,

said bucket being open at its forward and aft ends, the forward end of said bucket being adapted to cut into and excavate dirt as the lower flight of the chain moves upwardly, a transversely disposed rear end plate carried by a separate link of the chain rearwardly of the bucket carrying link, a transversely disposed bucket clean-out plate which is relatively movable with respect to the bucket, rearwardly extending, longitudinally disposed and laterally spaced clean-out plate supporting arms, said supporting arms having their forward ends secured to a separate link of the chain forwardly of the bucket carrying link, the transversely disposed bucket clean-out plate being secured to the rear ends of said supporting arms and normally lying in a position adjacent the chain and extending partially into the forward end of the bucket whereby when the link of the chain which carries the supporting arms reaches and starts around a sprocket the arms move the clean-out plate rapidly outwardly away from the chain and through the open forward end of the bucket to forcibly remove a portion of the dirt from said open forward end of the bucket and to disturb and loosen the remaining portion of the dirt therein so that when the bucket carrying link reaches and starts around the sprocket and the open aft end of the bucket swings rapidly outwardly away from the rear end plate the remaining portion of the dirt in the bucket will be thrown or will gravitate from the open aft end of said bucket, said rear end plate and open aft end of said bucket having moved away from each other.

2. In combination with a driven trenching machine, an endless sprocket supported and power driven trench digging chain, a generally U-shaped bucket carried by a link of the chain, said bucket being open at its forward and aft ends, spaced digging teeth formed on the forward end of said bucket and adapted to cut into and

excavate dirt as the lower flight of the chain moves upwardly, a transversely disposed rear end plate carried by a separate link of the chain rearwardly of the bucket carrying link, said transversely disposed rear end plate being provided with a cut-out portion intermediate its ends for normally accommodating a link of the chain intermediate said bucket carrying link and the rear end plate carrying link, said rear end plate normally straddling the chain and being spaced from the open aft end of the bucket, a transversely disposed clean-out plate carried by a separate link of the chain forwardly of the bucket carrying link, said transversely disposed clean-out plate normally lying adjacent the chain and extending partially into the forward end of the bucket whereby when the clean-out plate carrying link reaches and starts around a sprocket said clean-out plate will swing rapidly outwardly through and away from the forward end of the bucket to remove a portion of the dirt from said open forward end of the bucket and to disturb and loosen the remaining portion of the dirt therein so that when the bucket carrying link reaches and starts around the sprocket and the open aft end of the bucket swings rapidly outwardly away from the rear end plate the remaining portion of the dirt in the bucket will be thrown or will gravitate from the open aft end of said bucket, said rear end plate and said open aft end of said bucket having moved away from each other.

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