May 1, 1934. H. E. SWANSON 1,956,734

BUCKET CLEANER

Original Filed Sept. 3, 1929 2 Sheets-Sheet 1

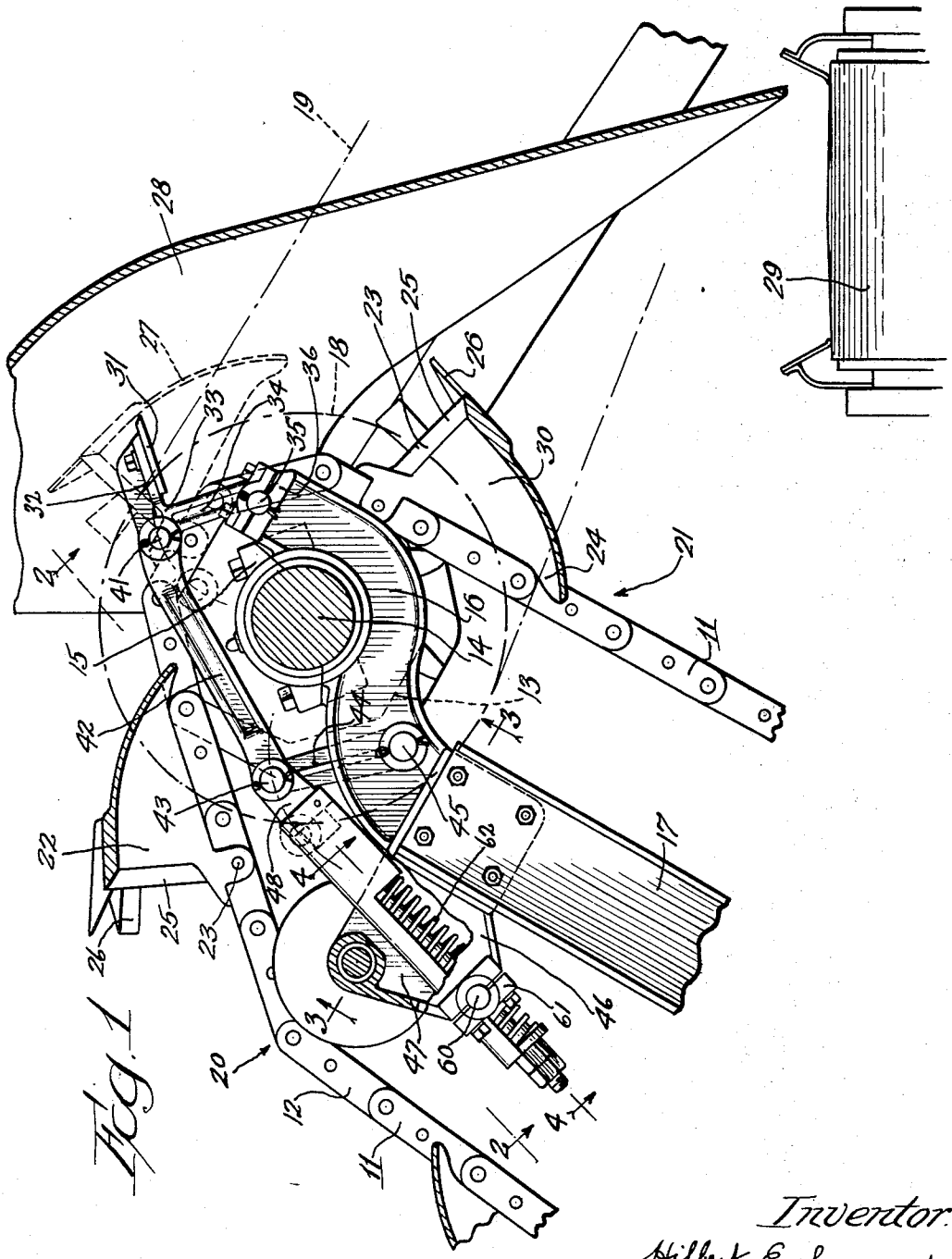


Fig. 1

Inventor:
Hilbert E. Swanson
John C. Carpenter
Atty.

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Original Filed Sept. 3, 1929 2 Sheets-Sheet 2

Fig. 2

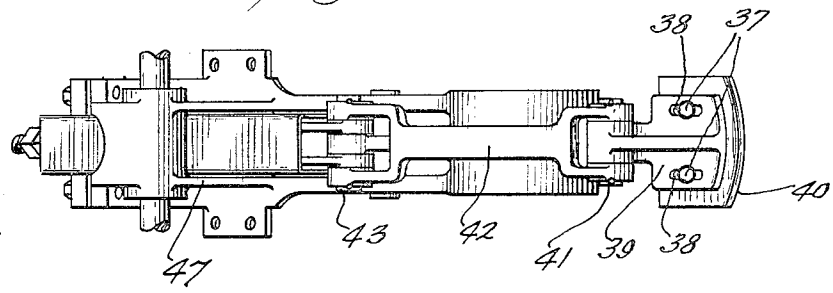


Fig. 3

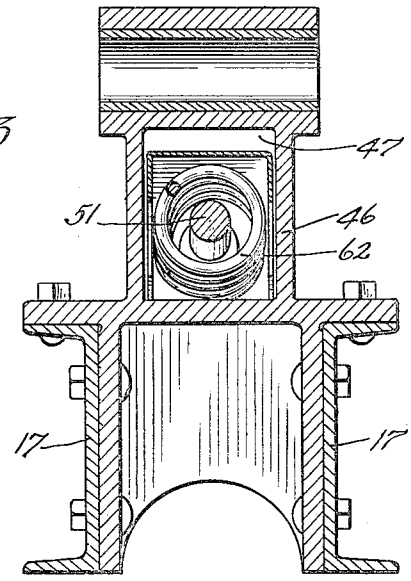
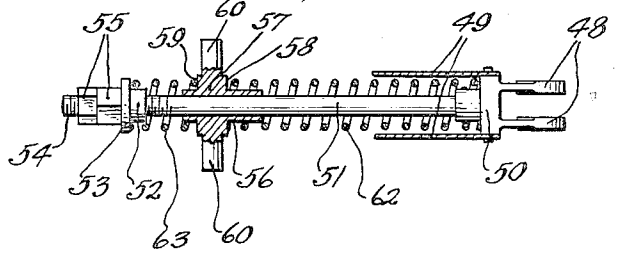


Fig. 4



Inventor:
Hilbert E. Swanson
John C. Carpenter
Atty.

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UNITED STATES PATENT OFFICE

1,956,734

BUCKET CLEANER

Hilbert E. Swanson, Muskegon, Mich., assignor to Austin Machinery Corporation, Muskegon, Mich., a corporation of Michigan

Application September 3, 1929, Serial No. 389,911
Renewed September 28, 1933

1 Claim. (Cl. 198—144)

This invention relates to trenching machinery and has for an object to provide an improved mechanism for cleaning out and ejecting at the point of discharge the loads from the buckets mounted on the endless chains or conveyors, as said buckets successively arrive in the load-discharging position.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

In the drawings:

Figure 1 is a detailed fragmentary sectional view of the upper portion of a trenching machine, showing part of the endless series of buckets, the sprocket chains upon which the buckets are mounted, and the improved bucket ejector or cleaner mechanism in position for operating upon the material contained within the buckets as the latter successively arrive in position for discharging their contents;

Fig. 2 is an end view of the bucket ejector taken substantially on the line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1, and

Fig. 4 is a detailed, longitudinal sectional elevation of the spring elements of the bucket ejector mechanism, as indicated by the line 4—4 of Fig. 1.

In the embodiment illustrated in the drawings, the improved bucket ejector mechanism is applied to a trenching machine, and such parts of the trenching machine are shown as are necessary to an understanding of the invention. Although the invention is of great utility in the illustrative application, it is not limited exclusively to such use and the improved bucket ejector mechanism may be employed in analogous machinery wherein it is necessary or desirable to insure the discharge of material from buckets or like devices as they present themselves in the discharging position.

The endless chain 11 of the illustrative trenching machine is located usually at the rear end thereof and extends downwardly from the upper part of the machine into the trench. This chain 11 consists ordinarily of a pair of like chain members, each composed of articulated links 12 and respectively extending over and supported by the drive sprocket indicated by dotted lines at 13 in Fig. 1. The sprocket 13 is mounted on a drive shaft 14 supported in a bearing 15 carried by the upwardly curved, inwardly projecting end 16 of the chain supporting beam 17. This beam 17 is preferably mounted, in machines of the type illustrated, to swing about the shaft 14 and is provided at its lower end with an idler sprocket or sprockets, which are engaged by the bottom of the endless chains 11. The drive sprocket 13 is rotated by a suitable sprocket, shown in dotted lines at 18, mounted in driving relation with respect to said sprocket 13 and itself driven by the chain, indicated by dotted lines at 19, which extends forwardly of the trenching machine and receives motion from any suitable source of power.

In the operation of the trenching machine, the sprocket 13 is driven in a counter-clockwise direction, as viewed in Fig. 1, so that the outer flight 20 of the conveyor 11 moves downwardly into the trench and the inner flight 21 moves upwardly out of the trench to the sprocket 13.

The buckets 22 are secured at intervals, as shown at 23, to the links of the chains 11 and each bucket is mounted preferably rigidly on the two parallel links of the chain to which it is secured. The buckets are open at their forward or cutting ends 23 and also at their rear ends 24 and taper from their forward ends toward their rear ends, as shown in Fig. 1. Each bucket is provided with a front cutting edge 25, the cutting action of which is augmented by teeth 26 disposed on and projecting forwardly from the sides of the buckets. This construction permits the cutting of a trench wider than the distance between the sprocket chains 11.

In the excavating operation, the buckets cut out dirt and other material while moving upwardly along the inner flight 21 against the side wall of the trench and carry the cut material upwardly along said inner flight until the buckets arrive successively at the sprocket 13. Whenever a bucket passes over the sprocket 13, the links 12 of the sprocket chains, adjacent to and just below the link to which the bucket is connected, recede from the wall 27 of the bucket and thus the latter is positioned at a sharp angle approaching the vertical with the rear end 24 of the bucket spaced from the sprocket chain links, so as to permit discharge of the material from the bucket without interference. In arriving at the discharging position, the buckets travel beneath a shield 28, secured in any suitable manner to the supporting framework, and discharge their loads onto an endless belt conveyor 29, which carries material to any suitable point for the proper disposal of the same.

The improved clean-out or ejection mechanism

includes a plate 31 secured to and projecting from the end of the arm 32 of a bell crank lever 33. The depending arm 34 of said lever is pivotally mounted at 35 in a bearing 36 positioned on and supported by the upper end of the curved portion 16 of the supporting beam 17. As shown in Fig. 2, the clean-out plate 31 is secured by bolts 37 which project through slots 38 in the relatively wide plate-supporting portion 39 located at the forward end of the arm 32 and thus is adjustable relative to its mounting on the supporting arm. The engaging edge 40 of the plate 31 is shaped to fit the interior of the buckets 22 as the latter pass the plate, and said edge 40 preferably is beveled off, as shown, to provide a substantially sharp scraping edge for thoroughly removing the dirt or other material clinging to the inner surface of the buckets.

The bell crank lever 33 is pivoted substantially at the juncture of its projecting and depending arms 32 and 34, as shown at 41, to a link 42. The other end of this link 42 is pivoted, as shown at 43, to the top end of a rocker arm 44, which, in turn, is pivoted at 45 to the lower end of the curved portion 16 of the beam.

Secured to the top of the beam 17 and just below the bottom of the curved portion 16 is a housing 46 provided with a chamber or passage 47 open at its top and bottom ends, as shown in Fig. 1. The spring parts or members for controlling the operation of the scraper or cleaner mechanism are controlled from a bearing 61 at the rear of the housing 46. These spring parts are constructed in the following manner: Pivoted on the axis 43, at the lower end of the link 42, are spaced, upwardly projecting bearing lugs 48, which are secured at their lower ends to the top of a spring casing 49 by means of a head or cap 50 which closes the top of said spring casing. Extending longitudinally within the spring casing is a rod 51, the upper end of which is fastened in the head 50. The lower end of the rod is provided with a collar 52 having a flanged seat 53. This collar 52 is threaded on the lower threaded portion 54 of the rod and adjustably mounted longitudinally thereof by means of the adjusting nuts 55 which retain the collar 52 and its seat 53 in adjusted position.

Between the head 50 and the seat 53, the rod 51 passes through a sleeve 56 which is located nearer the bottom than the top of the rod. This sleeve 56 is provided with a central body portion 57 forming top and bottom seats 58 and 59 and also with pivot pins 60 projecting transversely from the opposite sides of the rod 51. The pivot pins 60 are respectively mounted in the bearings 61 of the housing 46. An upper coil spring 62 surrounds the rod 51 between the head 50 and the seat 58 and a lower coil spring 63, relatively shorter than said upper coil spring 62, surrounds the bottom portion of the rod between the seat 59 and the seat 53 provided by the collar 52. The pivotal mounting of the rod carrying the springs and the supporting parts thereof, provided by the pins 60 in the housing bearings 61, permits the springs and their supporting parts to rock in response to rocking movement of the rock arm 44 and reciprocation of the link 42, transmitted through the pivotal connection 43 to the bearing lugs 48 at the top of the spring casing.

The spring 62 acts upwardly on the head 50 and exerts its power, in expanding, to force the link 42 forwardly on its rock arm supports 34 and 44, and the arm 32 in like direction to maintain the scraper blade 31 yieldingly in position to clean the buckets 22 as the latter are presented for discharging their contents. This action of the top spring 62 is opposed, of course, to a certain extent by the bottom spring 63, the force of which is in a direction to pull the bar 51 and the connecting link and blade supporting parts downwardly away from contact with the bucket surfaces. However, because of the adjustment of the parts, the bottom spring 63 does not offer any substantial resistance to the normal operation of the top spring in maintaining the cleaning position.

Whenever the blade 31, in performing the clean-out operation, engages a resistance occasioned by material sticking in the bucket, the blade 31 is forced back. This backward motion of the blade is transmitted to the link 42 and in turn to the spring casing 49, causing the casing to rock about the pivot pins 60 and at the same time to compress the spring 62. The movement effecting such spring compression produces a longitudinal sliding movement of the rod 51 in the surrounding sleeve 56 and this action continues until the spring 62 has stored sufficient power to enable it to strip the material from the bucket.

The stripping of the material from the bucket results in a sudden sharp return movement of the cleaner as the spring 62 expands. This continues until the movement is brought suddenly to an end at or just beyond the normal cleaner position. Here the return movement is suddenly halted and the sudden halt causes the charge removed by the cleaner from the bucket to be stripped from the cleaner and thrown onto the conveyor discharge belt 29. The spring 63 takes the shock off this sudden stoppage of the return movement and cushions the action. It will be noted that the parts of the cleaner control are all mounted above the portion of the bucket travel throughout which dirt is conveyed and are located well back of the movement of the cleaner in its forcible discharge. Thus arranged, the bucket charge cannot foul them. The shield 49 protects them from particles carried beyond the discharge station by the chain members or the buckets. This shield preferably extends down through the housing 47 above the bearing 61 to the collar 52.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof. Moreover, it is not indispensable that all features of the invention be used conjointly, as they may be advantageously employed in various sub-combinations and other combinations.

I claim:

An excavator, comprising a boom having an inclined digging position, digging and conveying buckets carried by the boom and discharging at its upper end, a cleaner arranged at the upper end of the boom and adapted to pass through the buckets as the buckets are discharging, spring means for holding said cleaner to its work and arranged above said boom and below its upper end, and a link arranged over the upper end and connecting said spring of the boom means to said cleaner.

HILBERT E. SWANSON.