Jan. 17, 1956 F. J. FETZNER 2,730,821

BUCKET CLEANER FOR EXCAVATING MACHINE

Filed Dec. 1, 1951 4 Sheets-Sheet 1

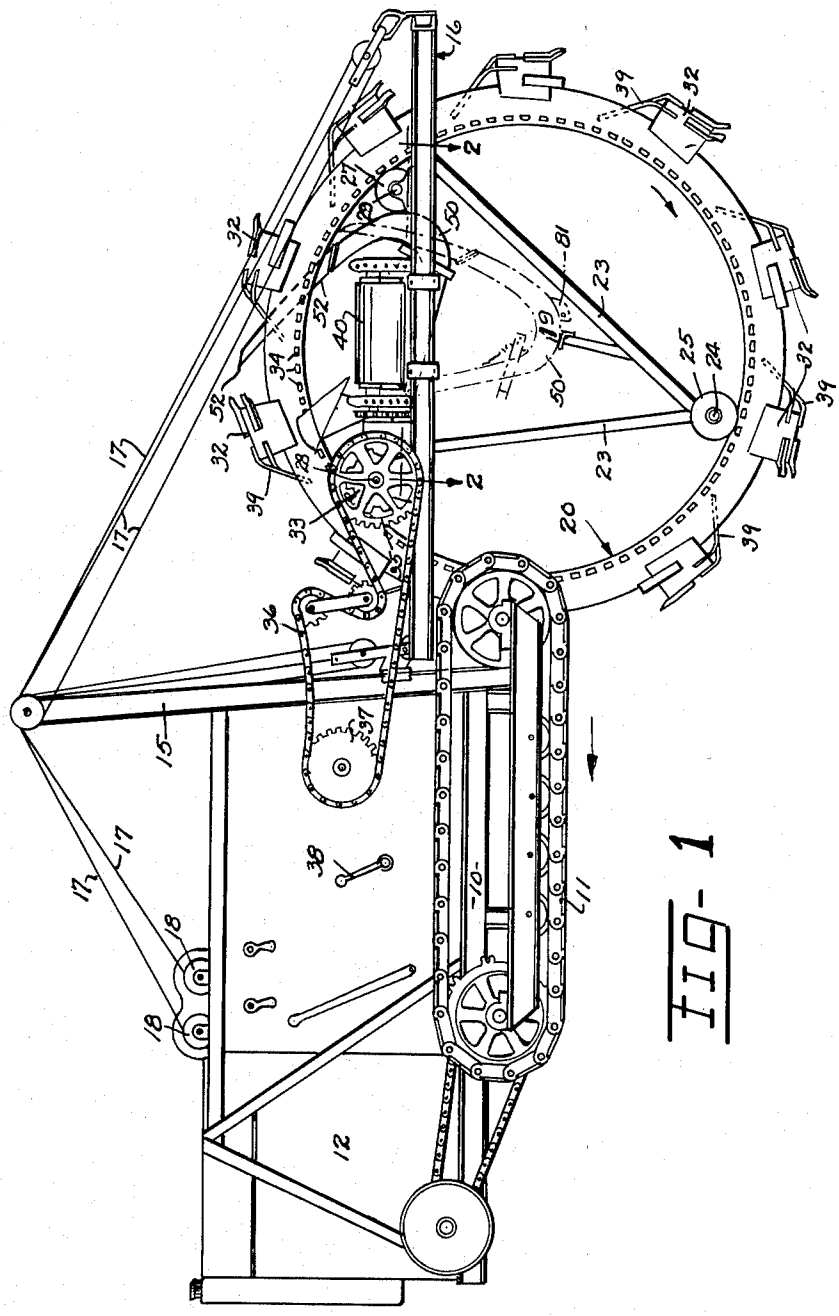


FIG. 1

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Filed Dec. 1, 1951 4 Sheets-Sheet 2

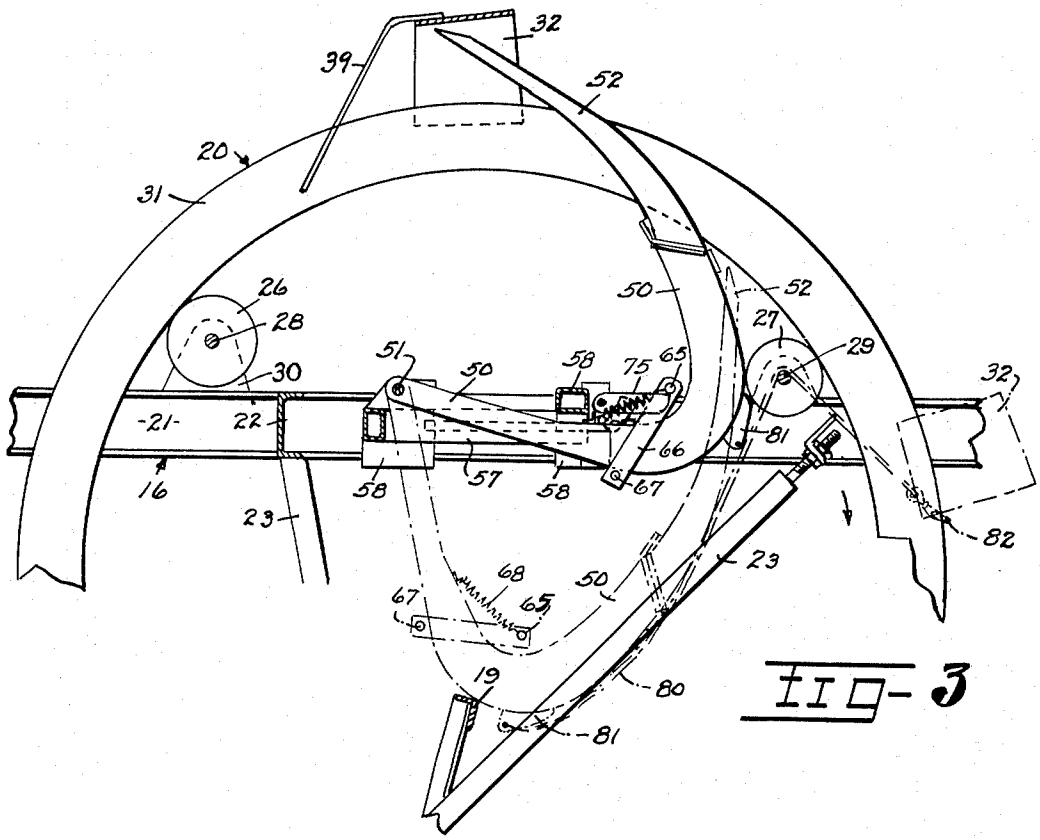


FIG. 3

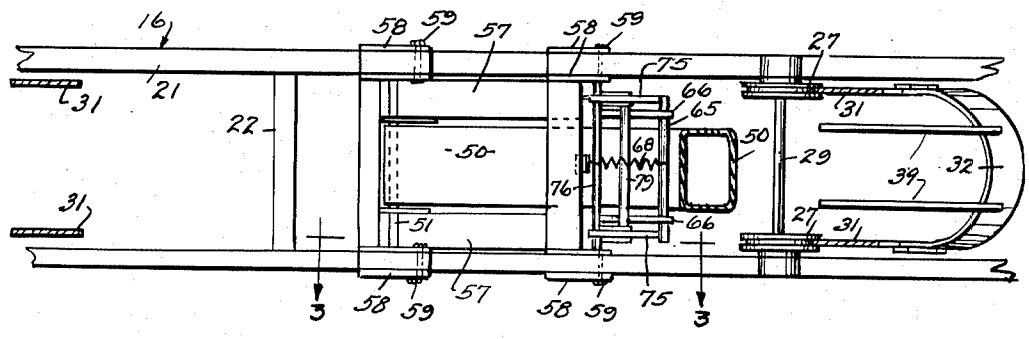


FIG. 2

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BUCKET CLEANER FOR EXCAVATING MACHINE

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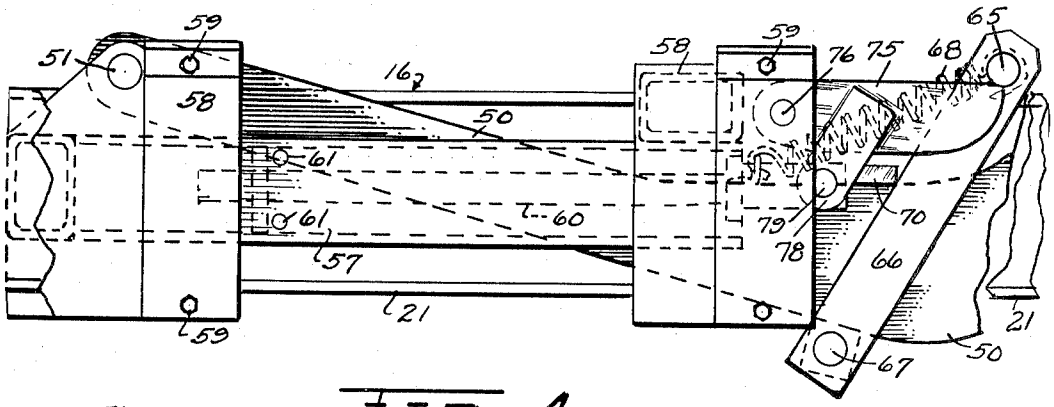


FIG-4

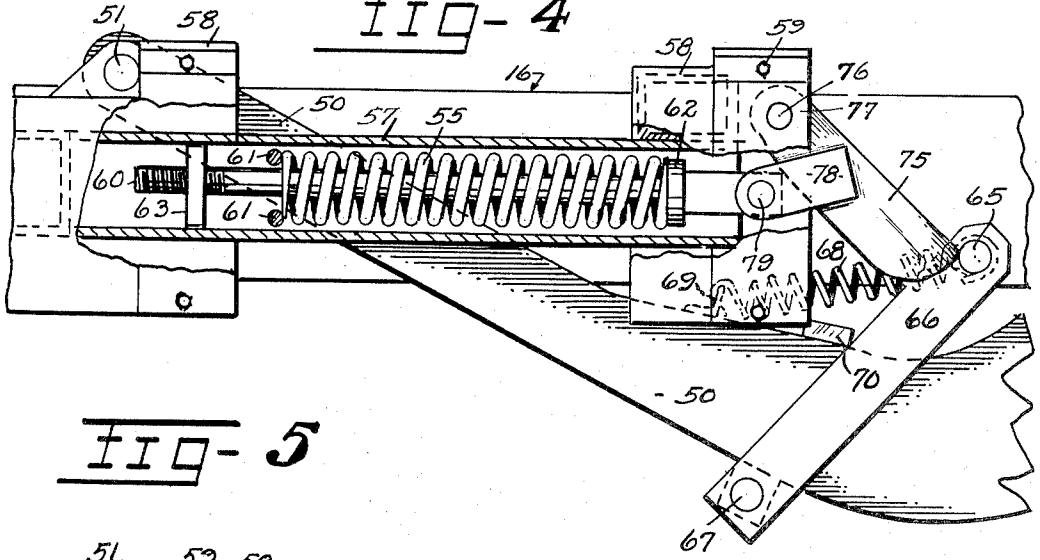


FIG-5

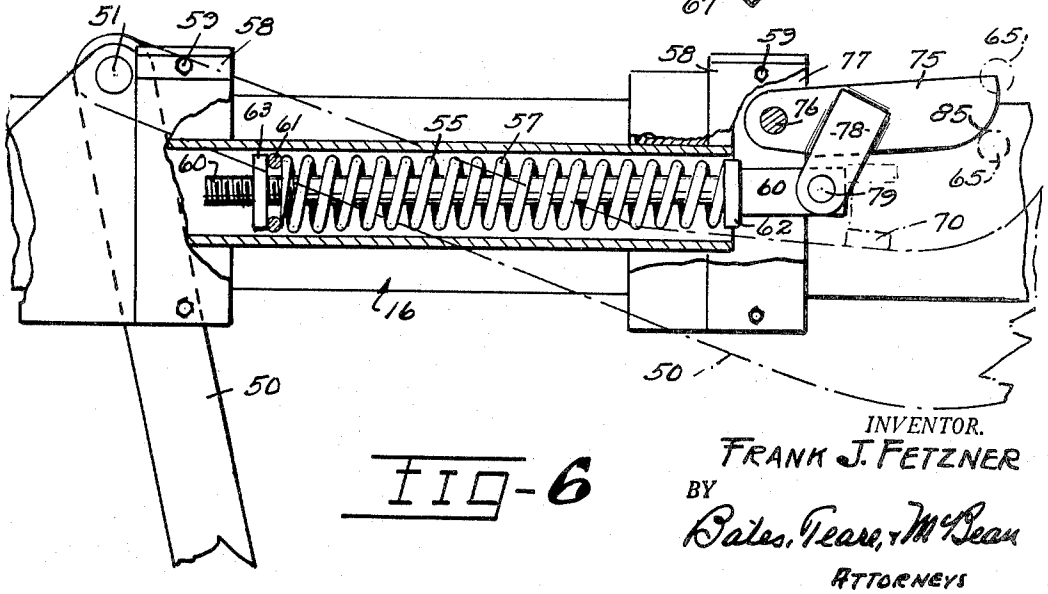


FIG-6

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BUCKET CLEANER FOR EXCAVATING MACHINE

Filed Dec. 1, 1951 4 Sheets-Sheet 4

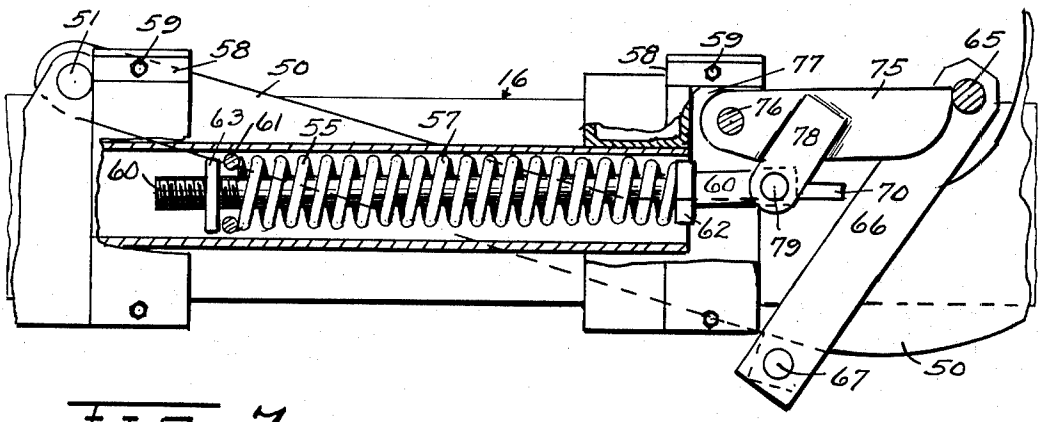


Fig. 7

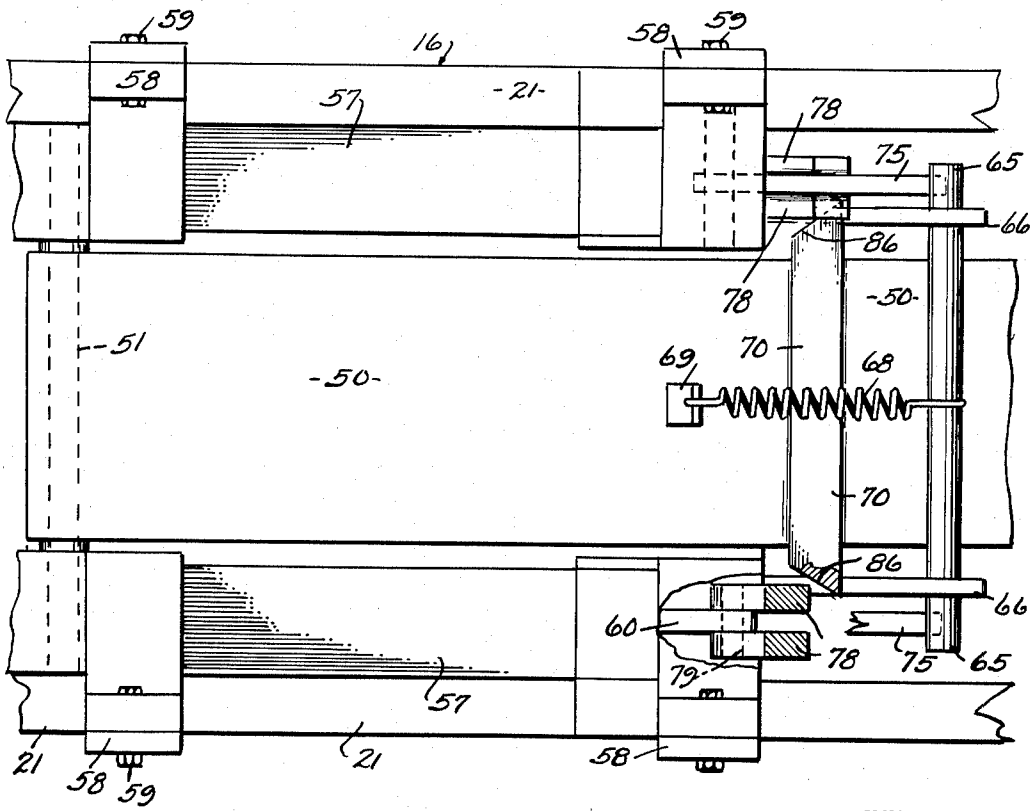


Fig 8

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BUCKET CLEANER FOR EXCAVATING MACHINE

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Application December 1, 1951, Serial No. 259,406

2 Claims. (Cl. 37—97)

This invention relates to improvements in and relating to a bucket cleaner for excavating machines, and especially to an improved bucket cleaner for insuring the removal of excavated material from the excavating buckets of a rotary wheel type excavating or trenching machine. These, therefore, are the general objects of the present invention.

A more specific object of the present invention is to provide a bucket cleaner for rotary wheel type trenching machine with resilient means under control of a latch mechanism to retain the cleaner in its active position but which mechanism will release the cleaner when an undue resistance is encountered, and wherein the latch mechanism will be automatically reset consequent upon movement of the cleaner to its active position.

The above objects are accomplished by the provision of a pivoted cleaner arm pivotally mounted on a support to swing from its active position to its inactive position under the influence of gravity, together with a compression spring which coacts with a latch mechanism to maintain the cleaner in its active position, such latch mechanism being releasable consequent upon the exertion of undue pressure on the cleaner arm, and arranged to be reset by the movement of the arm from an idle to an active position.

Other objects and advantages of the invention will become more apparent from the following description, reference being had to the accompanying drawings which illustrate one form of the invention. The essential features of the invention will be summarized in the claims.

In the drawings, Fig. 1 is a side elevation of a trench excavating machine incorporating the improved bucket cleaner mechanism; Fig. 2 is a fragmentary horizontal section through the excavating machine, certain parts being omitted to more clearly illustrate the bucket cleaner and its associated mechanism; Fig. 3 is a fragmentary vertical section illustrating the cleaner mechanism, portions of the excavating mechanism, as for instance the discharge conveyor and its operating mechanism being omitted to more clearly illustrate the construction of the cleaner mechanism; Figs. 4, 5, 6 and 7 are enlarged fragmentary sectional details taken in substantially the same plane as Fig. 3; Fig. 8 is a fragmentary plan view of portions of mechanism shown in Figs. 4 to 7 inclusive.

The present invention is especially adaptable for use in connection with a rotary wheel trench excavating machine. Such a machine is shown at Fig. 1 as comprising a frame 10 supported at either side by tractor type belts, one of which is shown at 11. The belts 11 are operatively connected with a motor 12 mounted on the forward end of the frame. At the rear end of the frame there is provided an inclined upwardly extending mast 15 upon which a rearwardly extending boom 16 is mounted for vertical movement. The boom 16 supports an excavating wheel 20 which is raised and lowered relative to the mast by cables 17 interconnected between the boom 16 and suitable cable winding drums 18.

The boom 16 includes a pair of horizontally spaced

longitudinally extending frame members 21 secured together by transverse spacing members, one of which is shown in Figs. 2 and 3 at 22. A pair of struts 23 are secured to each frame member 21 and extend downwardly therefrom forming triangular supports for a cross shaft 24 positioned at their lower ends. A pair of rollers 25 are mounted on the outer ends of the shaft 24 and similar rollers 26 and 27 are mounted on shafts 28 and 29 which are carried in supports 30 mounted on the frame members 21. The rollers 25, 26 and 27 support an excavating wheel 20.

The excavating wheel 20 may comprise a pair of horizontally spaced vertically extending annular rings 31 which are joined together adjacent their outer peripheries by spaced outwardly extending bucket-like formations 32. The inner peripheries of the rings 31 are supportingly engaged by the rollers 25, 26 and 27. The shaft 28 supporting the rollers 26 is rotatably mounted in its supports 30 and carries drive sprockets, one of which is shown at 33. These sprockets coact with a series of teeth-like formations 34 secured to the outer surfaces of the rings 31. Also secured to the shaft 28 is a sprocket wheel 35 which is drivingly connected by a drive chain 36 with a sprocket wheel 37, the latter being drivingly connected with the motor 12 by the usual change-speed transmission unit not shown, but which may be controlled by a lever 38.

As indicated in the drawings, particularly in Figs. 2 and 3, each bucket 32 may be provided with a plurality of bars 39 which extend rearwardly and inwardly relative to the direction of rotation of the excavating wheel and form a back for the bucket. These bars are shown as mounted directly on the bucket, however, they may be carried by separate brackets and secured to the wheel independently of the associated buckets.

The application of power to the excavating wheel and to the tractor belts is selectively controlled in the usual manner to cause the machine to travel in the direction of the arrow shown in Fig. 1 and to cause the wheel to rotate in a clockwise direction. A belt conveyor 40 is mounted on the boom frame members 21 and extends transversely through the excavating wheel. Such conveyor mechanisms are well known at the present time. Suffice it to say that, as the digging wheel rotates in a clockwise direction, the excavated material is progressed by the buckets until it reaches the upper part of the wheel where it may drop from the buckets 32 under the influence of gravity and fall onto conveyor 40 which discharges it to one side of the machine.

When the machine is used to excavate certain types of earth, such as wet soil, clay and the like, the buckets frequently will not discharge fully, and at times do not discharge at all. Accordingly, a cleaning mechanism to complete the discharge of the buckets is desirable. The present invention provides an improved cleaner mechanism in which the cleaner is resiliently maintained in active position, together with a trip mechanism which will release the cleaner for movement to an idle position should the cleaner meet with undue resistance, and wherein the trip mechanism will be automatically reset consequent upon the movement of the cleaner from an idle to an active position.

The bucket cleaner 50, with which the present invention is particularly concerned, comprises an elongated arm pivotally mounted as at 51 on the boom 16 at a point beneath the conveyor 40. The cleaner 50 extends rearwardly along the boom, below the conveyor, and then upwardly and forwardly, above the conveyor and between the rings 31 which form the wheel, into the buckets 32. The uppermost portion 52 of the cleaner may comprise a single member which, as shown in the drawings, projects into the buckets 32 between a pair of the bars 39 which form

the rear wall of the buckets. It will be apparent that a plurality of such members **52** may be removably attached to the arm **50** so as to extend between each pair of bars **39**, or the member **52** may be comb-shaped to permit the passage of the bars **39** as the wheel rotates.

The cleaner **50** is arranged to pivot about its axis **51** from the full line or active position, shown in Fig. 3, to the dotted line position therein shown wherein the cleaner is withdrawn entirely inside the wheel structure. In the present arrangement the cleaner moves about its pivot from its active to its inactive position under the influence of gravity.

The cleaner **50** is normally held in its active position, namely, the full line position of Fig. 3 by one or more compression springs **55**, which act on the cleaner **50** through a latch mechanism hereinafter to be more fully described. These springs **55** are mounted in elongated rectangular housings **57** which may be secured to the boom **16** as a unit (Fig. 2) or individually secured to the boom (Figs. 6 to 8 inclusive). In either instance each spring housing **57** extends longitudinally relative to the boom frame and is mounted in a bracket formation **58** which is clamped securely to the boom members **21** by bolts **59**.

Each spring **55** comprises a coil type compression spring which encircles a rod **60**, the ends of the spring being interposed between a pair of pins **61** carried by its respective housing **57** and an enlarged head **62** formed on its rod **60**. A rectangular block **63** is threadingly mounted on each rod **60** and serves to limit the outward and rotative movements of each spring relative to its casing **57**.

Each spring **55** is connected with a latch mechanism which normally retains the cleaner shoe in its uppermost position, shown at Figs. 3 and 4. This latch mechanism comprising a rod or bar **65** supported by a pair of arms **66**, which are pivotally connected as at **67** to the cleaner **50**. The rod **65** is normally drawn toward the pivot **51** of the cleaner by a spring **68** interposed between the rod and a lug **69** carried by the cleaner shoe, such movement being limited by a cross bar or stop **70** secured to the cleaner **50**.

The latch bar **65** cooperates with one or more coacting latch members **75**. The members **75** comprise levers, each of which is pivoted as at **76** to a bracket formation **77** which is secured to the associated spring housing **57**. Each lever **75** is provided with an extension **78** which is pivotally connected as at **79** with its associated spring rod **60** heretofore described. When the cleaner is in its normal or active position, as shown in Figs. 3 and 4, the outer end of each of the latch arms **75** lies beneath the latch bar **65** and the blocks **63** are separated from the stop pins **61** so that the full force of the springs **55** acts to urge the respective latch members **75** in a counter-clockwise direction, thereby resiliently retaining the cleaner **50** in its uppermost position. The upward movement of the cleaner is limited by engagement of the stop bar **70** with the latch extensions **78**.

Should an object become lodged in one of the buckets, which object cannot be removed by the cleaner, the rotation of the excavating wheel will cause the cleaner to rock in a clockwise direction. This rocking movement will increase the pressure of the spring **55**, as illustrated in Fig. 5. Should the obstruction remain in the excavating bucket, despite the increased spring pressure, the movement of the cleaner beyond that indicated in Fig. 5 will cause the latch rod **65** to disengage the latch member **75** whereupon the cleaner **50** will drop by gravity to the position indicated by dotted lines in Figs. 1 and 3, and in full lines in Fig. 6. The lower position of the cleaner is limited by a transverse bar **19** carried by the boom frame members **23**.

Following the removal of the obstruction by the operator, the rotative power of the wheel may be used to reset the cleaner **50**. As indicated in Fig. 3, one end of a suitable cable or chain **80** is removably secured, as

by a suitable hook, to a downwardly extending lug **81** of the cleaner **50** and the cable then passed around the shaft **29**, heretofore described, and its opposite end removably secured to one of the bucket formations **32** of the wheel, as for instance by a hook **82**. When the cable **80** is in position and the wheel is rotated in a clockwise direction (Fig. 3) the cleaner **50** will swing in a counter-clockwise direction about its pivot **51** from the dotted line position, shown in Fig. 3, to the full line position therein shown.

As the cleaner arm **50** moves from its released or lower position to its uppermost or active position the latch rod **65** is cammed to the right (Figs. 3 to 6) by cam surface **85** formed on the underside of the latch bars **75** thereby rocking the bar or rod **65** about its pivot **67** and permitting such bar to clear the latch members **75**. When the cleaner **50** reaches its uppermost position, the latch bars **65** will be drawn atop the ends of the latch arms by their springs **68**. The springs **55** now coact through the latch members **75** to resiliently retain the cleaner arm in its active or upper position.

One of the advantages of the present construction is that it permits the use of the rotative movement of the excavating wheel for resetting the cleaner and the latch mechanism. Further, it enables the use of comparatively heavy springs which, in their normal positions shown in Fig. 6, may be precompressed whereby the cleaner will be retained in its active position by substantially the full force of the springs. The arrangement likewise facilitates the use of a comparatively short spring which moves but a short distance in relation to the movement of the cleaner itself. Further, the arrangement insures the maintaining of both a predetermined relation between the parts of the latch mechanism and a predetermined spring pressure on the cleaner, despite repeated tripping and resetting of the latch mechanism.

I claim:

1. In an excavating machine having a support and a plurality of excavating buckets movable at a predetermined path relative to said support, a bucket cleaner mounted on said support and including a pivoted arm adapted to extend into the buckets as they move in said path, said arm being movable under the influence of gravity to an idle position out of the buckets, a latch member pivotally mounted on said arm, a stop for said member secured to said arm, resilient means interconnected between said arm and said latch member to retain said member against said stop, a second latch member pivotally mounted on said support, a compression spring mounted on said support and connected to said second latch member to maintain said latch members in engagement with each other and through the latch members to resiliently retain the cleaner in its active position in the path of said bucket, said latches being positioned relative to each other to disengage consequent upon the rocking of the cleaner a predetermined distance against the action of said spring and thereby permit the cleaner to fall to an idle position under the influence of gravity, and coacting cam surfaces on said latch members to move said first-named latch member away from its stop and permit restoration of the latching engagement of said members by said resilient means consequent upon movement of the arm to its active position.

2. A bucket cleaner for a trench excavating machine having a frame carrying an excavating wheel provided with excavating buckets mounted on its periphery, said cleaner including an arm pivotally mounted on the frame to swing from an active position extending into the path of the buckets to an idle position out of the path of the buckets, a latch member pivotally mounted on said arm, a second latch member pivotally mounted on said frame and engaging with the first-named latch member when the arm is in an active position, resilient means interposed between the arm and the first named latch member and active to resiliently maintain said latches in

engagement with each other, a compression spring interposed between said frame and said second named latch member to retain the arm in its active position while the latch members are in engagement, said latch members being positioned to disengage each other when the cleaner arm is moved about its pivot a predetermined distance against the action of said spring and thereby permit the cleaner to move to an idle position out of the path of the bucket, means carried by said arm to cooperate with the second-named latch member to restore said latch member consequent upon movement of the arm from its idle to active position, and wherein one of said latch

members has a cam surface to coact with the other latch member and permit said resilient means to restore the first-named latch member to its active position.

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