G. H. GREIMANN.

EXCAVATOR.

APPLICATION FILED JULY 3, 1918.

1,287,675.

Patented Dec. 17, 1918.

3 SHEETS—SHEET 1.

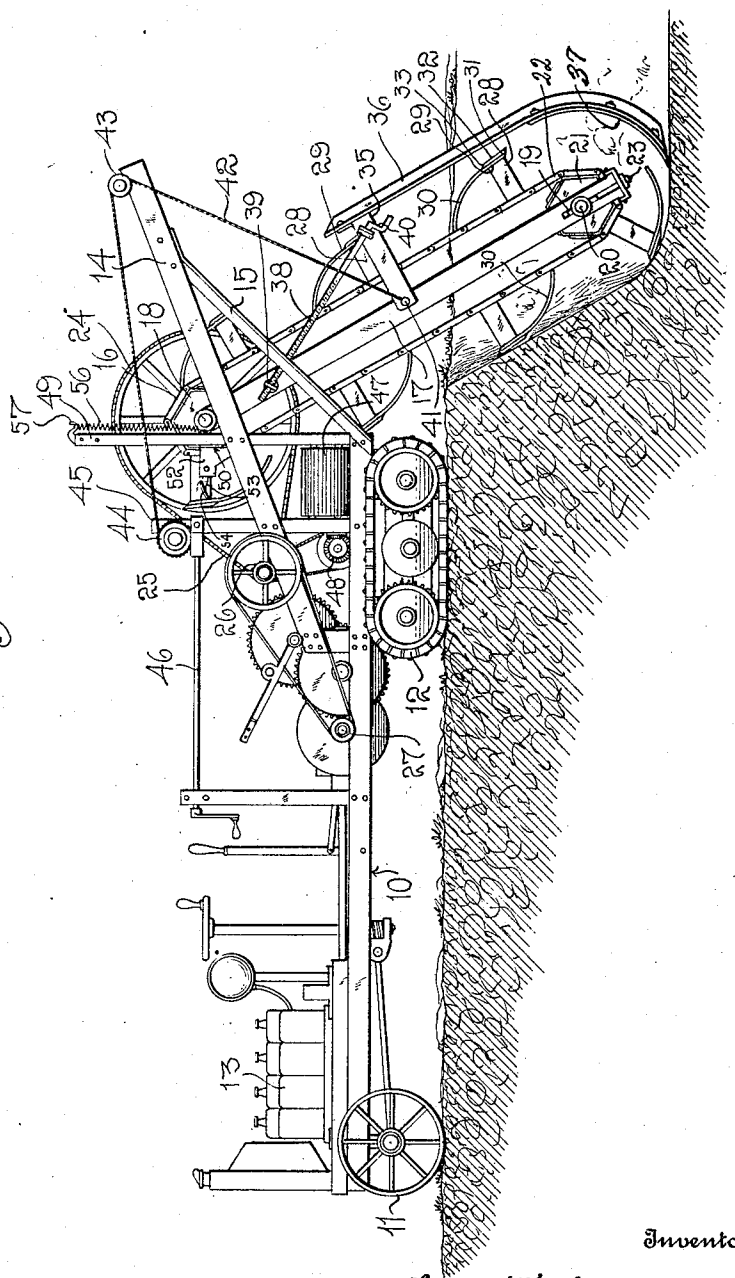


Fig. 1

Inventor

George H. Greimann

By Watson E. Coleman

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 6

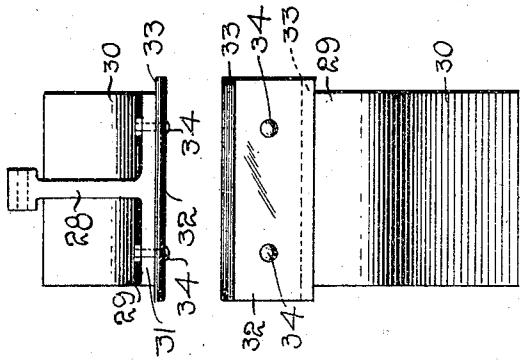
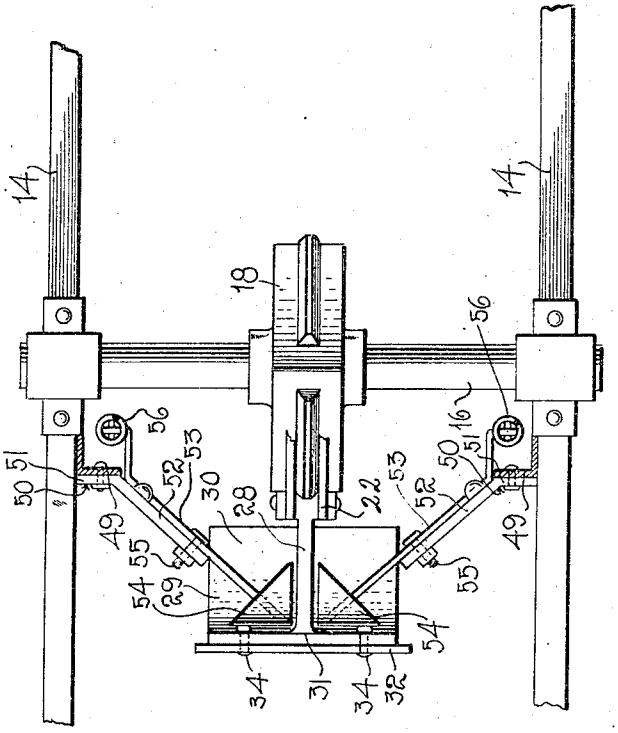


Fig. 7

Fig. 2



Inventor

George H. Greimann

By Watson E. Coleman

Attorney

JNO. MORRIS PETERS CO., PHOTO-LITHO., WASHINGTON.

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3 SHEETS—SHEET 3.

Fig. 4

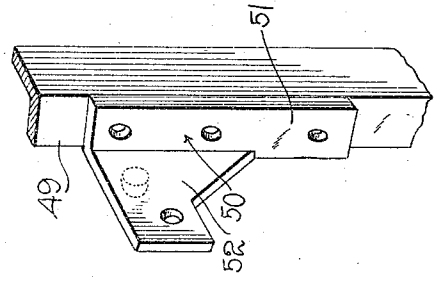


Fig. 5

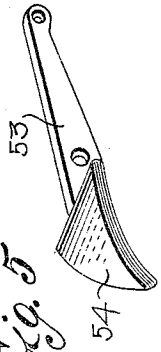
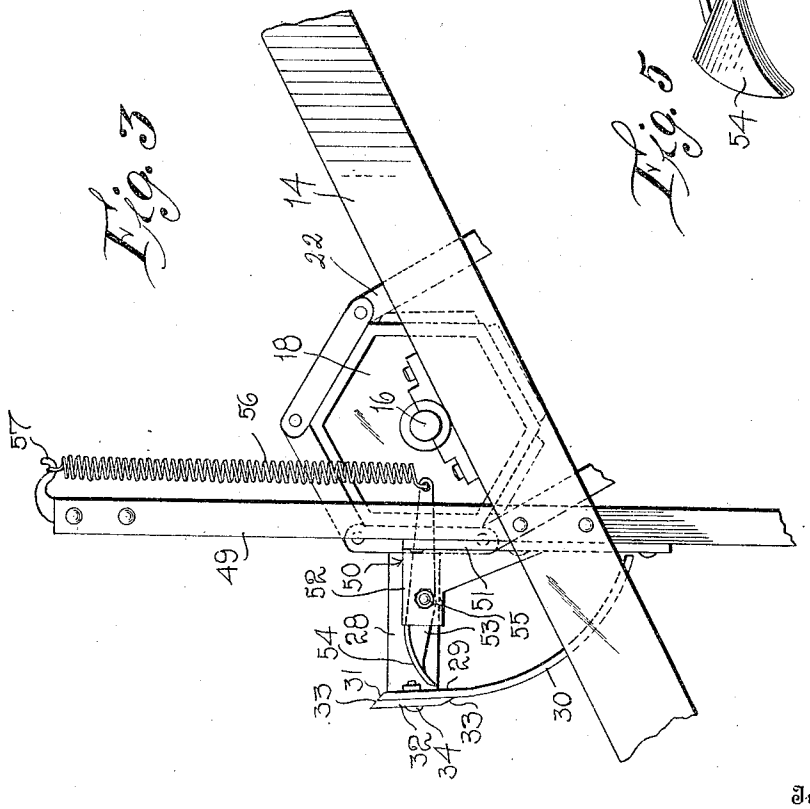


Fig. 3



Inventor

George H. Greimann

By Watson E. Coleman

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE H. GREIMANN, OF GARNER, IOWA.

EXCAVATOR.

1,287,675. Specification of Letters Patent. Patented Dec. 17, 1918.

Application filed July 3, 1918. Serial No. 243,153.

To all whom it may concern:

Be it known that I, GEORGE H. GREIMANN, a citizen of the United States, residing at Garner, in the county of Hancock and State of Iowa, have invented certain new and useful Improvements in Excavators, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to excavators, and particularly to certain improvements in the construction and mounting of the elevator buckets or shovels, and to means whereby the material in the shovel or bucket may be cleaned from the bottom thereof.

The general object of this invention is to improve upon the details of construction illustrated in my Patent No. 1,217,752, granted to me on February 27, 1917.

One of the objects of the invention is to provide an excavating shovel having a reversible cutter applied to its active edge, so that the cutter may be reversed in case one edge of the cutter is damaged or becomes dull.

A further object is to provide improved means for cleaning the shovel and so mount the cleaner that it will yield in case it comes in contact with any hard substance carried up by the shovel, thereby preventing the breakage of the parts.

A further object is to so mount the cleaner that it will always clean the shovels at the same place regardless of the position in which the shovel is placed, that is, regardless of the position of the endless element upon which the shovels are mounted.

Other objects have to do with the particular details of construction and arrangement of parts, as will hereafter more fully appear.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of an excavating apparatus embodying the improvements of my invention;

Fig. 2 is a fragmentary top plan view thereof, with parts in section;

Fig. 3 is a side elevation, on an enlarged scale, of a portion of the machine;

Fig. 4 is a detailed perspective view of a bracket hereinafter described;

Fig. 5 is a detailed perspective view of one of the scraper blades; and

Figs. 6 and 7 are views of one of the shovels.

Referring to the drawings, it will be seen that my excavating apparatus includes a main frame 10 supported at its forward ends upon steering wheels 11 and at its rear ends upon a caterpillar tractor 12. These parts may be of any suitable construction and arrangement. Mounted upon the forward end of the main frame is the motor 13, which is operatively geared to the driving wheels of the caterpillar tractor, in any usual or suitable manner.

Extending upward and rearward from the rear portion of the frame 10 are the beams 14, which are supported in this inclined position by downwardly and forwardly inclined braces 15 connected at their rear ends to the inclined frame 14, and mounted in suitable bearings, upon these beams 14, is the transverse shaft 16, of the endless elevator, which carries the shovels, as will be later described. This shaft 16 forms a pivotal support for the beams 17. Mounted upon the shaft 16 is the many-sided sprocket wheel 18 and mounted in slots 19 on the lower ends of the beams 17 is the shaft 20 which supports the wheel 21 over which the endless element 22 passes. This shaft 20 is supported for adjustment in the slots 19 by means of the adjusting screws 23, to thus provide means whereby any slack in the endless element may be taken up. The shaft 16 is rotated by means of a sprocket wheel 24, driven by a sprocket chain 25 from a sprocket wheel on the shaft 26, mounted upon the upwardly and rearwardly extending beams 14. This shaft in turn is driven in any suitable manner from a main driving shaft 27 operatively connected to the motor. I do not, of course, wish to be limited to the particular means for driving the shaft 16 from the motor.

The endless element 22 is composed of links and extending outwardly from these links are the shovel supporting posts 28 disposed at intervals upon the endless element, each of these posts having a plate formed integrally with it and designated 29, this plate extending laterally on each side of the post and extending rearward and inward toward the endless element 22 to form a shovel or bucket 30, as illustrated most clearly in Fig. 3. The forward edge of each shovel 30 is beveled as at 31 and attached to the under face of the shovel is a cutter 32, the edges of which are reversely beveled as at 33. Each of these cutters 32 is bolted to its respective shovel by means of the bolts 34, there being preferably two bolts for each shovel. It is to

be noted that these shovels 30 do not have side walls. Mounted upon the beams 17 are outwardly projecting supporting members 35, upon which are mounted the downwardly extending angle irons 36, these angle irons being extended downward and forward at their lower ends, and carrying upon them the transversely extending scraper plate 37 which acts, to a certain extent, as a plow and scraping against the bottom of the trench or other cutting made by the excavator.

The supporting members 35 are each connected to the beams 17 by means of rods 38 having screw-threaded engagement in pivoted nuts 39 mounted upon the beams 17, the outer ends of these rods 38 being cranked as at 40 and supported in suitable bearings so that by rotating these rods 38 the supporting members 35 may be turned upon their pivots 41 to thereby adjust the angle irons 36 and 37 upward or downward and nearer to or farther from the path of movement of the shovels. The beams 17 may be adjusted around a shaft 16 as a center, to thereby change the angle of the beams 17 by means of any suitable mechanism, such as the cable 42, which is attached to the beams 17 and extends upward and rearward and over a pulley 43 and thence to a winding drum 44 mounted upon an upright 45 and adapted to be rotated by means of a worm shaft 46.

The shovels move upward and discharge as they turn around the supporting sprocket wheel 18. These shovels discharge upon a transversely extending endless carrier 47, mounted upon any suitable rollers or wheels and driven in any suitable manner, as for instance by the beveled gear wheel 48, in turn driven by a sprocket chain from a sprocket wheel on the shaft 26.

For the purpose of positively cleaning the shovels and discharging all the earth therefrom, I provide pivoted scrapers mounted at a point opposite the shaft 16 and which are held in operative position by means of a spring but which, in case of meeting any impediment, will yield so as to permit the passage of the shovel past the scraper without breaking the scraper. Inasmuch as the shovel has the medially disposed supporting post 28 it is necessary to provide two scrapers of the character described and to this end I mount upon each of the upwardly and rearwardly extending beams 14 the vertically disposed supporting angle irons 49 and attach to each of these angle irons a bracket 50 having an elongated vertical base 51 bolted to the corresponding angle iron 49 and this base being provided with the outwardly projecting arm or bracket proper 52. To this projecting portion 52 is attached the shank 53 of the scraper, this shank being provided at its extremity with the triangular blade 54. The shank 53 is pivoted upon the bolt 55 and extends rearward beyond the base 51 and at its rear end is connected to a coiled contractile spring 56 which at its upper end is connected to a hook 57 attached to the upper end of the corresponding angle iron 49. In its normal position the spring 56 is relaxed and yieldingly holds the scraper in the position illustrated in Fig. 3, with its triangular blade in contiguity to the bottom of the shovel, and in parallel relation to the path of movement of the shovel. It will be, of course, obvious that both of the blades 54 are in spaced relation to the path of movement of the bottom of the shovel so as not to strike the bolts 34 and the nuts thereon.

It will be obvious now that under normal circumstances the shovels will move upward until the posts supporting each shovel rise opposite the shaft 16 when the shovels will commence to turn around the shaft and the scraper will scrape all material out of the shovels onto the carrier 47. If any hard substance should adhere to the bottom of the shovel which would, if it engaged the scraper, tend to break it, the scraper or cleaner will yield against the action of the spring 56 until the hard substance is passed when the scraper or cleaner will return to its initial position. It will be noted that the cleaner or scraper is attached to angle irons 49, in turn attached to the beam 14 and that the scrapers always have the same relation to the shovels without regard to the position or angle of the beams 17. Thus the beams 17 might be in a horizontal position and the shovels, therefore, move horizontally, and yet the scrapers would have precisely the same relation to the shovels that they have when the beams 39 are downwardly and rearwardly inclined.

The operation of this mechanism will be, of course, obvious from what has gone before. The depth of cut may be, of course, regulated by regulating the inclination of the supporting beams or boom 17. The shovels, as they move upward, scrape the earth from the forward end of the excavation or trench and carry it upward and discharge it at the upper end of the forward flight upon the carrier 47. If or when the shovel blades wear, the cutters or scraper blades may be reversed, by simply removing the bolts 34 and changing the position of the blade.

I claim:—

1. In an excavator, a supporting frame, a shaft carrying a sprocket wheel mounted upon the frame, supporting beams mounted upon the shaft for rotation around the axis of the shaft, an endless element engaged by said sprocket wheel and operatively supported upon said beams, a plurality of posts extending out from said endless element at intervals, shovels attached to said post and extending laterally beyond them and extending rearward and toward the endless ele-

ment, vertically disposed members mounted upon the frame on each side of the sprocket wheel, brackets attached to said members and extending in convergent relation toward the path of movement of the shovels, angular scrapers disposed in proximity to the path of movement of the shovels, and shanks upon which said scrapers are mounted, the shanks being pivotally mounted upon said brackets, stops limiting the movement of the shanks in one direction, and springs yieldingly urging said shanks against the stops.

2. In an excavator, a supporting frame, a shaft carrying sprocket wheels mounted on the frame, supporting beams extending from said shaft and rotatable about the axis thereof, a wheel mounted at the ends of said beams, an endless element supported by said beams, a plurality of shovels mounted upon said endless element, means for rotating said beams around the shaft as an axis, to thereby adjust the depth of cut, a shield extending parallel to the rearmost flight of said endless element and downward to the lower end of said rearmost flight, a member supporting said shield and pivoted to said beams, a pivoted nut mounted upon one of said beams, and a shaft connected to the outer end of said member and having screw-threaded engagement with said nut, the shaft being revoluble to thereby adjust the shield with relation to the path of movement of the shovel.

3. In an excavator, a downwardly extending supporting member, an endless element carried by said member and having shovels mounted thereon, a bracket pivotally mounted upon said member and extending rearward therefrom, a scraper operatively supported upon the bracket and extending down rearward of the path of movement of the shovels and below said path of movement, and means for adjusting said scraper comprising a screw-threaded rod mounted upon the bracket and having screw-threaded engagement with a nut on the member, said rod being rotatable by hand to thereby adjust the scraper.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

GEORGE H. GREIMANN.

Witnesses:
F. E. BLACKSTONE,
W. H. RAMSAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."