

C. S. BROWN & F. H. GERDEMAN.

EXCAVATING MACHINE.

APPLICATION FILED FEB. 1, 1912.

1,056,398.

Patented Mar. 18, 1913.

3 SHEETS-SHEET 1.

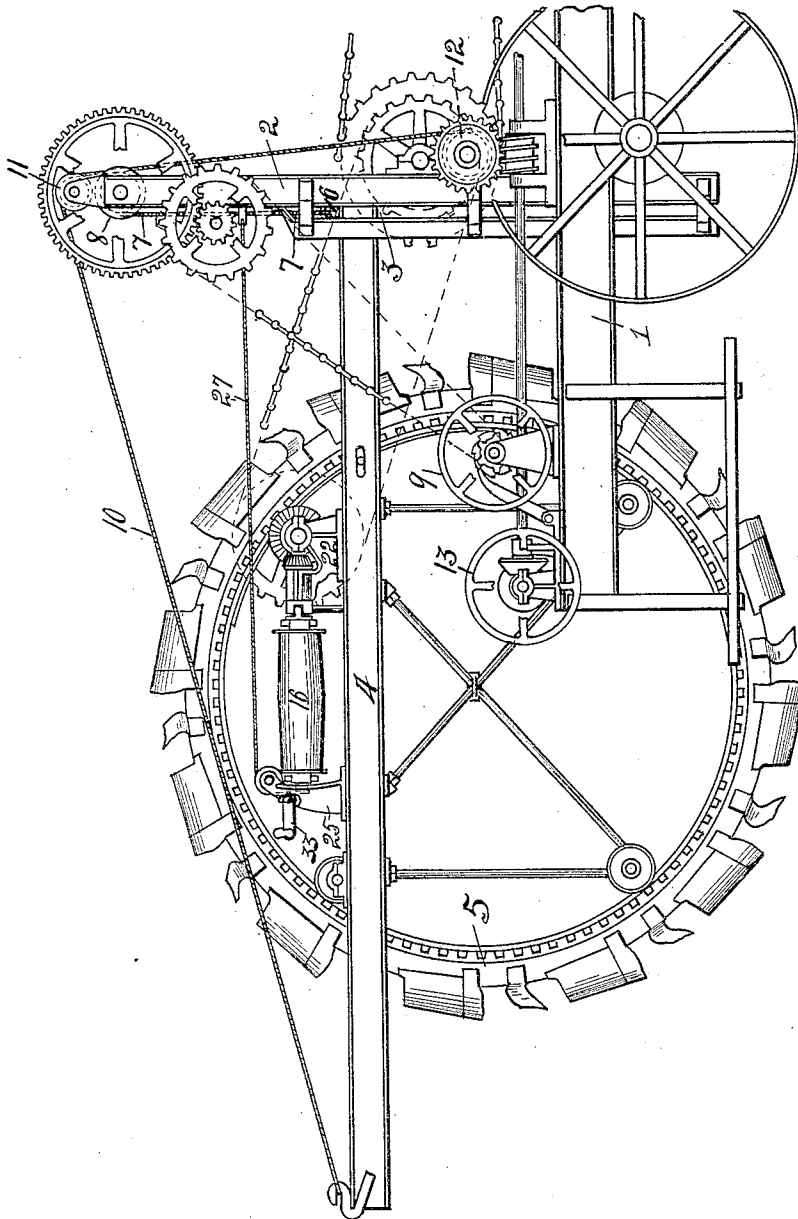


Fig. 1.

WITNESSES

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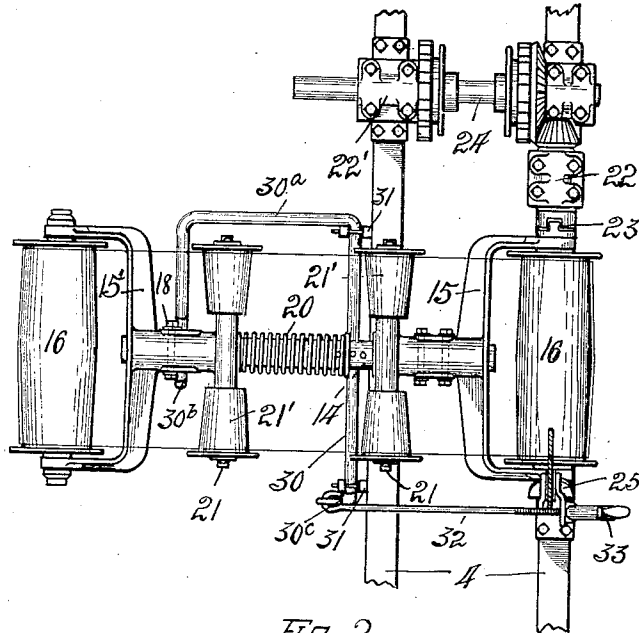


Fig. 2.

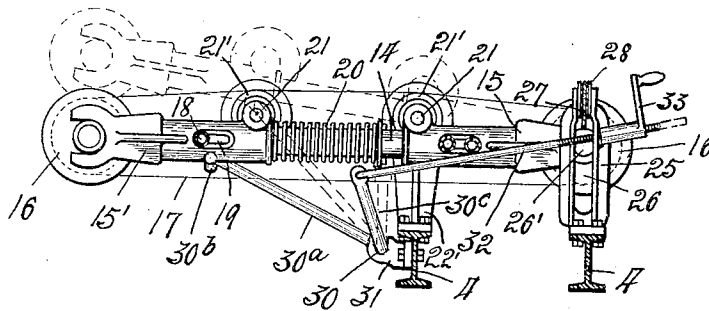


Fig. 3

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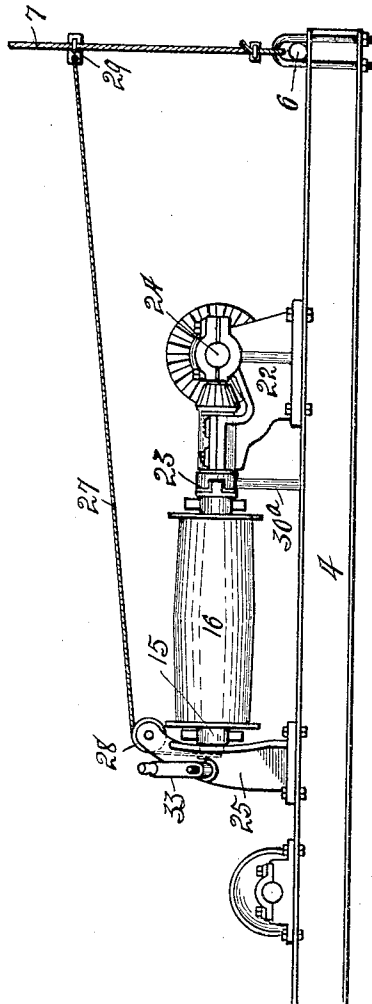


Fig. 4.

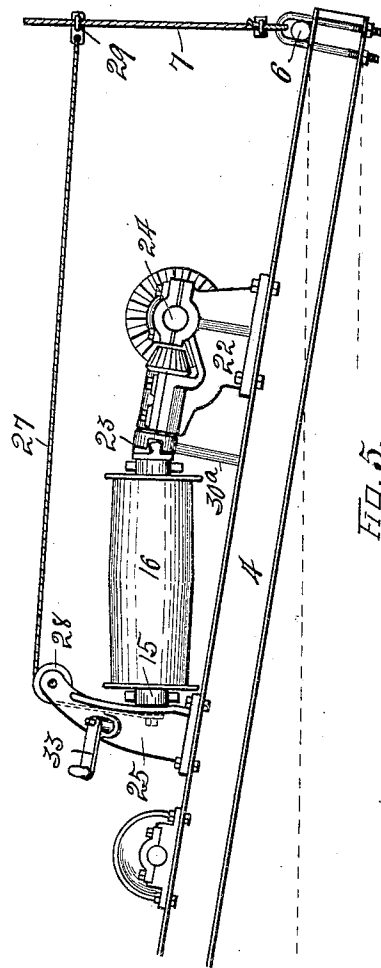


Fig. 5.

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UNITED STATES PATENT OFFICE.

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EXCAVATING-MACHINE.

1,056,398.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed February 1, 1912. Serial No. 674,778.

To all whom it may concern:

Be it known that we, CHALMERS S. BROWN and FRANK H. GERDEMAN, citizens of the United States, and residents of Findlay, in the county of Hancock and State of Ohio, have invented a certain new and useful Excavating-Machine; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to means particularly intended for use in connection with the dirt or other material conveying mechanism of ditch digging machines or the like, but is not restricted to such use as it may be used in any connection for which it may be adapted or appropriate.

The object of our invention is the provision, in combination with the customary adjustable frame carrying the digging means and with the conveyer mechanism for the diggings, of means which is automatically operable to maintain the axes of the apron guiding rolls of the delivery mechanism level or in a horizontal plane irrespective of the inclination of said frame, thus obviating the objections incident to the apron laterally tilting with the frame as it gradually swings about a pivotal point upon a raising or lowering of the digging means, as is well understood in the art.

A further object of our invention is the provision of simple and improved means for adjusting the longitudinal inclination of the conveyer mechanism for the diggings.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a portion of an excavating machine embodying the invention, with the digging wheel frame in horizontal position. Fig. 2 is an enlarged top plan view of the conveyer mechanism with the conveyer belt removed. Fig. 3 is a side view thereof, with the wheel carrying frame in cross-section, and Figs. 4 and 5 are

enlarged side elevations of portions of the digging-wheel carrying frame and associated conveyer parts equipped with our invention, and with the frame in the latter figure tilted from horizontal position.

Referring to the drawings, 1 designates the portable or wheeled frame of a ditching or excavating machine of the traction type, from the rear end portion of which rise laterally opposing standards 2 (one only being shown), each of which is provided with a vertical guide way 3. The frame 4, which customarily comprises two rigidly spaced I-beams or similar members, has the excavating wheel 5 mounted between the members thereof for rotary digging movements relative thereto, and has its inner or forward end provided at each side thereof with a laterally projecting trunnion 6 for working in the guide-way 3 of the associated standard and serving as a pivot for such frame.

The inner end of the frame 4 is suspended for vertical adjustment by one or more cables 7, which wind at their upper ends around a windlass 8, which is shown as being geared in a suitable manner to a hand-control wheel 9, which is mounted on the frame 1 in convenient position to be worked by the operator.

The outer or free end of the frame 4 is suspended in proper position relative to its inner end by a cable or cables 10, which extends upward and forward from the outer end over a sheave 11, carried at the upper end of one of the standards 2, and thence passes down to and around a windlass drum 12, which is suitably geared to a hand-control wheel 13, carried by the frame 1 adjacent to the control wheel 9 to enable the operator to work either or both of such wheels as desired.

In carrying out the features of our invention we provide a conveyer mechanism frame which is capable of transverse as well as longitudinal rocking movements relative to the frame 4 by which it is carried. In the present instance this conveyer frame is shown as comprising a longitudinally-extending shaft or bar 14, to the opposite ends of which are attached the yokes or forked members 15 and 15' between the arms of each of which is mounted a guide-roll 16 for the conveyer apron 17, the inner

one of such rolls being the drive-roll for the apron. The yoke member 15 is rigidly attached to the shaft 14 in any suitable manner, while the yoke member 15' is prevented from turning upon the shaft 14 but is permitted to have limited longitudinal movements thereon by reason of a bolt 18 projecting through the shaft and working in registering longitudinal slots 19 in the member, see Fig. 3. A coiled compression spring 20 is mounted on the shaft 14 between the yoke members and has one end in thrust contact with the inner end of the yoke member 15' and its other end anchored to the shaft, thus tending to force the rolls 10 apart to hold taut an apron mounted thereon, as is apparent. A shaft 21 is fixed to the inner end portion of each yoke member transversely thereof and carries idler apron-supporting rolls 21' at its ends.

The shaft which carries the drive-roll 16 of the conveyer mechanism has the forwardly projecting end thereof, or that projecting toward the inner end of the frame 4, mounted in a bearing standard 22 without the yoke 15, and is universally jointed between such standard and the yoke, as indicated at 23, thus enabling said roll and the conveyer mechanism frame to have lateral rocking movements relative to the portion of the roll shaft which is mounted in said bearing. The bearing-standard 22 is mounted on one of the members of the frame 4 and is shown as coöperating with a bearing-standard 22' on the other member of such frame to support a transverse shaft 24, which is geared to the drive-roll shaft of the conveyer mechanism and also to any suitable driving means, as well understood in the art.

Rising from the frame 4 without the yoke 15 at the rear end of the drive-roll 16 is a standard 25 having a vertical guide-way 26 in its inner side in which the rear end of the drive-roll shaft, or a part of the yoke 15 in substantial alinement with such shaft, as indicated at 26', works to guide the vertical rocking movements of said roll and carrying frame.

A cable 27 attaches to the shaft or yoke part 26' and passes upward therefrom over a sheave 28, carried by the standard 25, and thence forward over one side of the frame 4 and attaches to the cable 7, as at 29. The point of attaching the cable 27 to the cable 7 is gaged so that the transverse plane of the conveyer mechanism will stand in level or horizontal position whether the frame 4 is horizontal or has its free end tilted upward from horizontal position, as shown in Figs. 4 and 5. It will be apparent by reference to these figures that upon a raising of the free end portion of the frame 4 from a horizontal plane such frame will approach the plane of the cable or attaching member 7

for the cable 27, thus permitting the rear side of the conveyer mechanism to lower in equal proportion to maintain its level, and that the leveling movement of the conveyer mechanism will be the reverse when the frame 4 is lowering to horizontal position.

The raising and lowering movements of the free end of the conveyer mechanism, to permit a high or low delivery of the diggings therefrom, is controlled by the movements of a lever member 30, which is fulcrumed in brackets 31 carried by one of the beam members of the frame 4 and has an arm 30^a extending outwardly toward the free end of the conveyer and thence angling transversely under the conveyer with its free end bent, as at 30^b, to form a seat for the inner end portion of the yoke 15' on which it may laterally rock. The other arm 30^c of the lever 30 projects upward from its fulcrum and has a rod 32 extending from its free end and working through an opening in a flange of the standard 25. A crank-handle 33 is threaded onto the free end portion of the rod 32 and coöperates with the standard flange against which it bears and with said rod to effect a movement of the lever 30 to raise the outer end of the conveyer or to permit a gravity lowering of the conveyer upon a turning of the crank-handle in one direction or the other.

In the use of machines of this character it is customary to lower the pivotal end of the excavating-wheel carrying frame 4 relative to the outer end thereof preparatory to excavating, so that said frame stands on an incline when the wheel 5 is in initial cutting position. As the cutting or excavating operation progresses the operator slowly turns the control wheel 13 in the proper direction to permit a gradual lowering of the outer end of the frame 4 to lower the cutting wheel therewith. When the outer end of the frame 4 has lowered sufficiently for the frame to stand in substantially horizontal position, the operator works the hand control wheel 9 to permit a lowering of the inner end of the frame 4 to again place such frame in inclined position preparatory to lowering the depth of the cut, and then works the control wheel 13 to take up the slack occurring in the cable 10 due to the frame 4 rocking with the wheel 5 as its axis when its inner end is being lowered. By reference to Figs. 1, 4 and 5 it will be apparent that the cable or frame suspending member 7 is stationary during the swinging movements of the frame 4, thus permitting the conveyer mechanism, the outer side of which is attached to said cable 7 through the cable 27, to maintain a transverse level position irrespective of the swinging movements of the frame 4. With this arrangement the rolling of the diggings laterally from the conveyer apron due to a lateral

tilting of such apron with the frame to which it is attached, as has heretofore been the case, is entirely obviated, thereby materially enhancing the efficiency and practicability of apparatus of this class. To change the longitudinal inclinations of the conveyer mechanism to suit the conditions it is only necessary to turn the crank 33 to effect a swinging movement of the lever member 30 in one direction or the other to raise or lower the outer end portion of the conveyer mechanism as desired.

It is apparent that we have provided simple and efficient means for automatically adjusting the conveyer mechanism relative to the excavating wheel carrying frame to permanently maintain such mechanism in transverse level position irrespective of the inclinations of said frame, and that we have adapted such mechanism for attaching to the rotary cutter type of excavating machines commonly used. It is to be understood, however, that such adjusting mechanism is not restricted to use in connection with excavating machines of the particular construction shown, but is intended for use in any connection for which it may be applicable.

We wish it also to be understood that our invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is,—

1. In an excavating machine, a tiltable cutting-wheel carrying frame, a conveyer mechanism carried by said frame for lateral tilting movements relative thereto and having an apron driving roll, a drive shaft carried by said frame and having universal connection with said roll, which connection serves as the tilting axis of the conveyer, and means automatically operable to maintain said mechanism in transverse level position irrespective of the inclination of said frame.

2. In a machine of the class described, a vertically adjustable member, a tiltable cutting-wheel carrying frame vertically adjustable with and attached to said member and adapted to have vertical swinging movements when said member is at rest, a conveyer mechanism for delivering matter transversely of said frame and mounted for lateral tilting movements relative to the frame, and means connecting said member and conveyer mechanism for maintaining the transverse plane of said mechanism constant relative to said member irrespective of the inclination of said frame.

3. In an excavating machine, a tiltable and vertically adjustable frame, a conveyer mechanism carried by said frame for lat-

eral tilting movements relative thereto, means projecting from the inner end portion of said frame and vertically adjustable therewith but fixed against tilting movements with the frame, a conveyer mechanism carried by said frame for lateral tilting movements relative thereto, and means connecting said projecting means and mechanism for maintaining the plane of projection of such means and the transverse plane of said mechanism substantially constant irrespective of the inclination of said mechanism.

4. In an excavating machine, a tiltable cutting-wheel carrying frame, means suspending the inner end of said frame for pivotal movements and operable to vertically adjust said frame end, a conveyer mechanism carried by said frame for lateral tilting movements relative thereto, and means connecting said suspending means and mechanism to maintain the transverse plane of said mechanism and said suspending means substantially in fixed relation irrespective of the position of said frame.

5. In an excavating machine, a vertically adjustable reclining cutting-wheel carrying frame, means adjustably suspending one end of said frame for vertical swinging movements, a conveyer mechanism carried by said frame for delivering material transversely thereof and mounted for lateral tilting movements relative to the frame, and means connecting the outer tiltable side of said mechanism to said suspending means for maintaining the transverse level of said mechanism constant irrespective of the inclination of said frame.

6. In a machine of the class described, a tiltable cutting-wheel carrying frame, a conveyer mechanism carried by said frame for tilting movements relative thereto, a part associated with the inner end portion of said frame, a cable attaching the outer side of said conveyer mechanism to said part, and means guiding the movement of said cable to cooperate therewith and with said part to maintain the transverse plane of said mechanism substantially constant irrespective of the inclination of said frame.

7. In a machine of the class described, a reclining frame mounted for vertical swinging movements, a conveyer mechanism for delivering matter transversely of said frame and mounted for lateral tilting movements relative thereto, said mechanism having an apron drive roll, a shaft mounted on said frame and having universal connection with and adapted to support an end of said roll, means guiding the vertical swinging movements of the opposite end of the roll relative to said frame, and means supporting the swinging end of said roll and mechanism for floating action relative to said frame to maintain the transverse level of

said mechanism substantially constant irrespective of a swinging movement of the frame.

8. In a machine of the class described, a
5 reclining frame mounted for vertical swinging movements, a conveyer mechanism carried by said frame for longitudinal swinging and lateral tilting movements relative thereto, and means operable to adjust the
10 longitudinal inclination of said mechanism and permit it to have lateral rocking movements relative to the frame.

9. In combination, a frame mounted for vertical swinging movements, a drive shaft
15 carried by said frame, a conveyer mechanism having an apron driving and guiding

roll attached at one end to said shaft for universal movements relative thereto, and means coöperating with said shaft in supporting the conveyer and automatically operable to maintain the transverse plane of the conveyer substantially horizontal irrespective of the inclination of said frame. 20

In testimony whereof, we have hereunto signed our names to this specification in the
25 presence of two subscribing witnesses.

CHALMERS S. BROWN.
FRANK H. GERDEMAN.

Witnesses:

LEO A. KRUPP,
CHARLES E. JORDAN.

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