

May 17, 1932.

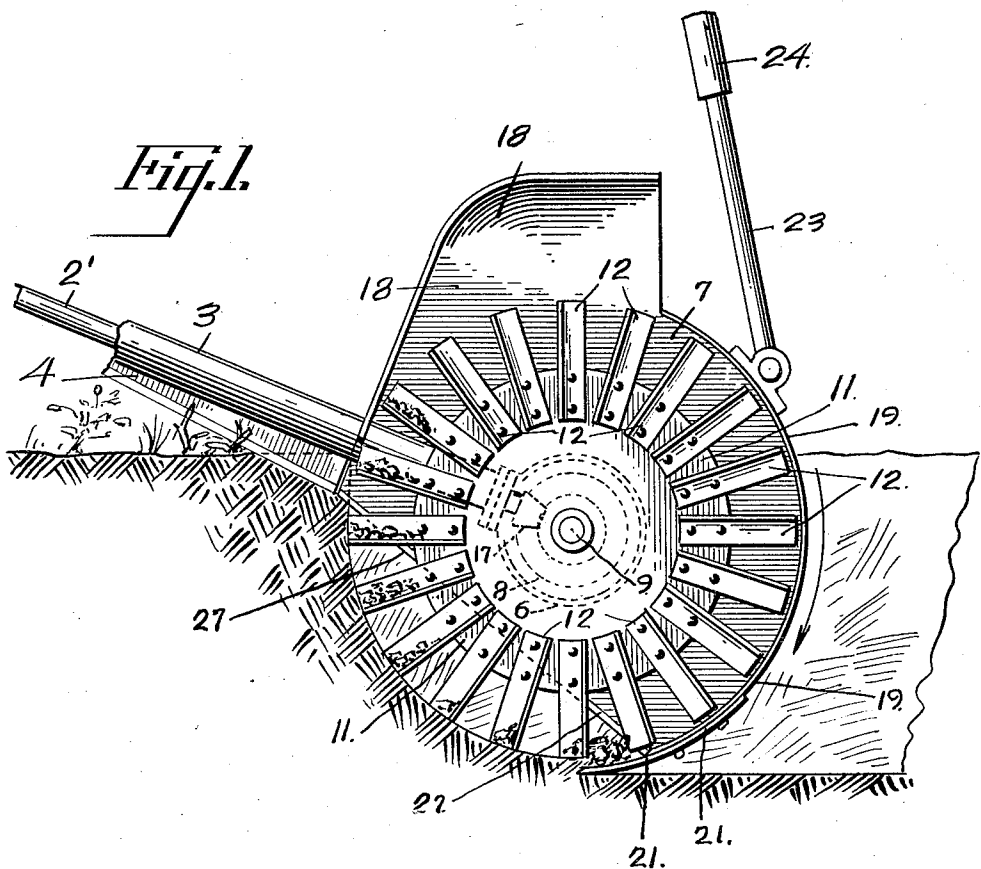
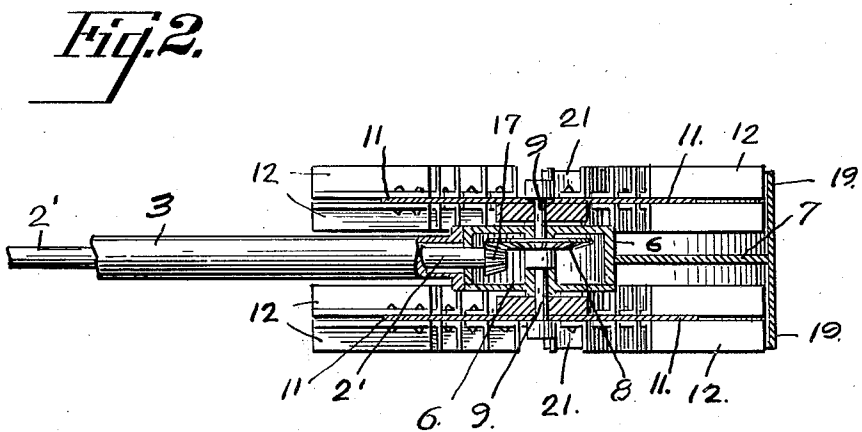
H. E. CRUSE

1,858,360

EXCAVATOR

Filed June 6, 1931

2 Sheets-Sheet 1



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By *Arthur L. Slee*
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2 Sheets-Sheet 2

Fig. 3.

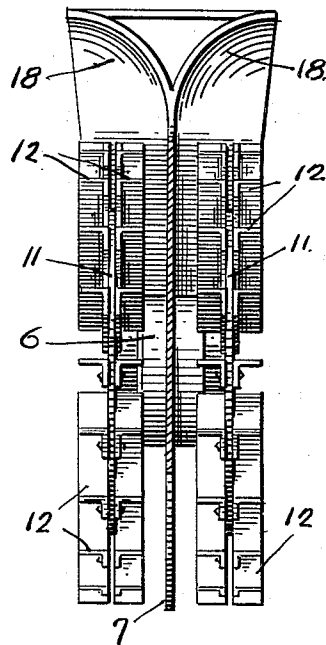


Fig. 4.

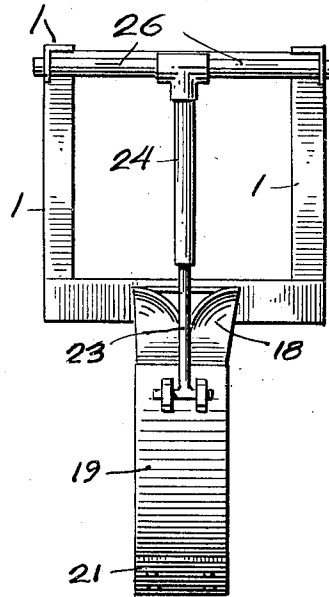


Fig. 6.

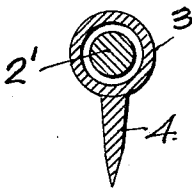
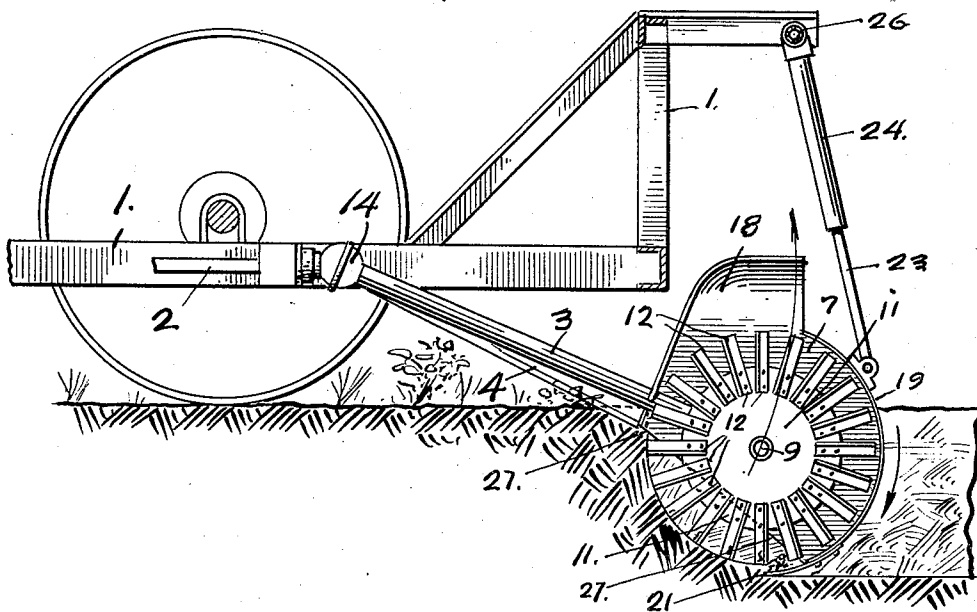


Fig. 5.



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EXCAVATOR

Application filed June 6, 1931. Serial No. 542,496.

My invention relates to improvements in excavators wherein a pair of vertically disposed discs, arranged in parallel spaced relation, each provided with a plurality of radially and peripherally disposed cutting edges, operate in conjunction with a torque tube, operatively connecting said excavator in trailing connection with said vehicle to permit vertical movement only of said excavator, to limit the depth of an excavated ditch by said torque tube resting on the front edge of an excavated ditch as said excavator advances, and with means for receiving and laterally discharging material excavated by said excavator. Means are also provided to retain the excavator in vertical position at various elevations thereof.

The primary object of the present invention is to provide a new and improved excavator.

Another object is to provide a new and improved excavator for excavating comparatively narrow irrigating ditches and sub-ditches, having improved means for receiving excavated material and for discharging the same laterally on both sides of an excavated ditch.

A further object is to provide a new and improved device of the character described wherein an excavator is trailed for a motor vehicle in a manner to permit vertical movement only of said trailed excavator, said trailing mechanism being arranged to engage the front end of an excavated ditch as the excavator is advanced to limit the depth of the excavation.

A still further object of the present invention is to provide new and improved means for cutting and separating a mass of accumulated debris gathered by the trailing torque bar.

A still further object is to provide new and improved automatically adjustable means for retaining the excavator in vertical operative position at different elevations thereof.

Another object is to provide improved adjustable means for automatically preventing discharge of excavated material into the ditch and for leveling the bottom of an excavated ditch.

I accomplish these and other objects by means of the improved device disclosed in the drawings forming a part of the present application wherein like characters of reference are used to designate similar parts throughout the specification and drawings, and in which—

Fig. 1 is a side elevation of my improved excavator;

Fig. 2 is a horizontal sectional view thereof;

Fig. 3 is a rear elevation, partly in section, with a portion of the rear guard removed;

Fig. 4 is a rear elevation disclosing the automatically adjustable means for retaining the excavator in vertical position at different elevations thereof; and

Fig. 5 is a view disclosing the manner in which the excavator is trailed from a motor vehicle and automatically held in vertical position, and also the manner in which the depth of the excavated ditch is limited and the manner in which accumulated debris under the edge of the torque bar is cut.

Referring to the drawings, the numeral 1 is used to designate in general a motor vehicle of suitable type and 2 the power shaft thereof.

Hingedly connected at its front end to the vehicle 1, for vertical movement only, I have provided a torque tube 3 provided on its lower side with a longitudinally disposed cutting blade 4, the purpose of which will hereinafter be more fully described. The opposite free end of the tube 3 is rigidly connected to a central housing 6 of a vertically disposed partition 7, within which is provided a suitable bevel gear 8 mounted upon a shaft 9 extending thru said housing 6 and connecting a pair of vertical discs 11 arranged in spaced parallel relation on opposite sides of the partition 7 and the central housing 6 thereof, said discs 11 being each provided with a plurality of cutting blades or elements preferably formed of angle irons 12, extending beyond the peripheries of said discs 11 whereby peripheral and radial cutting edges may be provided to excavate a ditch and smoothly cut the sides thereof.

A shaft 2' is mounted within the torque tube 3 and connects at its forward end, thru

any suitable universal joint 14, to the motive power of the vehicle 1 as represented by the power shaft 2 thereof. The opposite end of the shaft 2' extends thru the entire length of the tube 3 and into the central housing 6 and is therein provided with a suitable bevel pinion 17 meshing with the gear 8 in turn operatively connected to the discs 11 by means of the shaft 9, as disclosed in Fig. 2 of the drawings.

The partition 7 is provided at its upper end with oppositely faced discharge portions 18 arranged to discharge laterally excavated material received from the periphery of the excavator thru the action of centrifugal force.

The rear edge of the partition 7 is also provided with an annular flange 19 to prevent the discharge of excavated material backward into the excavated trench or ditch. The lower edge or end of said flange is provided with an adjustable chisel or horizontal cutting member 21 provided to level the bottom of an excavated ditch.

In order to retain the excavator in a vertical or operative position regardless of its elevation I have provided a rod 23 hingedly connected at its lower end to the back of the annular flange 19 and its upper end is slidably mounted within the lower end of a tubular member 24 of a horizontal bar 26 in turn pivotally mounted within an extension of the vehicle 1 extending rearwardly over the excavator, as disclosed in Figs. 4 and 5 of the drawings. The provision of the member 26 arranged laterally to the member 24 provides a wide base or bearing for the retaining member so that the excavator is readily and effectively retained in a vertical or operative position when excavating. The sliding or telescopic arrangement of the members 24 and 23 provides a simple and effective means for automatically adjusting this retaining mechanism to different elevations of the excavator.

In operation, as the vehicle 1 is advanced and the excavator is trailed, said excavator is rotated at a speed which will permit it to readily dig itself into the soil, the radial and peripheral cutting edges of the angle iron cutting elements 12 rapidly cutting away the soil on the bottom and sides of the trench or ditch, thus lowering said excavator into the soil until the torque tube 3 rests upon the front edge of the ditch being excavated, thereby preventing further lowering of the said excavator.

As said excavator is digging itself into the soil the telescopically connected members 23 and 24 are extended automatically to constantly retain said excavator in a vertical or operative position.

As the vehicle and excavator advance, weeds and other debris will accumulate under the torque bar 3 at the point of contact of said bar with the unexcavated soil. The

knife or longitudinally disposed cutting blade 4, being pulled over said accumulation, will readily cut or sever the same as fast as it accumulates, after which it will be torn up or excavated with the soil and discharged laterally by the discharge portions 18 of the central partition 7.

As the excavator is advanced into the soil by the vehicle 1 the excavated material is thrown off from said excavator by the action of centrifugal force into the discharging portions 18 of the central portion 7. When the vehicle is turning the excavator is moved laterally a certain amount and such movement is permitted by the action of the radial cutting edges of the excavator.

As the discs 11 are necessarily arranged in parallel spaced relation to provide space for the torque tube to connect with the central housing and partition, it is obviously necessary to have a space between the adjacent inner radial cutting edges of the two discs. Material, therefore, directly under the torque tube will not be reached by the peripheral cutting elements, but a sort of ledge or unexcavated portion would ordinarily remain in the center of the excavated ditch. This ledge is easily removed, first, by the action of the cutting blade 4 on the lower side of the torque tube 3, and second, by an inclined forward edge 27, which edge first slices the unstable ledge centrally and longitudinally and separates the sliced portions thereof, causing the same to fall into the path of the radial cutting edges of the revolving cutting elements 12 which disintegrate and carry the said ledge as excavated material, to the discharge portions 18 of the central partition 7.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is—

1. The combination with a motor vehicle of a vertically disposed rotary excavator; means connected to said excavator and to the vehicle for trailing and operating said excavator and resting upon the forward edge of a trench dug by said excavator as it advances, to limit the descent of said excavator; and means mounted within the connecting means and connected to said excavator and the motive power of said vehicle for operating said excavator.

2. The combination with a motor vehicle of an excavator comprising a pair of vertically disposed discs arranged in spaced parallel relation and each having a plurality of radially disposed excavating blades projecting beyond the peripheries of said discs; a partition arranged midway between said discs and provided at its central portion with a housing; a shaft extending thru the housing and connecting the discs; a gear on the shaft and within the housing; a torque tube connected at its rear end to the housing and hingedly connected at its front end to said

motor vehicle to trail the excavator, said hinged front end of said torque tube permitting vertical movement only of the excavator whereby said excavator may descend into a ditch excavated by said excavator while being trailed by said motor vehicle; and means mounted upon the partition for receiving and discharging laterally material excavated by the excavator.

3. The combination with a motor vehicle of an excavator comprising a pair of vertically disposed discs arranged in spaced parallel relation and each having a plurality of radially disposed excavating blades projecting beyond the peripheries of said discs; a partition arranged midway between said discs and provided at its central portion with a housing; a shaft extending thru the housing and connecting the discs; a gear on the shaft and within the housing; a torque tube connected at its rear end to the housing and hingedly connected at its front end to said motor vehicle to trail the excavator, said hinged front end of said torque tube permitting vertical movement only of the excavator whereby said excavator may descend into a ditch excavated by said excavator while being trailed by said motor vehicle; and automatically adjustable means connecting the excavator with the vehicle and for retaining said excavator vertically disposed at different elevations thereof.

4. The combination with a motor vehicle of an excavator comprising a pair of discs connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch.

5. The combination with a motor vehicle of an excavator comprising a pair of discs connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch; and means for receiving excavated material from said excavator and discharging the same laterally.

6. The combination with a motor vehicle of an excavator comprising a pair of discs

connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch; and means for retaining said excavator in a vertical position.

7. The combination with a motor vehicle of an excavator comprising a pair of discs connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch; and automatically adjustable means connected to said vehicle and to said excavator for retaining said excavator vertically disposed at different elevations.

8. The combination with a motor vehicle of an excavator comprising a pair of discs connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch; means for receiving excavated material from said excavator and discharging the same laterally; and means for preventing discharge of said excavated material into said ditch.

9. The combination with a motor vehicle of an excavator comprising a pair of discs connected in parallel spaced relation and provided with a plurality of radial and peripheral cutting edges; a torque bar operatively connected at its rear end to said excavator and hingedly connected at its front end with the motive power of said vehicle, whereby said excavator may be trailed from said vehicle and capable of vertical movement relatively to said vehicle, the rear portion of said tube engaging the front end of an excavated ditch as said excavator is advanced to limit the excavated depth of said ditch; means for receiving excavated material from

said excavator and discharging the same laterally; and means for leveling the bottom of a ditch excavated by said excavator.

10 10. The combination with a motor vehicle of an excavator; a torque tube hingedly connected at its front end to said vehicle and connected at its rear end to said excavator to limit the descent of said excavator into the soil by engaging the front edge of a ditch being excavated.

15 11. The combination with a motor vehicle of an excavator; a torque tube hingedly connected at its front end to said vehicle and connected at its rear end to said excavator to limit the descent of said excavator into the soil by engaging the front edge of a ditch being excavated; and means for severing accumulated debris at the point of contact of said tube with said front edge.

20 12. The combination with a motor vehicle of an excavator; a torque tube hingedly connected at its front end to said vehicle and connected at its rear end to said excavator to limit the descent of said excavator into the soil by engaging the front edge of a ditch being excavated; and a vertically disposed cutting blade mounted longitudinally of said tube on the under side thereof to sever accumulated debris at the point of contact of
30 said tube with said front edge.

In witness whereof, I hereunto set my signature.

HOWARD E. CRUSE.

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