

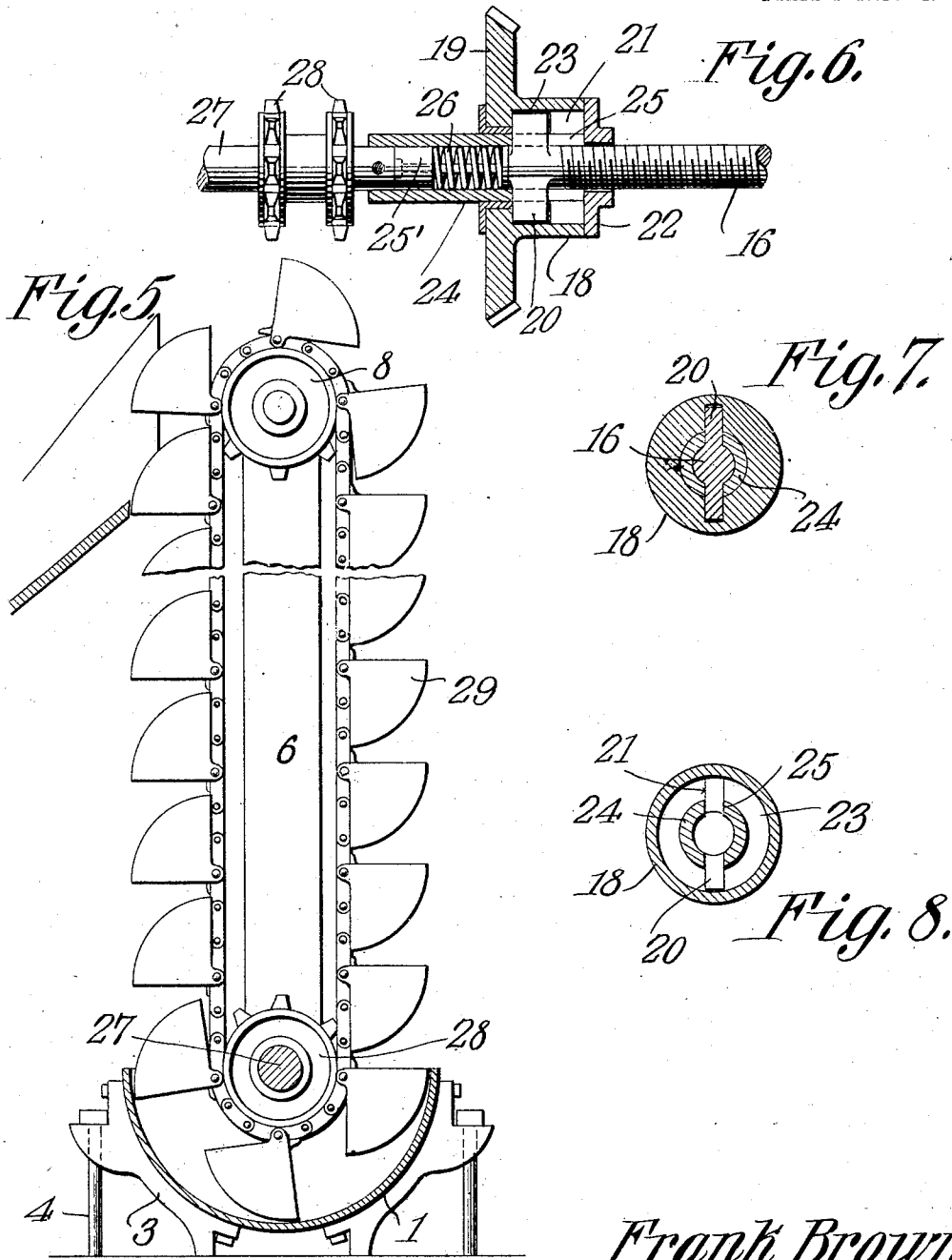
No. 866,839.

PATENTED SEPT. 24, 1907.

F. BROWN.
EARTH AUGER.

APPLICATION FILED AUG. 22, 1906.

2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK BROWN, OF TOLEDO, OHIO.

EARTH-AUGER.

No. 866,839.

Specification of Letters Patent.

Patented Sept. 24, 1907.

Application filed August 22, 1906. Serial No. 331,679.

To all whom it may concern:

Be it known that I, FRANK BROWN, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Earth-Auger, of which the following is a specification.

This invention relates to earth augers and its object is to provide an auger which is of simple construction, easily operated, and which is adapted to bore under the surface of the ground in order to permit pipe, tiles, etc. to be placed under the surface without the necessity of digging trenches as ordinarily.

Another object of the invention is to provide apparatus which will not only bore through the ground but also convey the loosened dirt up to the surface of the ground.

A still further object is to provide means for automatically stopping the rotation of the auger should the same come into contact with a non-yielding object such as a pipe, large stone, etc.

A further object is to provide mechanism for slowly feeding the auger forward as it rotates and for quickly returning the auger to its initial position.

With the above and other objects in view the invention consists of a trough-like body in which is arranged a feed screw adapted to rotate within a box located at one end of the body. The other end of the screw is connected to a gear of the drive mechanism in such a manner that the gear will become disconnected from the screw and will not rotate therewith when the resistance to the forward movement of the screw reaches a predetermined degree. An elevator and auger are rotatable with the gear and means are provided for transmitting rotary motion to the gear from any suitable source of power. The box in which the screw is located is rotatable for the purpose of quickly moving the screw and the parts connected thereto longitudinally independently of the screw rotating mechanism.

The invention also consists of certain other novel features of construction and combinations of parts which will be hereinafter more fully described and claimed and pointed out in the accompanying drawings, in which the preferred form of the invention is shown.

In said drawings Figure 1 is a longitudinal section through the apparatus and showing the auger retracted into the body and certain parts of the apparatus broken away; Fig. 2 is a section on line 2—2, Fig. 1; Fig. 3 is a section on line 3—3, Fig. 1; Fig. 4 is an enlarged section through the connection between the screw and gear; Fig. 5 is an enlarged vertical transverse section through the apparatus and showing the elevator; Fig. 6 is an enlarged section similar to Fig. 4 and showing the positions of the parts when the drive gear is automatically disengaged from the feed screw to stop the forward movement of the worm when the same contacts with an unyielding obstruction; Fig. 7 is a section

on line 7—7 Fig. 4; and Fig. 8 is a section on line 8—8 Fig. 4.

Referring to the figures by characters of reference, 1 is a trough-like body closed at one end by a head 2 and preferably supported in yokes 3 having stakes 4 in the ends thereof. A cross head 5 is slidably mounted upon and extends transversely of the body and carries a standard 6 having an extension 7 on which are arranged sprockets 8. A cylindrical box 9 is rotatably mounted in the head 2 of the body and has an annular flange 10 at one end and a sprocket 11 at its other end whereby displacement of the box is prevented. A chain 12 is arranged on the sprocket 11 and also upon a sprocket 13 located at one end of a shaft 14 to which a crank 15 is secured. A threaded passage is formed through the box 9 and a screw 16 extends therethrough and has a small auger 17 at its outer end. The inner end of the screw projects into the hub 18 of a gear 19 and has keys 20 radiating therefrom and normally disposed within seats 21 formed in the hub of the gear. The outer ends of these seats are closed normally by a cap 22 and the inner ends of the seats open into an interior annular groove 23 the width of which is slightly greater than that of the keys 20.

A tubular extension 24 is mounted to rotate within the gear 19 and has longitudinal slots 25 in which the keys 20 are adapted to work. A plug 25' is located within this extension and a spring 26 is interposed between said plug and the end of the screw 16. This spring serves to hold the keys 20 normally pressed against the cap 22 and within the seats 21 as shown in Figs. 4 and 7. These seats 21 have also been shown in elevation in Fig. 8. Obviously when the keys are within these seats 21 the gear 19 and the shaft 27 and auger 30 must rotate together. A shaft section 27 is secured in any preferred manner within one end of the extension 24 and has sprockets 28 secured thereon. An elevator 29 is arranged on the sprockets 28 and 8. An auger 30 is secured in any desired manner to the shaft section and is preferably made up of sections having couplings 31 fastening them together. A bracket 32 is arranged upon the cross head 5 and constitutes a bearing for a shaft 33. A gear 34 is arranged at one end of this shaft and meshes with gear 19 and the other end of said shaft is connected by a universal joint 35 with an extensible shaft 36 adapted to transmit rotary motion from any suitable source of power.

In using this apparatus a ditch or trench of suitable proportions is dug at a point where a line of pipes is to be started and the body 1 and the parts connected thereto is then placed in the trench. By rotating the shaft 14 the box 9 will be caused to rapidly revolve and will drive the auger 17 into one end of the trench until the gear 19 and the cross head 5 are brought into position close to the head 2. A section of the auger 30 is then fastened to the shaft 27 and the gear 19 is ro-

tated by means of gear 34 and shafts 33 and 36. This will cause the screw 16 and tubular extension 24 to rotate together because the keys 20 are disposed within the seats 21 and independent rotation is impossible (see Figs. 1 and 7). The elevator and auger will be simultaneously operated and will at the same time be moved slowly forward by the screw 16 turning the seats 21 and within the box 9. The loosened dirt will be moved backward by the auger on to the elevator which will in turn convey it to the surface of the ground. After the auger has been fed by the screw 16 into the ground a distance equal to the length of the section in use said section is detached from shaft 27 and the screw 16, cross head 5, and elevator 29 moved to their initial positions by means of the chain 12. Another auger section is then secured between shaft 27 and the auger section first connected thereto. The operation hereinbefore described can then be continued. Should the auger strike a large stone or other unyielding object the screw 16 will of course continue to feed forward but as the auger can not move forward therewith the continued rotation of gear 19 will cause the rotation of the keys 20 and screw 16. Said screw will therefore be fed forward so as to compress the spring 6 and during this forward movement the wings will slide longitudinally within the slots 25 until they are completely removed from the seats 21 and assume positions within the annular groove 23. When the wings are brought to this position the gear 19 can rotate without causing a corresponding movement of the wings and the screws 16 and therefore feeding of the screw will be stopped and the shaft 27 will also stop rotating. All danger of injury to the machine as a result of unyielding objects in the path of the auger is thus eliminated.

It will of course be understood that the spring 26 is compressed when the gear becomes uncoupled in this manner and therefore as soon as the obstacle to the advance of the auger has been removed this spring will expand and cause the gear to reengage the keys on the screw.

By providing the small auger 17 the apparatus may be used in a ditch no longer than the body 1 because said apparatus can be lowered into the ditch minus the worm or auger 30 and with the auger 17 close to the box 9. The auger 17 can then be screwed into one end of the ditch or trench a sufficient distance to allow an auger section to be attached to the extension 24 after which the rotation of the screw 16 may be reversed so as to force the auger 30 into the opposite end of the ditch.

The preferred form of the invention has been set forth in the foregoing description but I do not limit

myself thereto as I am aware that modifications may be made therein without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of the claims.

What is claimed is:

1. In an apparatus of the character described the combination with a body; of a feed screw therein, an auger, driving mechanism interposed between and connected to the feed screw and auger, and means for automatically shifting the driving mechanism out of engagement with the feed screw when the auger is subjected to resistance of a predetermined degree.

2. In an apparatus of the character described the combination with a body; of a feed screw therein, and auger, driving mechanism interposed between and connected to the feed screw and auger, means for automatically shifting the driving mechanism out of engagement with the feed screw when the auger is subjected to resistance of a predetermined degree, and means for automatically moving said mechanism into engagement with the screw when said pressure is removed.

3. In an apparatus of the character described the combination with a troughshaped body; of a feed screw mounted therein, a cross head, an auger rotatably mounted within the body, driving mechanism carried by the cross head and connected to the auger, keys upon the screw, resilient means for holding the keys normally in engagement with the driving mechanism.

4. In an apparatus of the character described the combination with a trough-shaped body; of a feed screw mounted therein, a cross head, an auger rotatably mounted within the body, driving mechanism carried by the cross head and connected to the auger keys upon the screw, resilient means for holding the keys normally in engagement with the driving mechanism, and an elevator operated by the driving mechanism and extending into the body.

5. In an apparatus of the character described the combination with a trough shaped body; of a box rotatably mounted within said body, a feed screw rotatably mounted within the box, a cross head, an auger rotatably mounted within the body, driving mechanism carried by the cross head and connected to the auger, keys upon the screw, resilient means for holding the keys normally in engagement with the driving mechanism, an elevator operated by the driving mechanism and extending into the body, and means for rotating the box.

6. In an apparatus of the character described the combination with a body; of a feed screw mounted therein, a key extending therefrom, a gear having an interior annular groove adapted to receive the key, and a seat for said key and communicating with the groove, an auger connected to the gear and rotatable therewith, and a spring within the seat and holding the key normally disposed within its seat.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FRANK BROWN.

Witnesses:

EARLE L. PETERS,
ETHEL B. MARSHALL.