E. KEAST.

EXCAVATING MACHINE.

APPLICATION FILED JAN. 25, 1917.

1,260,683.

Patented Mar. 26, 1918.

3 SHEETS—SHEET 1.

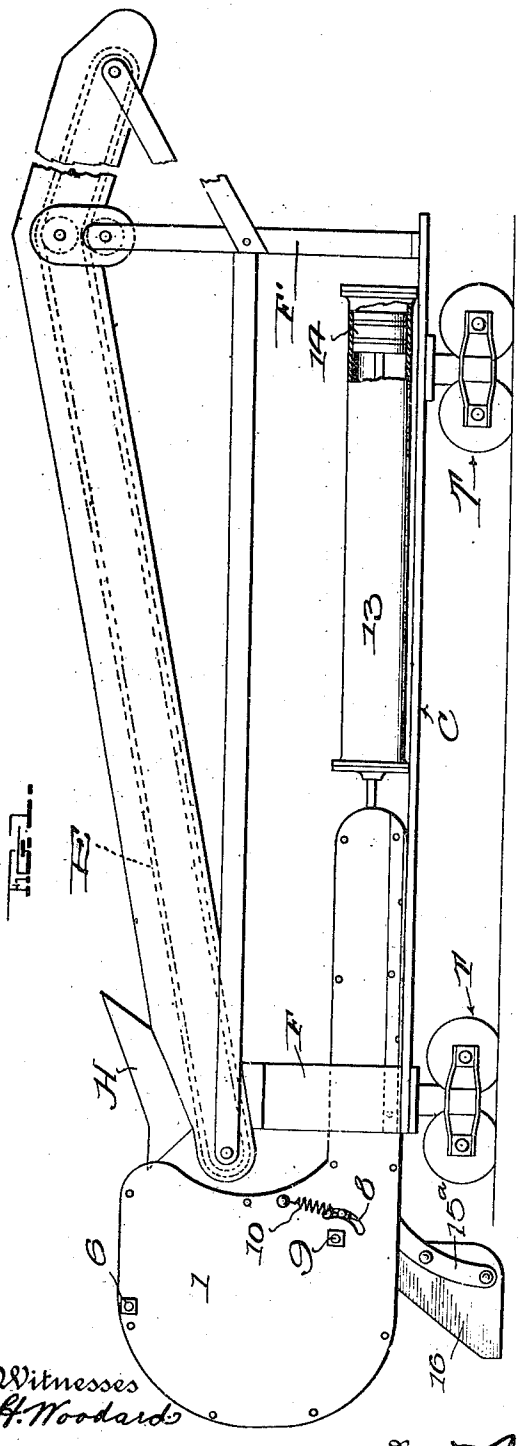


FIG. 1.

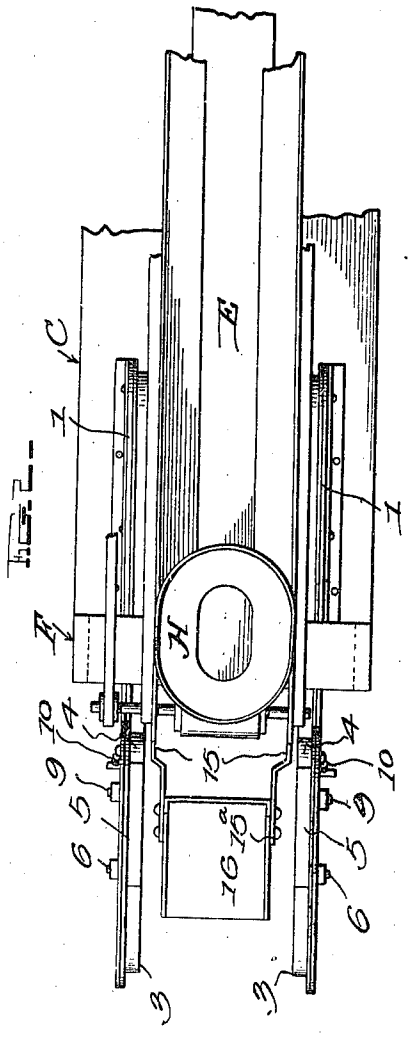


FIG. 2.

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3 SHEETS—SHEET 2.

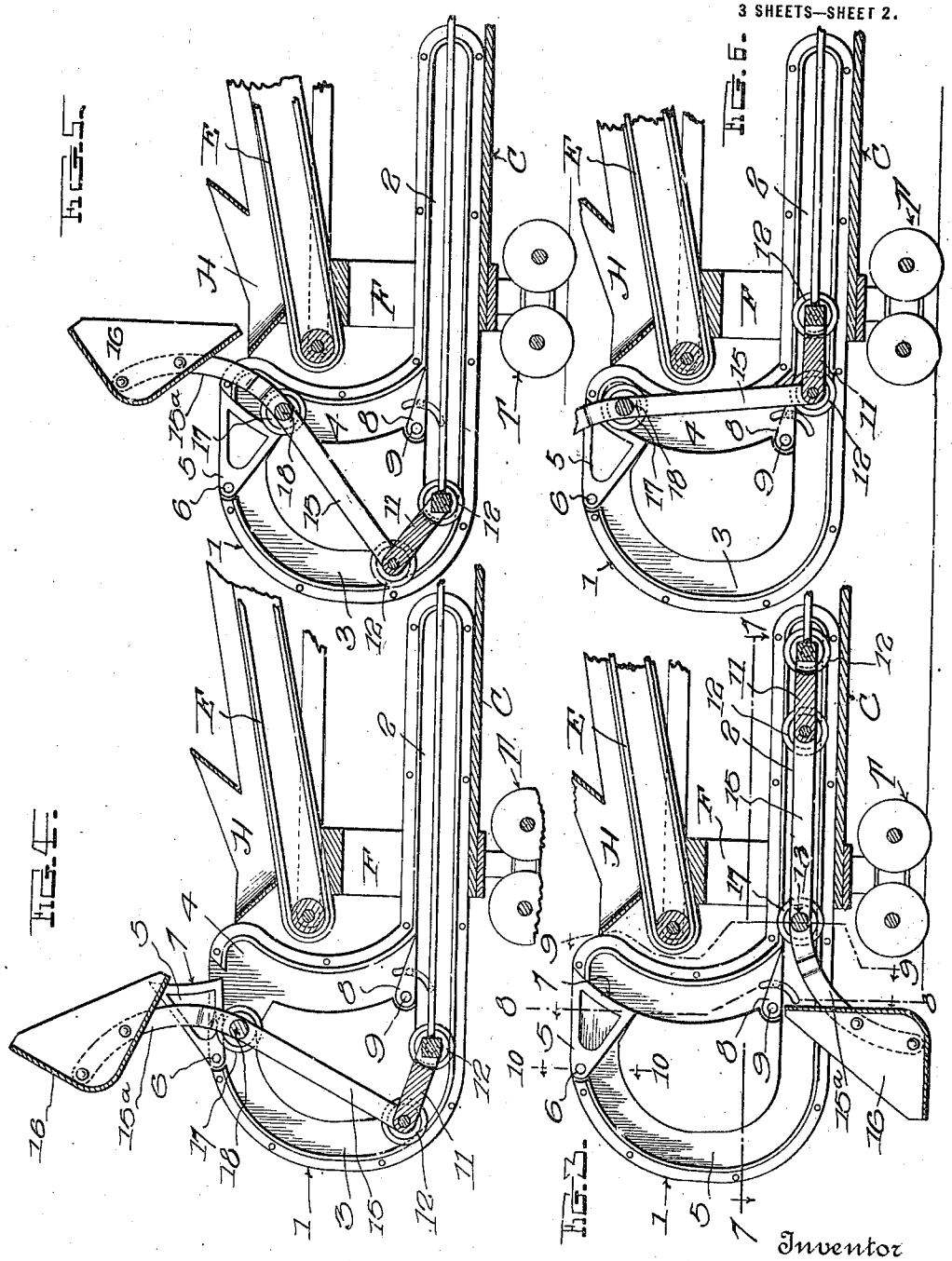


FIG. 5.

FIG. 6.

FIG. 4.

FIG. 7.

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3 SHEETS—SHEET 3.

FIG. 7.

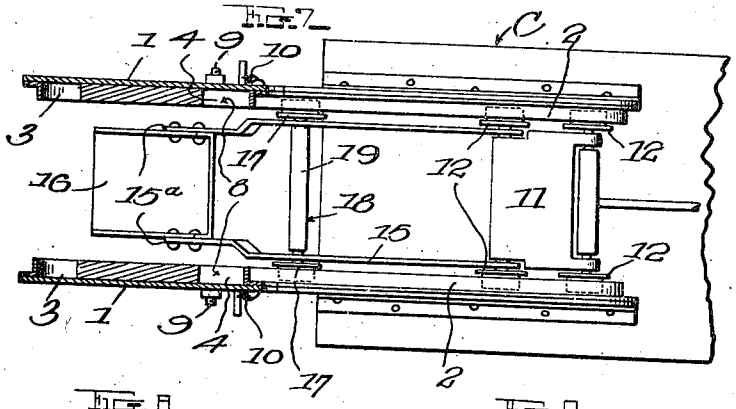


FIG. 8.

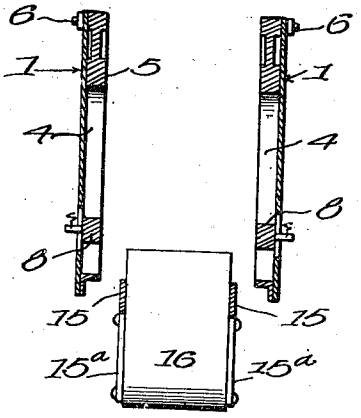


FIG. 9.

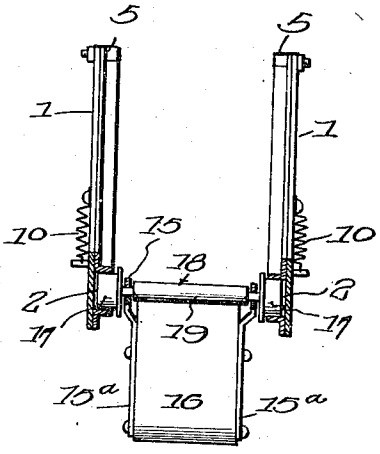


FIG. 10.

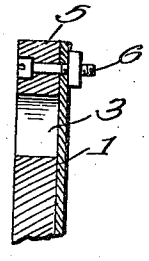


FIG. 11.

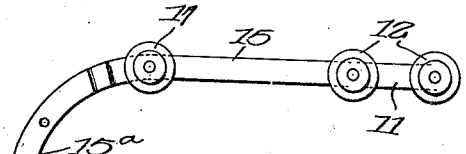
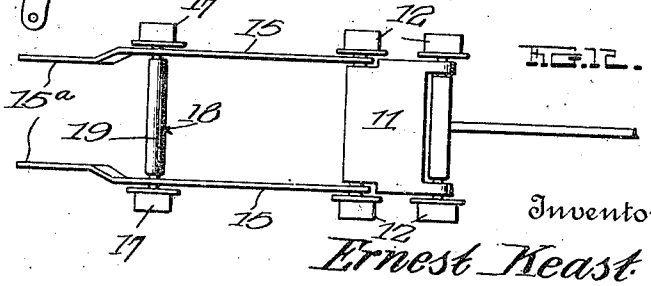


FIG. 12.



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UNITED STATES PATENT OFFICE.

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EXCAVATING-MACHINE.

1,260,683. Specification of Letters Patent. Patented Mar. 26, 1918.

Application filed January 25, 1917 Serial No. 144,416.

To all whom it may concern:

Be it known that I, ERNEST KEAST, a citizen of the United States, residing at Negaunee, in the county of Marquette and State of Michigan, have invented certain new and useful Improvements in Excavating-Machines; and I do 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.

My invention is an excavating machine designed primarily for use in tunneling and mining, although its application need not be limited to these fields.

The object of the invention is to provide a machine of this class which will readily raise earth, ore and the like and deposit it into a conveyer, without the use of a multiplicity of moving parts. To this end, the invention resides in certain novel features of construction and in the unique combinations of parts to be hereinafter fully described and claimed.

In describing the invention, I shall refer to the accompanying drawings wherein similar reference characters designate corresponding parts throughout the several views and wherein:—

Figure 1 is a side elevation of a machine constructed in accordance with my invention;

Fig. 2 is a fragmentary top plan view;

Figs. 3, 4, 5 and 6 are detail vertical longitudinal sections showing different steps in the operation of the machine;

Fig. 7 is a horizontal section taken on the plane indicated by the line 7—7 of Fig. 3;

Figs. 8, 9 and 10 are vertical transverse sections viewed respectively on the lines 8—8, 9—9 and 10—10 of Fig. 3;

Fig. 11 is a side elevation of the carriage and the arms carried thereby; and

Fig. 12 is a top plan view of these parts.

In these drawings, a car C is shown mounted upon trucks T designed to run upon a track not shown. Supported by the car C upon front and rear frames F and F', is an endless conveyer E having at its front end a hopper H into which the excavating mechanism is adapted to discharge, whereby the ore or other material raised by such mechanism may be conveyed to the rear end of the car C. The provision of the conveyer E renders the machine well adapted for tunneling purposes since the material from the blind end of the tunnel may be conveyed to the open end thereof without the use of cumbersome apparatus.

Rigidly secured to and projecting forwardly from the car C is a pair of suitably designed upright cheeks 1 having on their inner opposed sides a pair of horizontal trackways 2 whose front ends are curved upwardly and rearwardly as disclosed at 3, while leading from the front terminals of the ways 2 to the intermediate portions thereof, is a pair of additional substantially upright trackways 4 which are preferably curved as shown.

At the juncture of the upper ends of the ways 4 with the ways 2, a pair of gravity positioned gate members 5 is provided, such members being of triangular formation and being pivoted at one of their angles to the cheeks 1 adjacent the upper sides of the front terminals of the tracks 2, the pivots being designated in the drawings by the numerals 6. The gate members 5 are normally disposed across the front terminals of the trackways 2 with their free rear ends 7 so positioned as to constitute continuations of the front walls of the trackways 4, this being expedient in order that shoe members yet to be defined may move from the front ends of the trackways 2 into the ways 4, but may not travel from the latter into the former.

Additional gate members 8 are provided at the juncture of the lower ends of the trackways 4 with the ways 2, such gate members being pivoted at 9 and held normally raised by springs 10 or the equivalents thereof. The function of the members 8 is to allow the shoe members above mentioned to readily travel from the trackways 4 into the ways 2, but to prevent movement of such members from the latter into the former.

Slidably mounted between the two cheeks 1 is a carriage 11 having rollers or the like 12 traveling in the trackways 2, said carriage being connected with the front end of a piston rod which enters a fluid pressure cylinder 13 on the rear end of the car C and carries an appropriate piston 14, whereby the carriage may be projected or retracted at will by the admission of pressure into one end or the other of the cylinder.

Projecting forwardly from the carriage 11 and pivotally connected thereto, preferably on one of the axles of the rollers 12, is a pair of arms 15 having downturned front

ends 15ª carrying a scoop or bucket 16 normally disposed in advance of the front truck of the car C. The intermediate portions of the arms 15 carry shoe members 17 preferably in the form of rollers mounted on the opposite ends of an axle 18 which passes through the two arms 15 and is enlarged at its center at 19 to correctly space said arms. Although this arrangement of parts is preferable, it is evident that the rollers 17 might well be carried by stub shafts projecting one from each arm 15.

When the carriage 11 is projected forwardly, the rollers 17 are adapted to travel upwardly and rearwardly in the curved front ends 3 of the trackways 2, whereas the carriage wheels 12 travel only in the horizontal portions of said ways. This causes the bucket 16 to be inverted over the hopper H as clearly shown in Fig. 5, whereupon the load gathered by said bucket during its initial forward movement is deposited in said hopper to be carried rearwardly therefrom by the conveyer E. When the rollers 17 come in contact with the under sides of the gate members 5, they will raise such members as shown in Fig. 4 and will thus travel into the upper ends of the trackways 4. The gate members 5 drop by gravity as soon as the rollers enter the ways 4 and thus prevent such rollers from moving again into the curved portions of the trackways 2. When the rollers stand in this position, the carriage 11 is disposed at its limit of forward movement as illustrated in Fig. 5. When now the carriage is retracted, since the rollers 17 cannot leave the upper ends of the ways 4, they will travel downwardly therein after the carriage has passed the lower end of said ways and will open the gate members 8 by contact therewith, whereupon they may assume their normal positions in the horizontal portions of the ways 2. The members 8 are now returned to normal position by their springs 10 in order that they may not obstruct the forward movement of the rollers 17 and the carriage 11 when again projected. The above cycle of operation takes place successively as long as the machine is in use and obviously accomplishes the required results in an efficient manner, regardless of the simplicity of the machine.

The trackways above described are preferably constructed in the manner depicted in the drawings, but obviously numerous changes regarding these features as well as others may be made within the scope of the invention without sacrificing any of the advantages thereof.

I claim:

In an excavating machine, the combination of a support, a pair of parallel vertical cheeks mounted on said support and having rearwardly extending horizontal portions, horizontal tracks on the inner opposed sides of said portions and curving upwardly and rearwardly at the front edges of said cheeks, additional tracks leading from the upper ends of the curved portions of said first named tracks to the horizontal portions thereof, a carriage having front and rear shoes traveling on said first named tracks, a pitman for moving said carriage forwardly and rearwardly, a pair of arms pivoted at their rear ends to said carriage and having front ends curved downwardly, said front ends carrying a scoop, and shoes on said arms adapted to travel upwardly and rearwardly in the curved ends of the first named tracks to dump the scoop and then downwardly in said additional tracks to right said scoop.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ERNEST KEAST.

Witnesses:

THEODORE A. THOREN,

HENRY NAUKEOVIS.