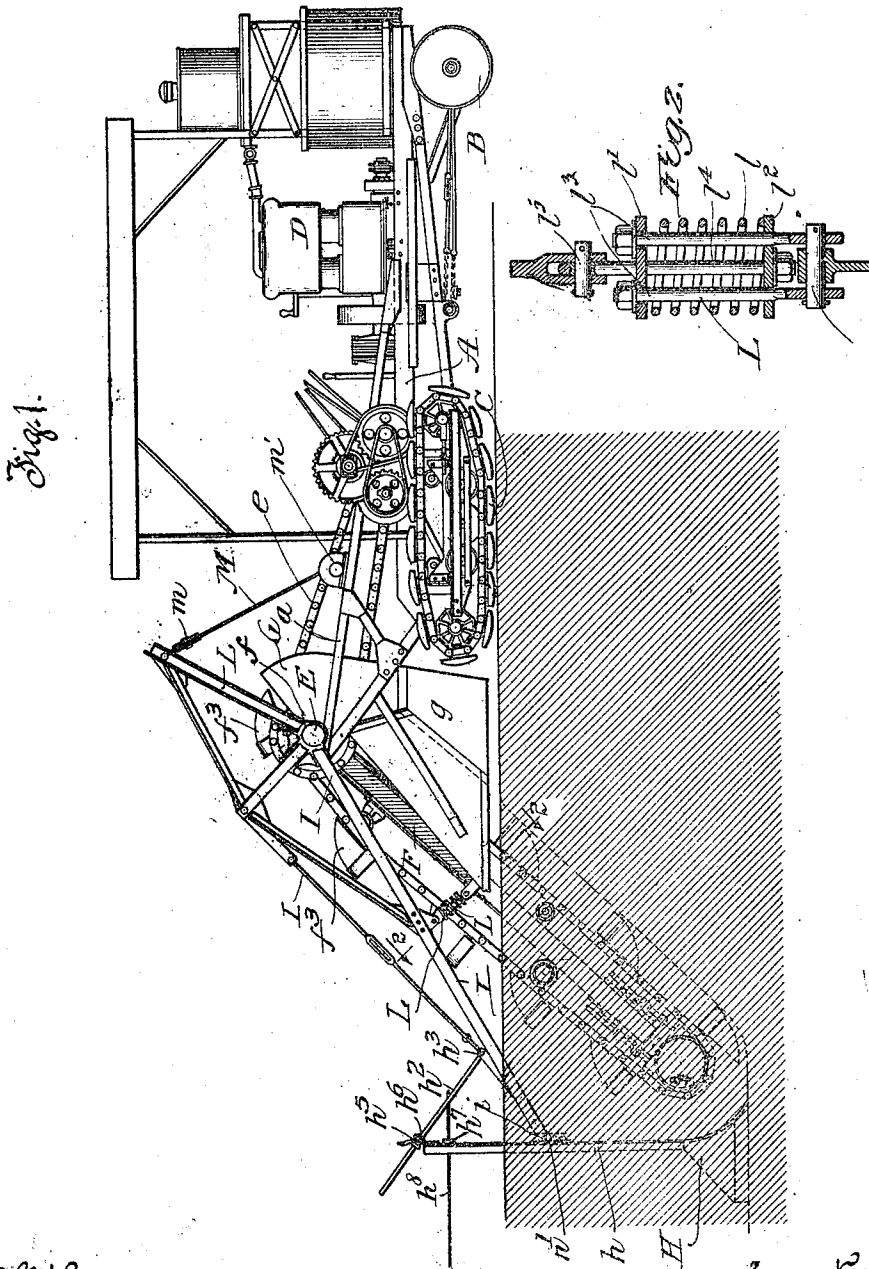


J. C. FRENCH.
TRENCHING MACHINE.
APPLICATION FILED MAY 25, 1914.

1,239,474.

Patented Sept. 11, 1917.
2 SHEETS—SHEET 1.



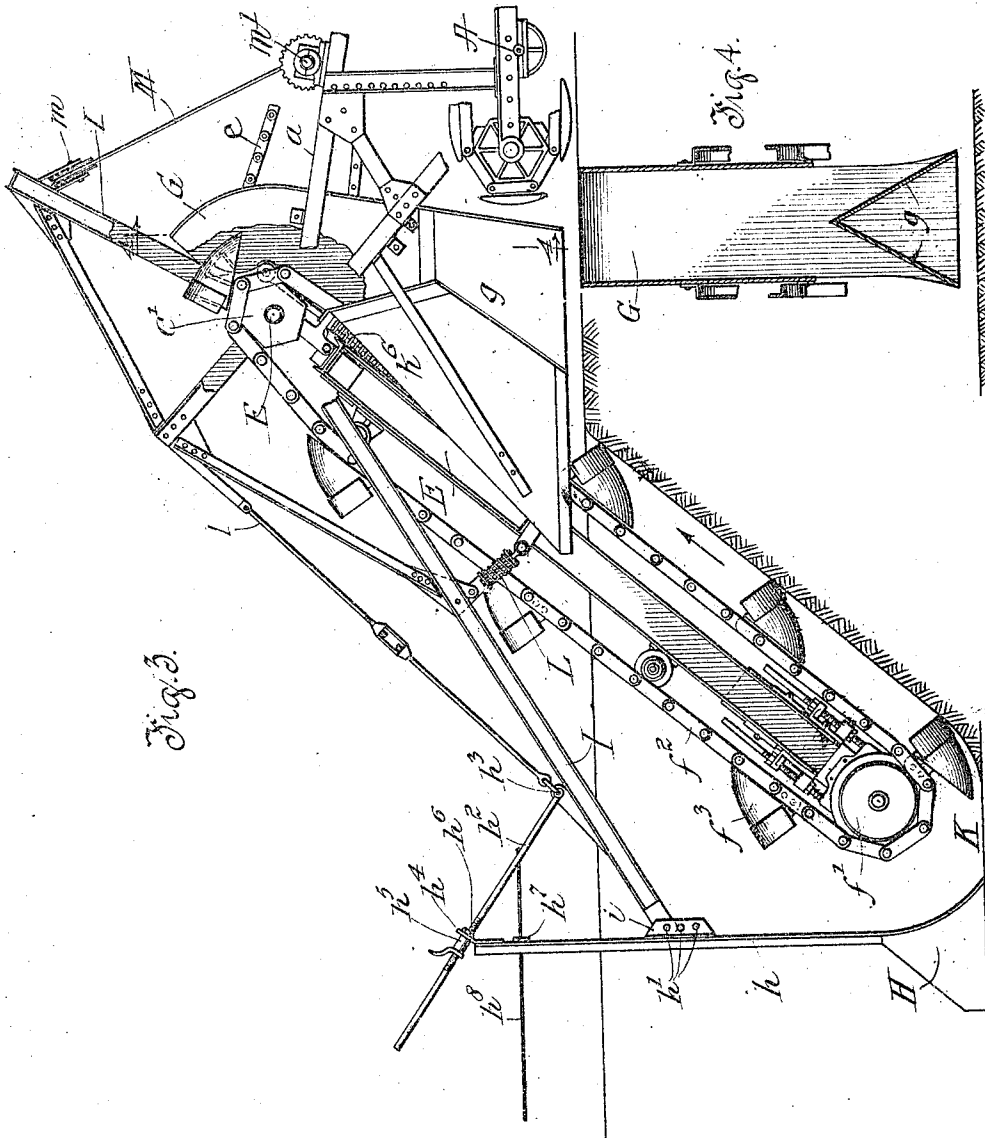
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UNITED STATES PATENT OFFICE.

JAMES C. FRENCH, OF KENOSHA, WISCONSIN, ASSIGNOR TO FREDERICK C. AUSTIN,
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TRENCHING-MACHINE.

1,239,474.

Specification of Letters Patent.

Patented Sept. 11, 1917.

Application filed May 25, 1914. Serial No. 840,665.

To all whom it may concern:

Be it known that I, JAMES C. FRENCH, a citizen of the United States of America, and resident of Kenosha, Kenosha county, Wisconsin, have invented a certain new and useful Improvement in Trenching-Machines, of which the following is a specification.

My invention relates to excavators of that particular type in which the excavating apparatus comprises a beam pivoted on a horizontal shaft at the rear of the machine, and in which an endless series of buckets is arranged to travel up and down said beam, the said buckets cutting a trench as the machine moves slowly forward.

Objects of my invention are to provide efficient means for smoothing or grading the bottom of the ditch behind the bucket; to provide a novel and efficient arrangement for preserving a proper grade line for the ditch or trench; and to provide certain details and features of construction and combinations tending to increase the general efficiency of an excavating machine of this particular character.

To these and other useful ends my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings—

Figure 1 is a side elevation of an excavating machine embodying the principles of my invention, showing the beam and buckets down in the ground.

Fig. 2 is an enlarged detail section on line 2—2 in Fig. 1.

Fig. 3 is an enlarged side elevation of the excavating apparatus in operative position, showing certain portions thereof broken away for convenience of illustration.

Fig. 4 is a detail section on line 4—4 in Fig. 3.

As thus illustrated, the body A of the machine may be of any suitable known or approved character, and may be supported upon front wheels B and rear caterpillars C, the latter being suitably driven by the engine D on the body. The said body is provided with a rearwardly extending frame α upon which is mounted the horizontal shaft E, bearings being provided for holding the shaft in place, and for supporting it for rotation. It will be seen that the said shaft is driven by a sprocket chain connec-

tion e , and it will be understood that this chain is in turn operated in any suitable manner by said engine.

The swinging beam F has its upper end supported by bearings f on the shaft E, and the lower end of said beam is provided with sprocket wheels f^1 for the endless sprocket chains f^2 which carry the buckets f^3 , and whereby said buckets are maintained in operating position. The shaft E is provided with sprockets e^1 for the chains f^2 , and with this arrangement the buckets travel downward at the upper or rear side of the beam and then upward at the front side of the beam, or in front of the same, whereby each bucket takes up a load of dirt as it passes under the sprocket f^1 , and as it then travels upward from the bottom of the trench. These buckets are each secured to a link of each chain, so that the rear end of each bucket tilts outward and away from the sprocket chains f^2 as it passes upward and around the shaft E, thus dropping the load of dirt at this point. (See Fig. 5.) The load of dirt thus discharged is received by the hopper or chute G, which latter is provided with inclined deflectors g by which the dirt is discharged at opposite sides of the path of the ditch. The construction thus far described is old and well known.

In order to provide the ditch or trench with a smooth surface at the bottom thereof, and in order to facilitate the laying of the tile, a grading device in the form of a scraper H is disposed behind the buckets, and is arranged to rest on the bottom of the ditch or trench, being secured to the lower end of a vertically disposed standard or upright h , which latter extends above the ground. The trussed frame I is pivoted at the outer ends of the shaft E, and has its lower end provided with a pivotal connection i on the forward side of the standard h , the latter having several holes h^1 for raising and lowering this pivotal connection. A rod h^2 has its lower end pivoted at h^3 to the frame I, and has its threaded upper portion extended through a bracket h^4 on the upper end of the standard h , the said rod being disposed at an angle and extending backward over the upper end of said standard. A nut h^5 on the threaded portion of the rod bears against the back of the bracket

h⁴, and with this provision the angle between the standard h and the frame I can be changed at will. A nut h⁶ on said rod h² engages the forward side of the bracket h⁴, and coöperates with the nut h⁵ to clamp the bracket between them and in various positions on said rod. By changing the angle of the standard h relative to the frame I, the proper position of the scraper H can be maintained at all times. Furthermore, an indicator h⁷ on the upper portion of the standard h can be employed for indicating whether the apparatus is working at the proper depth, and for assisting the operator in maintaining the proper grade line for the trench. This can be done by sighting from the said indicator, relative to objects along the path of the ditch, or by running a wire h⁸ along the ditch. By keeping the standard h upright at all times, and by then maintaining the indicator h⁷ exactly opposite this wire at all times, the bottom K of the ditch or trench will always be a given distance below the said wire, and thus the desired grade line will be maintained during the forward progress of the machine.

The frame I is prevented from rising, and is yieldingly held down in place by the spring connection L, one at each side of the machine, which connects said frame with the bucket beam. These device may be of any suitable character, but are preferably constructed as shown in Fig. 2. As thus illustrated, the spring l is interposed between the shoulders l¹ and l², which are carried respectively on the ends of the rods l³ and l⁴ in any suitable manner. The rods l³ are connected by a pivot with the bucket beam, and the upper end of the rod l⁴ is connected by a pivotal connection l⁵ with the frame I, whereby the said spring l is compressed by any inclination on the part of the scraper H to rise from the bottom of the trench. Thus the grading devices are yieldingly held down in place, and the yielding action serves in some measure to prevent breakage when obstructions are encountered.

The bucket beam and the frame I are raised and lowered by a cable M which travels over a sheave m on the upper end of said frame, and which has its lower end wound upon a suitable drum m¹, it being understood that the latter can be operated by hand or by the engine on the body. Any suitable means, however, can be employed for raising and lowering the excavating apparatus in the ditch. By changing the angle of the bucket beam, the depth of the ditch or trench can be varied at will.

I do not limit myself to the exact construction shown and described.

What I claim as my invention is:—

1. An excavating machine comprising instrumentalities for cutting a trench, and

means behind said instrumentalities and resiliently connected therewith for smoothing the trench in rear thereof.

2. An excavating machine comprising instrumentalities for cutting a trench, and means behind said instrumentalities for smoothing the trench in rear thereof, said machine including a shaft for supporting said instrumentalities, and said means having a support mounted independently of said instrumentalities on said shaft.

3. An excavating machine comprising instrumentalities for cutting a trench, and means behind said instrumentalities and resiliently connected therewith for smoothing the trench in rear thereof, said means including a scraper which slides on the bottom of the trench, and devices for adjusting up and down the position of said scraper.

4. An excavating machine comprising instrumentalities for cutting a trench, and means behind said instrumentalities for smoothing the trench in rear thereof, said instrumentalities including a tilting digging beam, a shaft upon which the upper end of said beam is mounted, buckets carried on said beam, operated by said shaft, and said means having a tilting support mounted independently of said beam on said shaft, extending downward behind said beam.

5. An excavating machine comprising instrumentalities for cutting a trench, and means behind said instrumentalities for smoothing the trench in rear thereof, said instrumentalities including a beam provided with an endless series of buckets, and a spring device for yieldingly holding said means in position, connected to said beam.

6. An excavating machine comprising instrumentalities for cutting a trench, and means behind said instrumentalities for smoothing the trench in rear thereof, said means including a standard, a scraper on the lower end of said standard, a support, a pivotal connection between said standard and the rear end of said support, and an adjustable brace between said support and the upper portion of said standard.

7. An excavating machine comprising instrumentalities for cutting a trench, means behind said instrumentalities for smoothing the trench in rear thereof, said means comprising a standard, a grade-line indicator on the upper portion of said standard, and adjusting devices at the top of said indicator to vary the position of said means for different depths, and to hold said indicator upright.

8. An excavating machine comprising instrumentalities for cutting a trench, means behind said instrumentalities for smoothing the trench in rear thereof, said means having a grade line indicator mounted thereon, and adjusting devices at the top of said

indicator to vary the position of said means for different depths, and to hold said indicator upright.

5 9. An excavating machine comprising instrumentalities for cutting a trench, means behind said instrumentalities for smoothing the trench in rear thereof, and devices for raising and lowering said instrumentalities and means in unison, and springs providing

relative motion between said instrumentalities and said means. 10

Signed by me at Chicago, Illinois, this 9th day of May 1914.

JAMES C. FRENCH.

Witnesses:

JOHN T. WILSON,
FREDERIC S. BOYER.