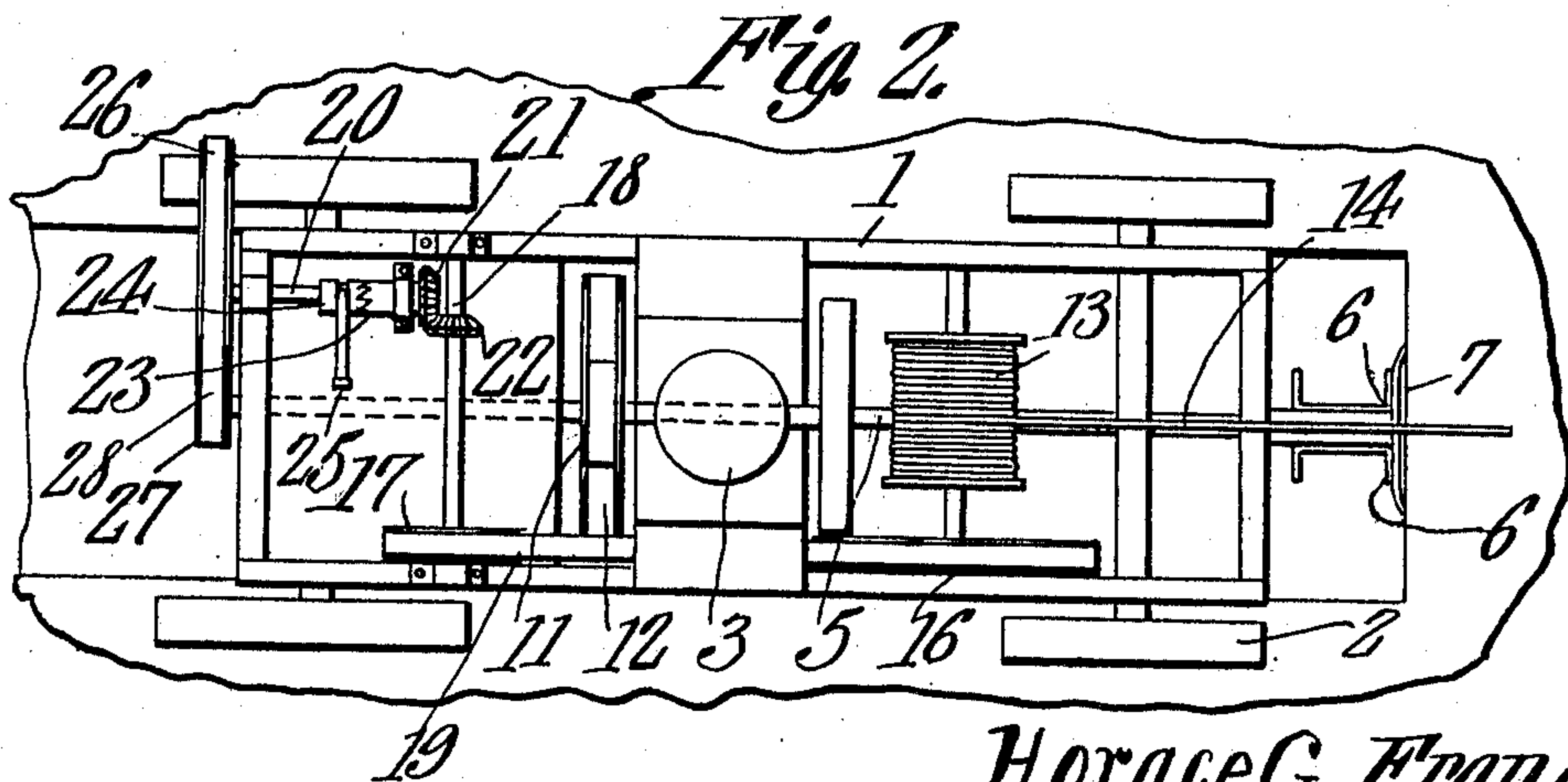
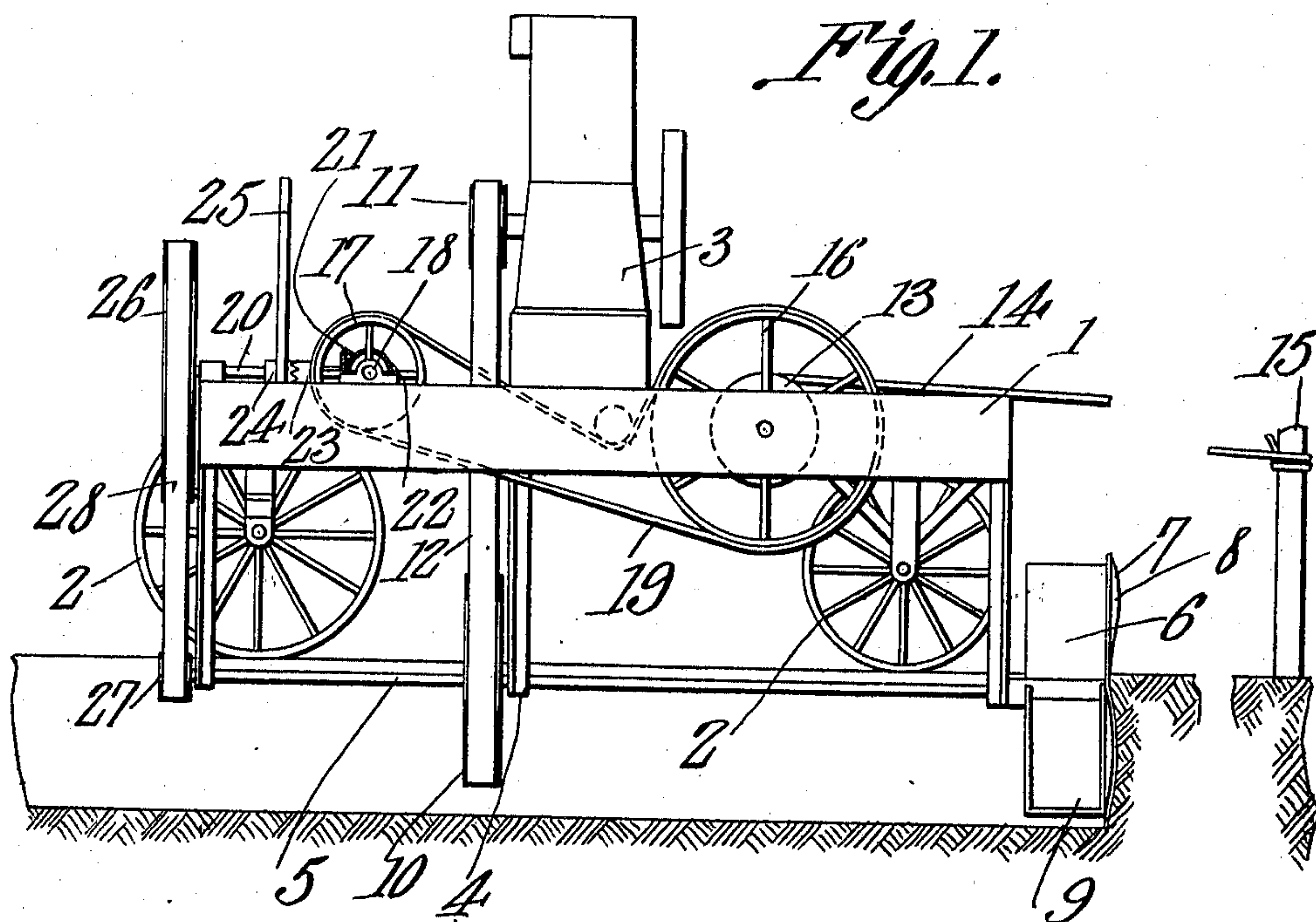


H. G. FRANCIS.
DITCHING MACHINE.
APPLICATION FILED MAY 18, 1910.

992,866.

Patented May 23, 1911.
2 SHEETS—SHEET 1.



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Fig. 3.

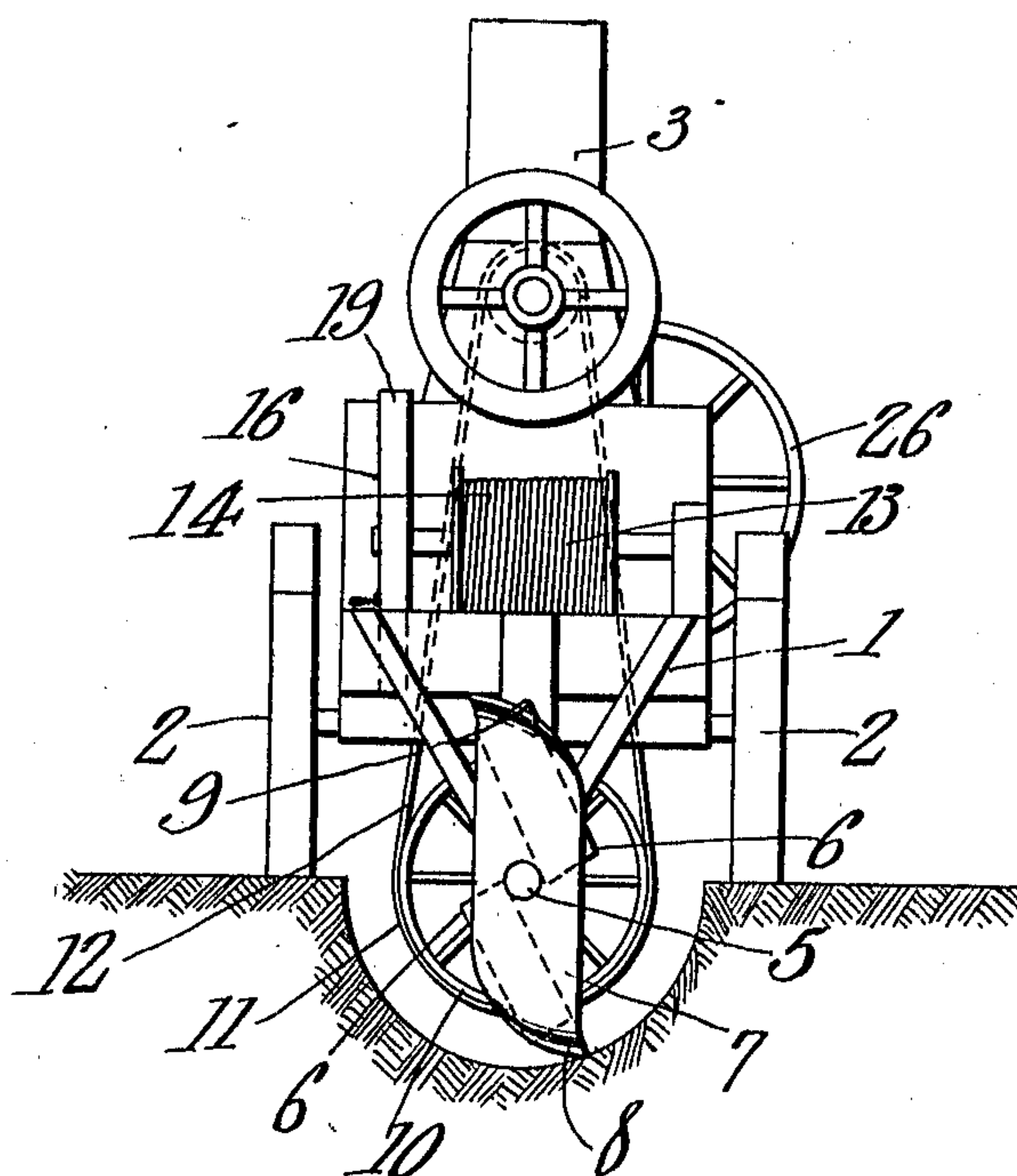
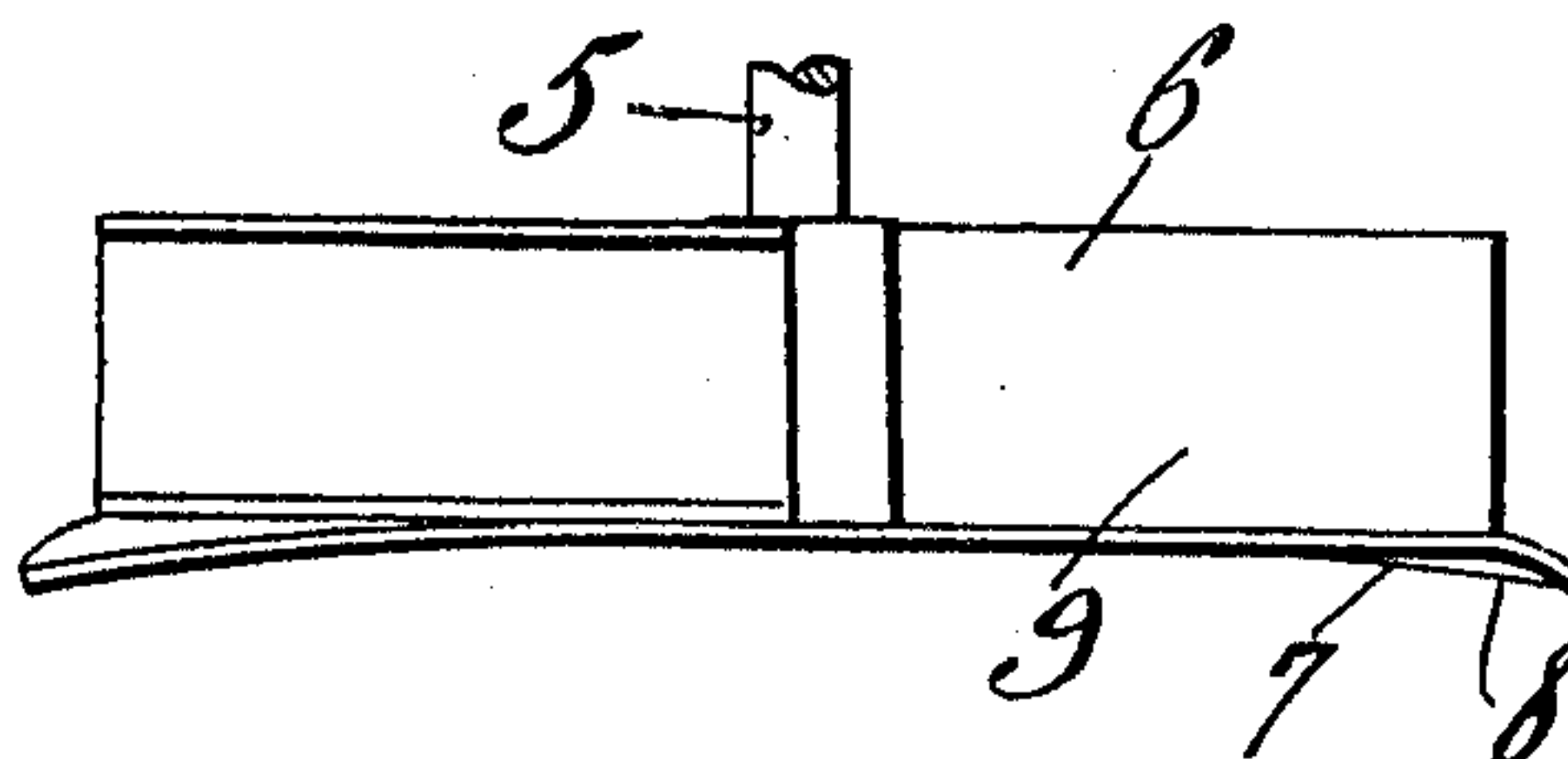


Fig. 4.



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UNITED STATES PATENT OFFICE.

HORACE G. FRANCIS, OF DEXTER, MISSOURI, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO EMMETT S. WILLS AND ONE-FOURTH TO JAMES K. ROBINSON, OF DEXTER, MISSOURI.

DITCHING-MACHINE.

992,866.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed May 16, 1910. Serial No. 561,632.

To all whom it may concern:

Be it known that I, HORACE G. FRANCIS, a citizen of the United States, residing at Dexter, in the county of Stoddard and State of Missouri, have invented a new and useful Ditching-Machine, of which the following is a specification.

This invention relates to a ditching machine and consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention, is to provide a machine of the character indicated equipped with means adapted to cut a ditch of approximately semi-circular or semi-cylindrical configuration and means adapted to be manually operated whereby the machine may be automatically advanced toward its work.

With the above object in view the machine includes a wheel mounted frame upon which is located an engine. A shaft depends from the frame and is provided at one end with a cutter and means is provided which operatively connects said shaft with said engine. A windlass is mounted upon the frame and means is provided for operatively connecting the windlass with the engine at the will of an operative. A cable is adapted to wind at one end upon the windlass and may at its other end be connected with a post or other fixed object so that the machine is advanced toward its work as the cable is wound upon the windlass.

In the accompanying drawings;—Figure 1 is a side elevation of the ditching machine. Fig. 2 is a top plan view of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a plan view enlarged of the cutter of the machine.

The machine consists of a frame 1 which is supported upon ground wheels 2 in any appropriate manner. An engine (preferably of the hydrocarbon type) is mounted upon the frame 1. The engine is designated 3 and hangers 4 depend from the frame 1. A shaft 5 is journaled for rotation in the hangers 4 and is provided at its forward end and in advance of the front end of the frame 1 with a cutter 6. The cutter 6 consists of approximately radially disposed blades 7 having forwardly curved cutting edges 8 and buckets or vanes 9 are located behind said blades 7. The outer ends of the buckets 9

terminate short of the outer ends of the blades 7. In fact it consists of providing blades located at diametrically opposite sides of the shaft 5 or a single blade 7 as illustrated in Fig. 3 may be used and the said blade may be provided at its opposite ends with cutting edges 8, as indicated. That is to say, the blades at the opposite sides of the shaft 5 may be integral or formed from a single piece.

A belt pulley 10 is fixed to the intermediate portion of the shaft 5 and a belt pulley 11 is fixed to the shaft of the engine 3. A belt 12 passes around the pulleys 10 and 11 and is adapted to transmit rotary movement from the engine shaft to the shaft 5 and its attachment.

A windlass 13 is mounted upon the forward portion of the frame 1 and a cable 14 is arranged to wind upon the said windlass. The forward end of the said cable may be attached to a post 15 or other fixed object. A belt pulley 16 is fixed to the shaft of the windlass 13 and a belt pulley 17 is fixed to a shaft 18 which is journaled upon the frame 1 behind the engine 3. A belt 19 passes around the pulleys 16 and 17 and is adapted to transmit rotary movement from the shaft 18 to the windlass 13. A shaft 20 is also journaled upon the rear portion of the frame 1 and a beveled pinion 21 is journaled upon the forward end of the said shaft 20. The pinion 21 meshes with a beveled pinion 22 which is fixed to the shaft 18. The beveled pinion 21 is provided with a clutch hub 23. A clutch member 24 is slidably mounted upon the shaft 20 but is constrained to rotate in unison with the same. A lever 25 is operatively connected with the clutch member 24 and may when it is swung bring the member 24 into engagement with the clutch hub 23 of the wheel 21 or swing the said clutch member away from the same. A relatively large belt pulley 26 is fixed to the rear end of the shaft 20 and a relatively small belt pulley 27 is fixed to the rear end of the shaft 5. A belt 28 passes around the pulleys 26 and 27 and is adapted to transmit rotary movement from the shaft 5 to the shaft 20.

From the above description it will be seen that when the machine is in operation and the cutter 6 is maintained in a state of rotation the cutting edges of the blade or blades

7 will encounter the earth below the surface and loosen the same and the loose earth will be caught up in the buckets 9 and be passed up out of the ditch which is being formed.

5 At the same time an operative may swing the lever 25 whereby the clutch member 24 will be carried into engagement with the clutch hub 23 of the beveled pinion 21 and thus the shaft 18 will be rotated in unison
10 with the shaft 20, and as above described rotary movement will be transmitted to the windlass 13 and as the cable 14 is wound thereon the ditching machine will be drawn toward the post 15 or in other words the
15 cutter 6 will be advanced toward its work.

By reason of the fact that the belt wheel 10 is relatively large and the belt pulley 11 is relatively small, the shaft 5 will be rotated at a certain rate of speed, that is to say it
20 may be rotated at any predetermined rate and by reason of the fact that the belt pulley 27 located upon the shaft 5 is relatively small and the belt pulley 26 located upon the shaft 20 is relatively large, the shaft 20
25 will be rotated at a much lower rate of speed than the shaft 5. Also by reason of the relative sizes of the belt pulleys upon the shaft of the windlass 13 and the shaft 18, the rotary movement from the shaft 18
30 through the pulley 13 is again reduced and thus the machine is not advanced against its

work at a greater rate of speed than it is possible for the cutter 6 to attend to. Therefore there is no chance for the cutter 6 to become choked or to be subjected to an
35 over-amount of work even should the conditions of the soil in which it is operating vary.

What is claimed is:—

A ditching machine comprising a frame 40 mounted at its end portion upon supporting wheels, an engine mounted upon the frame at a point approximately midway between the ends thereof, hangers depending from
45 said frame, a shaft journaled in said hangers and at its end portions projecting beyond the ends of the frame, a cutter mounted upon the forward projecting end of the shaft, means operatively connecting the engine
50 with the shaft at an intermediate point thereof, a winding mechanism mounted upon the forward portion of the frame, and a reducing gear operatively connecting the winding mechanism with the rear projecting
55 end portion of said shaft.

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

HORACE G. FRANCIS.

Witnesses:

E. W. GROJEAN,
NORMAN D. BLUE.

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