

No. 755,645.

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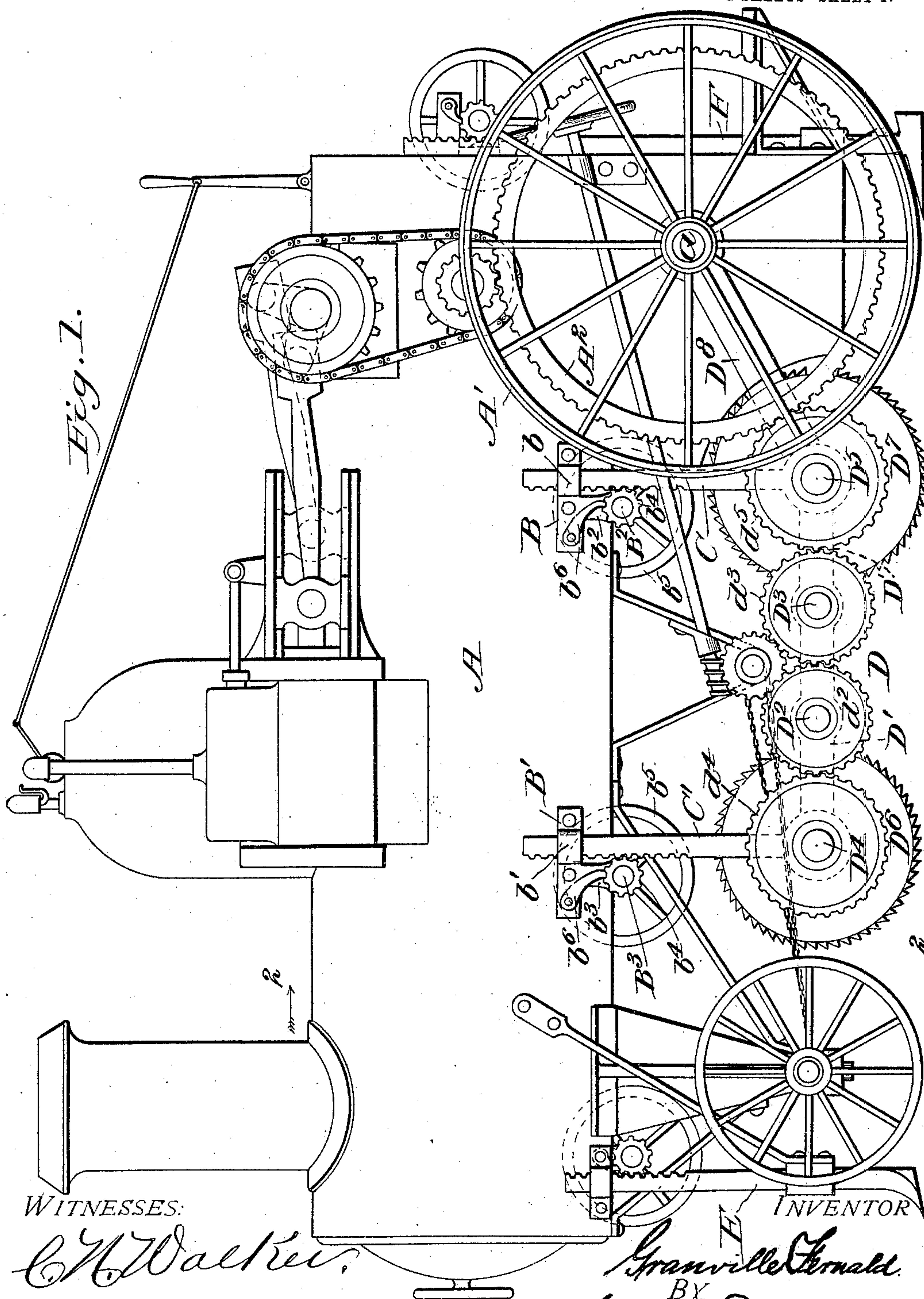
G. FERNALD.

MACHINE FOR CUTTING TRENCHES THROUGH ASPHALTIC PAVEMENTS.

APPLICATION FILED OCT. 20, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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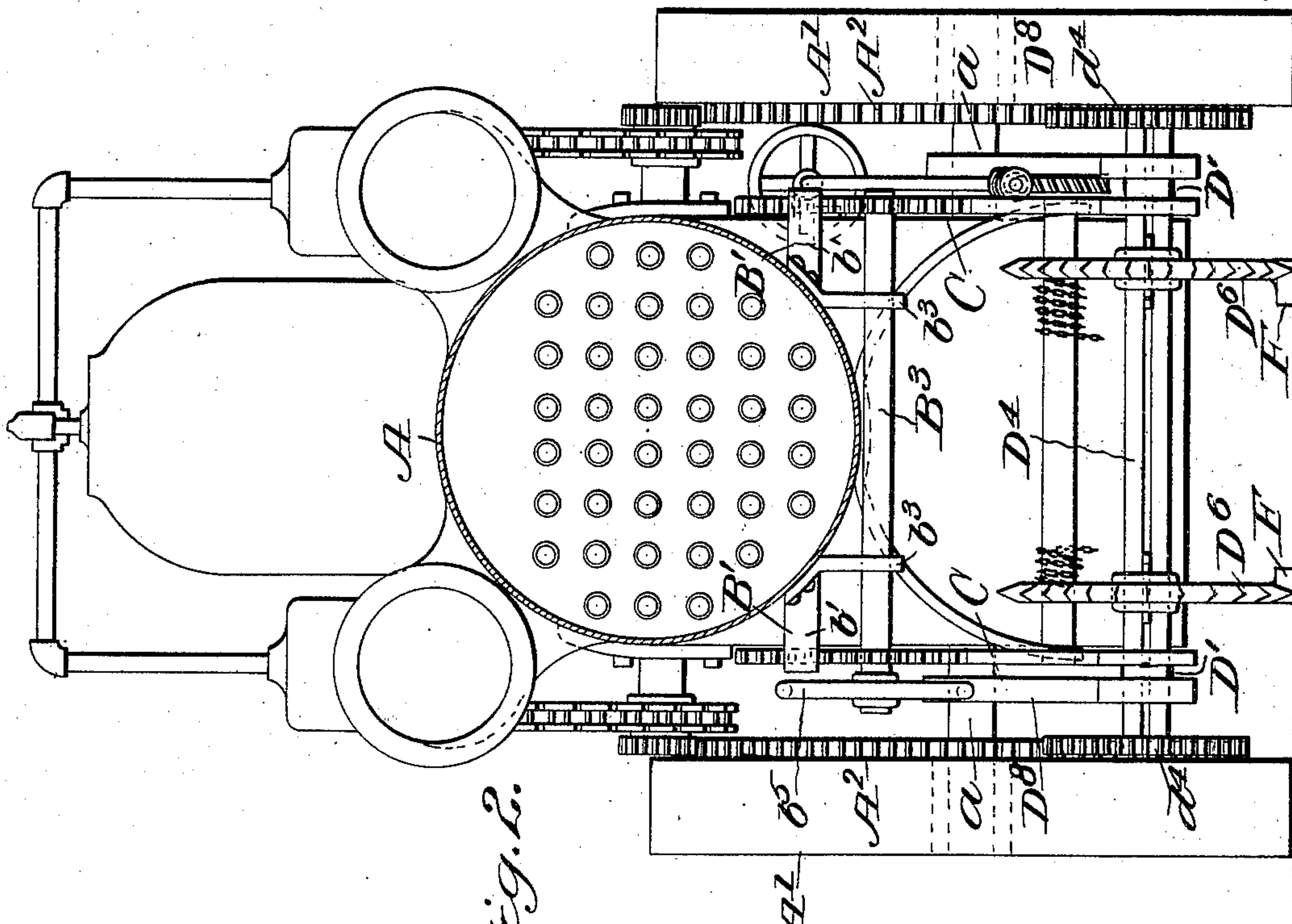


Fig. 2.

Fig. 3.

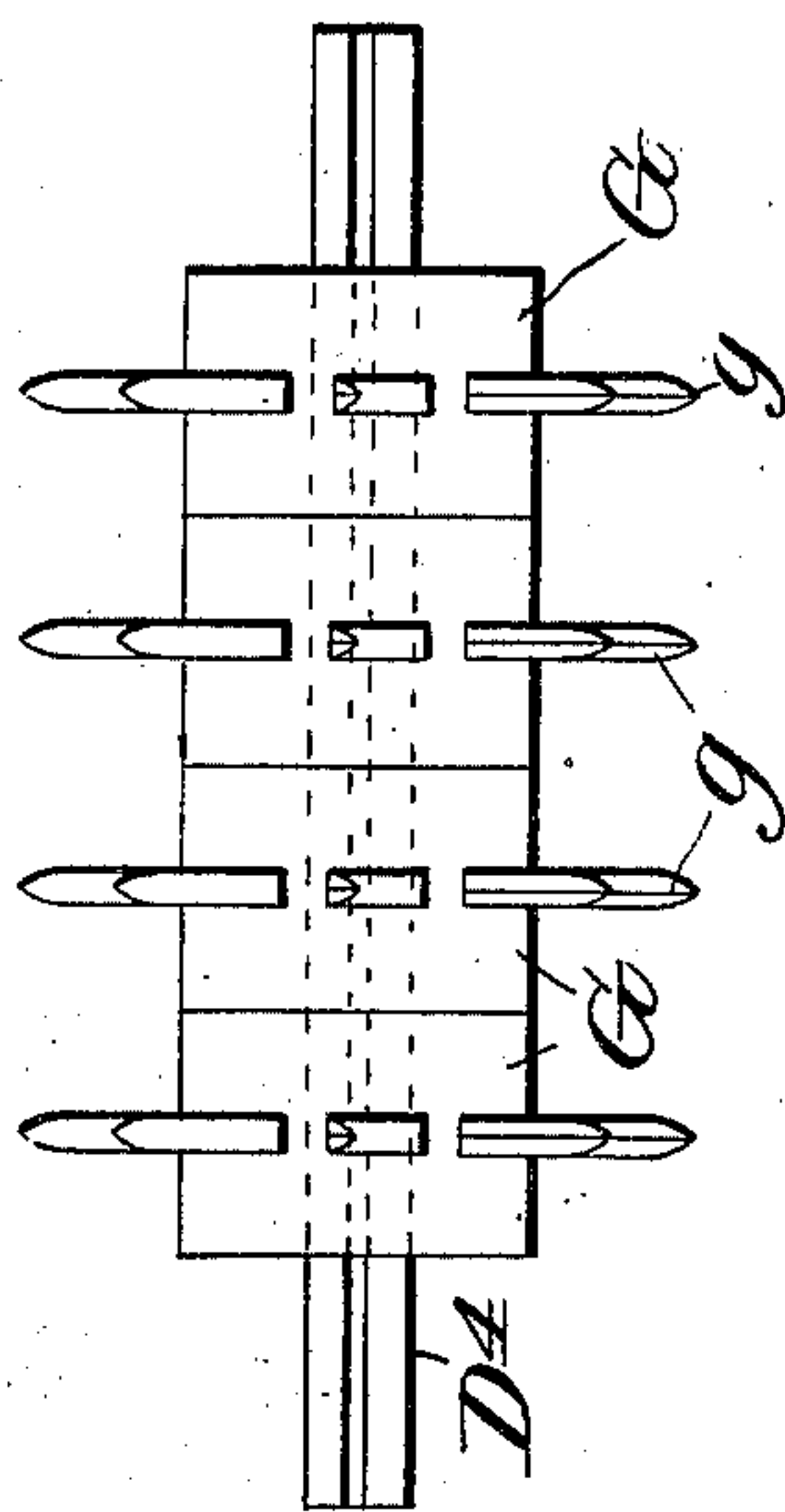


Fig. 4.

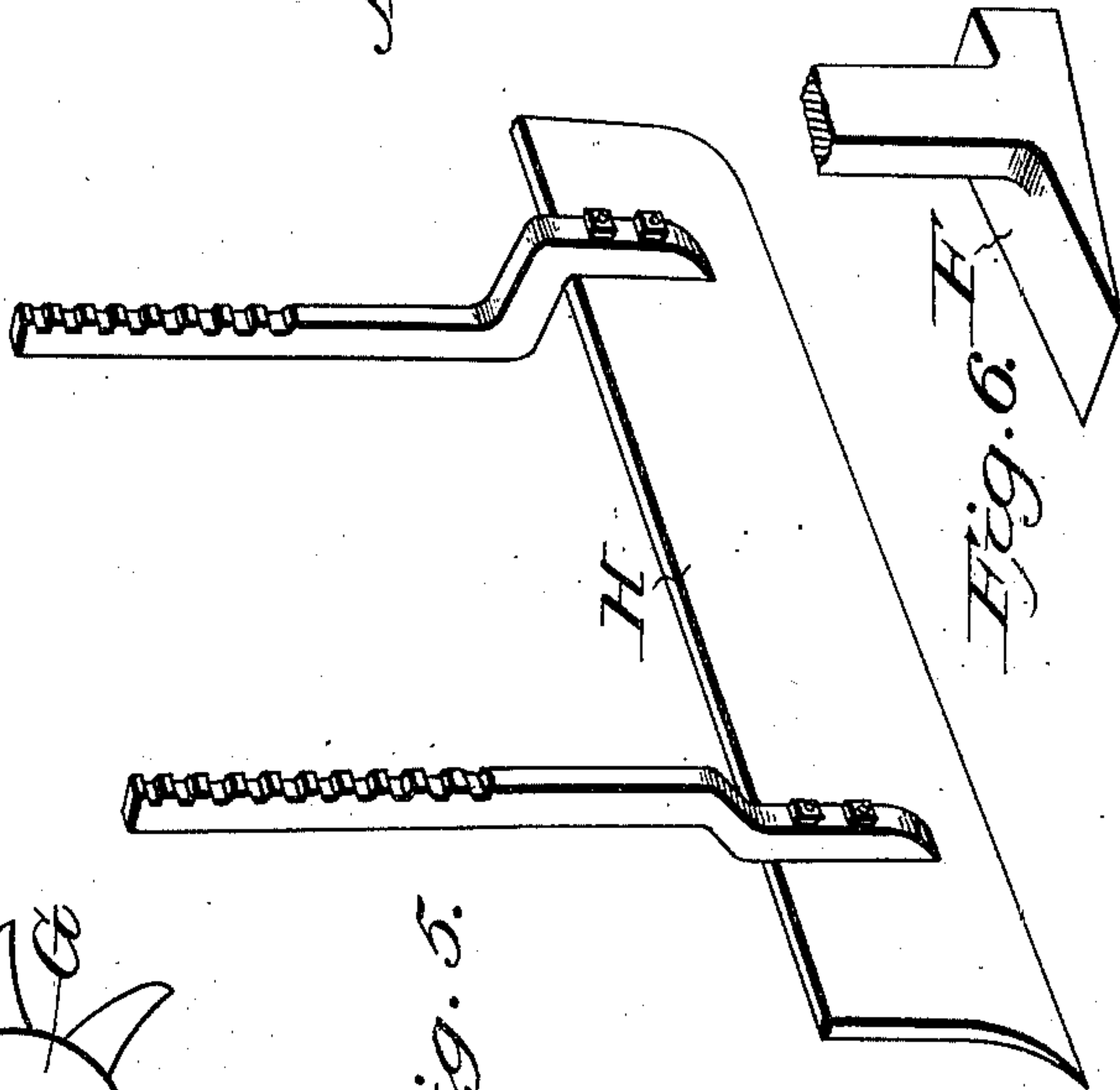
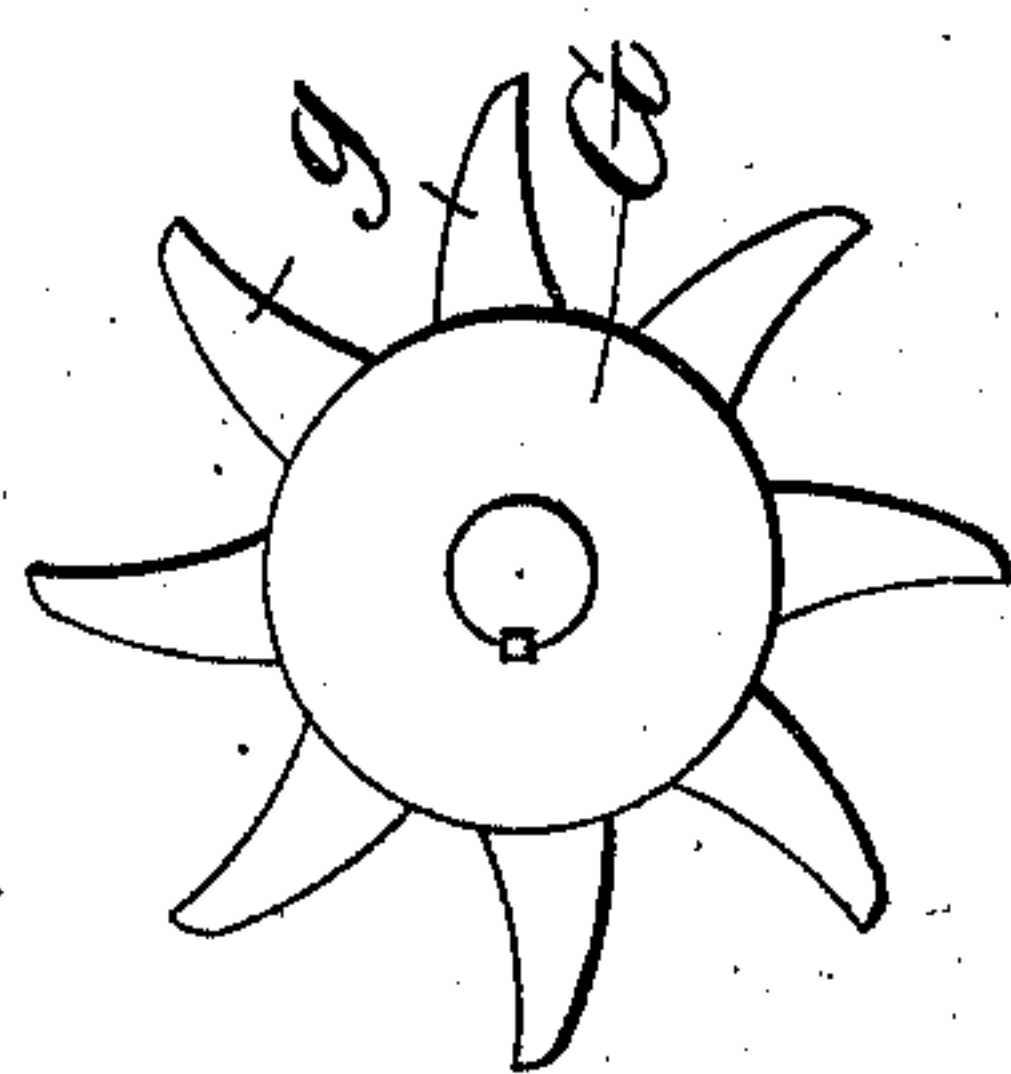


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

GRANVILLE FERNALD, OF WASHINGTON, DISTRICT OF COLUMBIA, AS-
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MACHINE FOR CUTTING TRENCHES THROUGH ASPHALTIC PAVEMENTS.

SPECIFICATION forming part of Letters Patent No. 755,645, dated March 29, 1904.

Application filed October 20, 1903. Serial No. 177,739. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE FERNALD, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Cutting Trenches Through Asphaltic or other Composition Pavements; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

This invention relates to certain new and useful improvements in machines for cutting trenches through asphaltic or other composition pavements or roadways, the purpose of the invention being to provide means for first cutting through the surface of the pavement, then loosening the asphalt surface, so that it may be removed, after which the foundation is disintegrated by rotary diggers applied and operated from the shafts which carried the rotary or circular saws.

The invention consists in the construction and combination of the parts, as will hereinafter be set forth, and pointed out in the claims.

The invention is illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation showing the invention applied to a traction-engine, and in said view to the front portion of the engine fixed cutters are carried by the engine and are followed by rotary cutters, they being followed by plows or lifters to raise the edges of the cut-through surface. Fig. 2 is a vertical section taken on the line 2 2 of Fig. 1. Fig. 3 is a front elevation of a rotary digger, a pair of such diggers being applied on the saw-supporting shafts after the surface of the pavement has been removed. Fig. 4 is a side elevation of one of the sections of the rotary digger. Fig. 5 is a perspective view of a scraper constructed for attachment to the rear portion of the engine and to be used in connection with the rotary diggers shown by Figs.

4 and 5, and Fig. 6 is a detail perspective view of one of the lifters.

In the accompanying drawings, A refers to a traction-engine, the rear wheels A' A', which are connected with the motor, having annular rims with teeth in gear with pinions which are driven from the motor, and these toothed rims A² A² also mesh with gears carried by an adjustable frame D. The wheels A' A' are mounted on stub-axes *a a*, which project from the sides of the rear portion of the engine, preferably that part which usually incloses the fire-box and depends below the boiler.

To the tubular portion of the body or boiler casing and between the supporting-wheels are brackets B B', constructed to provide outward-extending parts *b b'*, with vertical apertures therethrough. The brackets also carry depending portions or shaft-supporting members *b² b³*, which extend below the boiler shell or casing to provide journals for shafts B² B³, each shaft having rigidly attached thereto spur-wheels *b⁴ b⁴*. The outer ends of the shafts carry hand-wheels *b⁵ b⁵*, and means are provided to prevent the rotation of the shafts, as pawls *b⁶*, which are maintained to swing into engagement with spur-wheels and prevent the same being turned by the vertically-movable parts, which engage the spur-wheels and are adjusted thereby.

C C' refer to rack-bars or standards, the upper ends thereof being passed through the openings in the parts *b b'* of the brackets B B', the standards having teeth which engage the spur-wheels *b⁴* on the shafts B² B³, the lower ends of the standards being shaped to provide eyes or openings through which are passed the transverse shafts, having thereon rotary cutters or saws, as shown.

The frame D is adjustable vertically and is capable of being lowered so that the cutters or other rotary means on the driven shafts thereof may be lowered to position the cutters or diggers on the shafts below the plane of the supporting-wheels of the engine when it is desired to cut into and through the asphalt surface of the pavement or to disintegrate the

foundation for such pavement. In use the cutters are held against upward movement by the weight of the engine. The frame D embodies in its construction the standards and shafts hereinbefore mentioned, and adjacent to the standards to engage the shafts are links $D'D'$, which constitute the side frames and provide bearings for transverse shafts or bars D^2D^3 , which carry the gears d^2d^3 . The rear shafts D^5 are connected to the stub-axles by links D^8 . The cutter-carrying shafts D^4 and D^5 are each provided with keyways for adjustably and securely connecting the cutters and gear-wheels thereto, and when the pins which engage the cutters and one of the gear-wheels are removed the shafts may be separated from the frame either to change the cutters or to attach the diggers, the standards, links, and braces having bushings which hold them connected and provide bearings for the shafts. The toothed rims of the main driving-wheels $A'A'$ mesh with gear-wheels d^5 to drive the gears d^3 , d^2 , and d^4 , such train turning the shafts D^4 and D^5 in opposite directions, so that the tendency of one pair of cutters or diggers to move the machine forward is overcome or resisted by the other cutter or digger, the machine being moved forward as desired by the driving-wheels.

The saws or cutters D^6D^7 may have removable rims or insertible teeth, the teeth or cutters being of any suitable type and set to suit the direction of rotation imparted to the cutters by the train of gearing, and in practice the diameter of the rear cutters exceed those of the forward ones to cut below the grooves made by the first pair.

To the forward part of the engine in advance of the cutters are gravers $E'E$, the same being vertically and laterally adjustable to operate in advance and in line with the cutters. These gravers are for the purpose of scoring the pavement in advance of the saws or cutters to remove inequalities therefrom, so that the cutters may operate upon plane surfaces and in slight depressions or grooves.

To the rear end of the engine there are attached wedge-shaped plows or lifters F , the same being adjustably attached to the engine and of great strength. The lower ends have laterally-projecting portions of a width considerably greater than that of the standards, and in operation these parts pass under the concrete and raise the edges thereof, so that the strip when separated transversely can be removed from the road-bed. In operation these standards F may be lowered to lift the rear end of the machine and the driving-wheels off of the pavement, so that the entire power can be utilized in turning the saws or cutters, and when said saws or cutters have cut through the surface of the pavement the machine is lowered, so that the driving-wheels

will rest on the pavement and advance the engine. In ordinary practice it is anticipated that the speed and direction of rotation of the cutters will admit of the driving-wheels being in constant contact with the pavement. If found necessary, the tooth-rim A^2 may be separate from the driving and supporting wheels and when disconnected will be driven from the engine in any suitable manner. After the pavement has been cut through the cutters can be removed, and in place thereof I attach to the shafts D^4 and D^5 disks G , having teeth or diggers g , which are adapted to disintegrate the road-bed, so that it may be readily removed either by a scraper, as H , or by manual labor.

I reserve the right to modify the construction and substitute other mechanical expedients for those herein shown and do not wish to limit myself to the particular construction and arrangement of the parts except wherein specified in the claims.

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

1. The combination in a machine for cutting parallel grooves in or through composition pavements, of a portable motor, a pair of parallel shafts carried by the motor, means between the motor and shafts for driving the shafts in opposite directions, and a pair of toothed cutters mounted on each shaft, the cutters on one shaft being in line with and of greater diameter than those on the other shaft so that the grooves made by the cutters on one shaft will be deepened by the cutters on the other shaft.

2. In a machine for cutting trenches through asphalt pavements a motor, a vertically-adjustable frame carried thereby, saws mounted on shafts carried by the frame, and gearing driven from the motor to effect a rotation of the shafts carrying the saws in opposite directions.

3. In a machine for the purpose set forth, a motor, a frame having rotary cutters in gear with each other and with the motor, gravers carried by the motor in advance of the rotary cutters and lifting-plows in rear of and in line with the cutters and gravers, substantially as shown.

4. In a machine for the purpose set forth, a motor or traction-engine, a frame comprising side links, brace-bars and standards adjustably connected to the frame of the motor, shafts carried by the frame, cutters on the shafts, a train of gears on the shafts and side links of the frame which are driven from the driving-wheels of the motor and turn the cutter-carrying shafts in opposite directions, and vertically-adjustable standards on the rear end of the traction-engine.

5. In a machine for cutting into or through

composition pavements, the combination of a
motor mounted on wheels, a shaft-supporting
frame adjustably attached to the motor, a pair
of parallel shafts carried by the frame, means
5 between the shafts and motor for turning the
shafts in opposite directions and a pair of
toothed cutters adjustably secured on each
shaft, substantially as shown.

In testimony whereof I have signed my name
to this specification in the presence of two wit- 10
nesses.

GRANVILLE FERNALD.

Witnesses:

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EUGENE W. JOHNSON.