

No. 894,269.

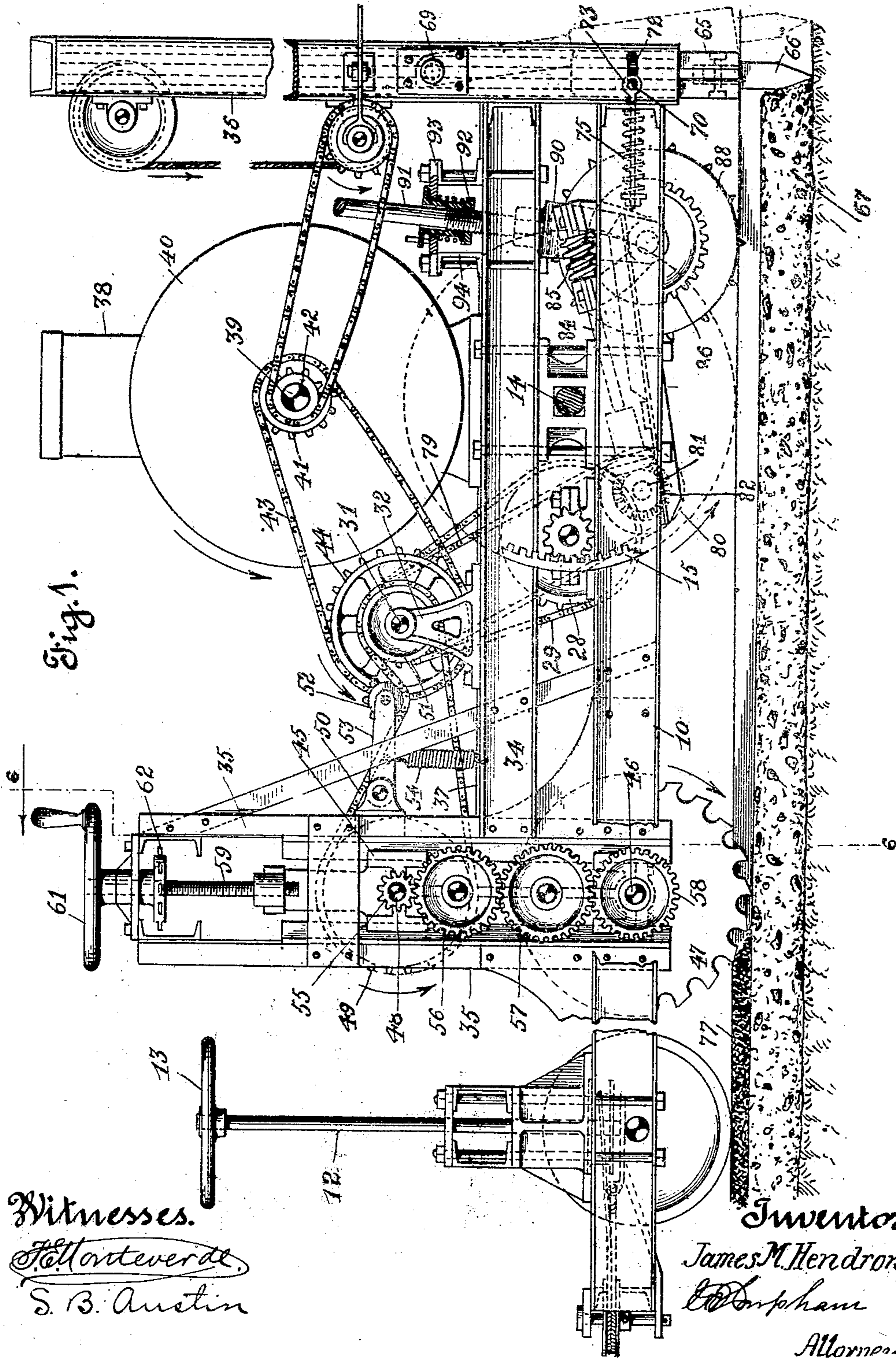
J. M. HENDRON.

PATENTED JULY 28, 1908.

MACHINE FOR OPENING TRENCHES IN PAVED STREETS.

APPLICATION FILED AUG. 7, 1907.

4 SHEETS-SHEET 1.



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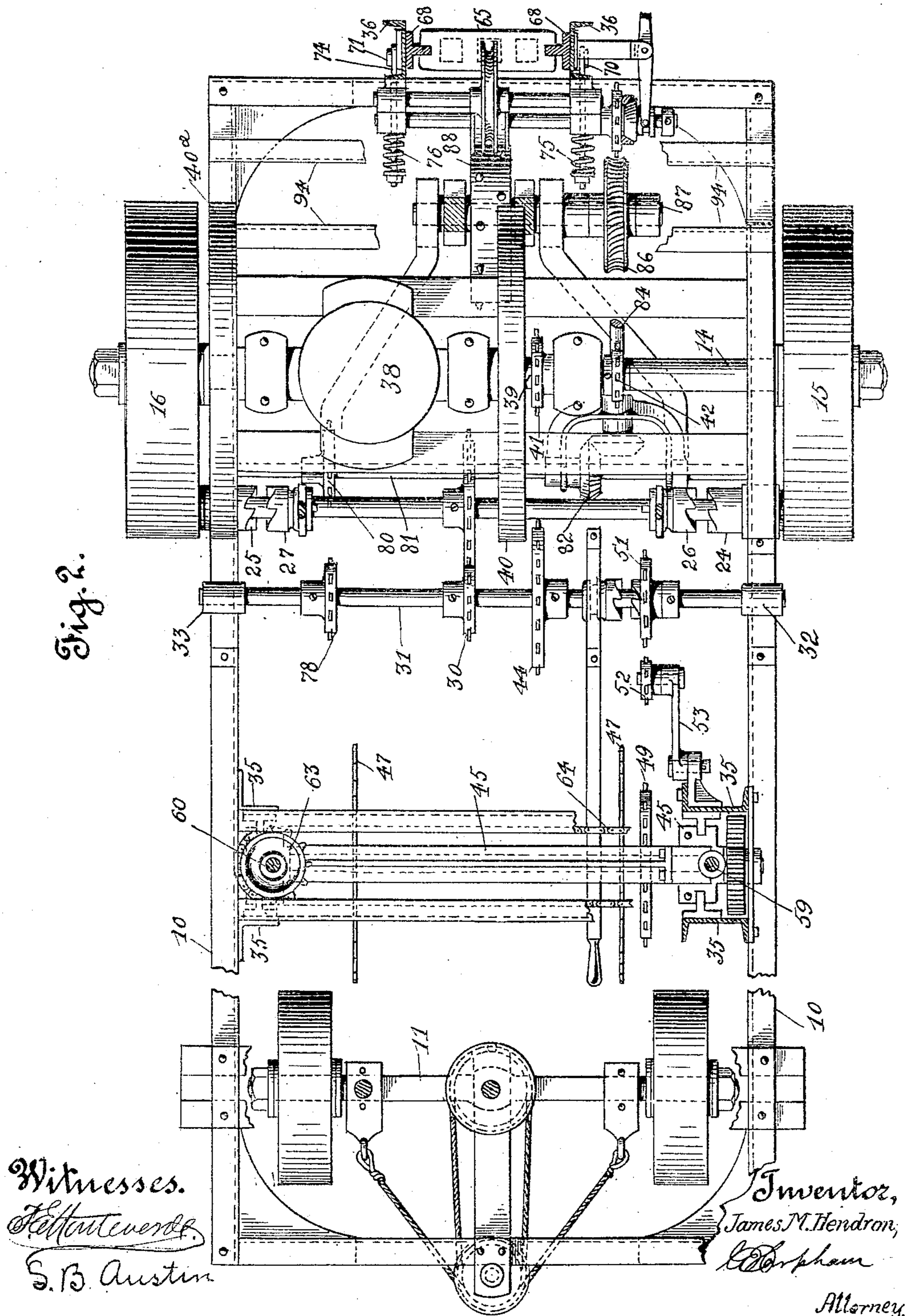
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4 SHEETS—SHEET 2.

Fig. 2.



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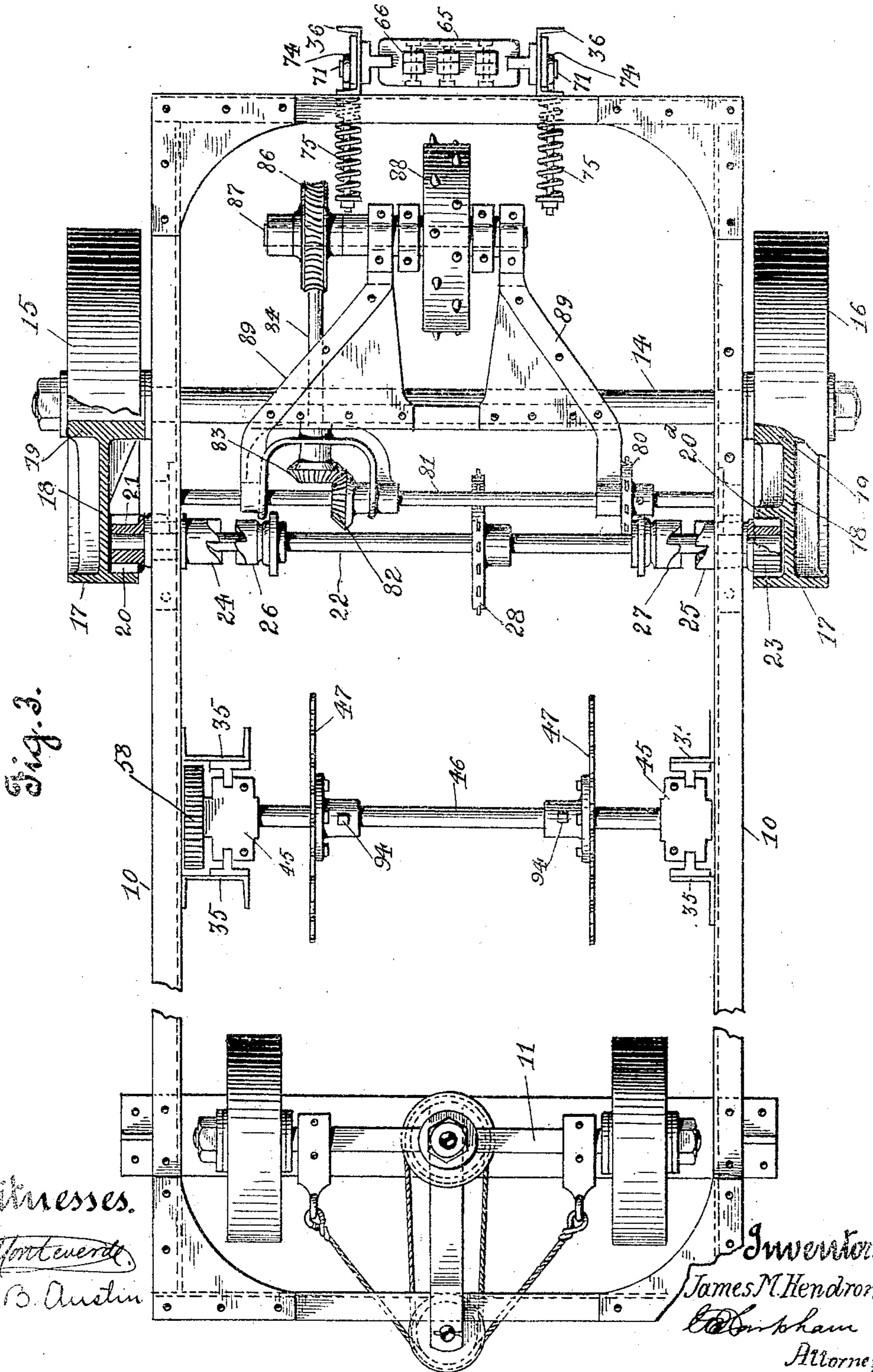
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4 SHEETS—SHEET 3.



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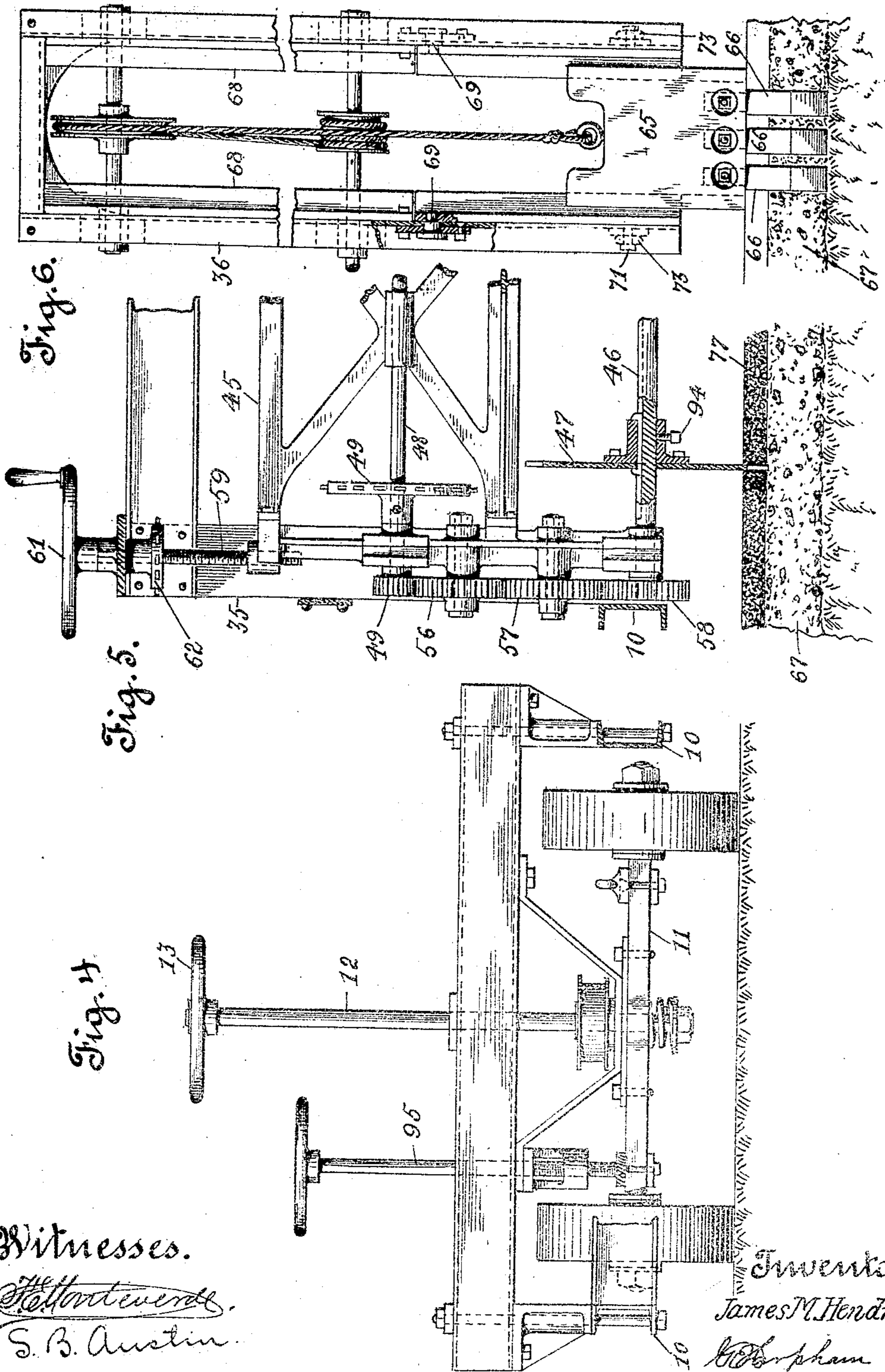
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UNITED STATES PATENT OFFICE.

JAMES M. HENDRON, OF LOS ANGELES, CALIFORNIA.

MACHINE FOR OPENING TRENCHES IN PAVED STREETS.

No. 894,269.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed August 7, 1907. Serial No. 387,504.

To all whom it may concern:

Be it known that I, JAMES M. HENDRON, a citizen of the United States, residing in Los Angeles, county of Los Angeles, and State of California, have invented new and useful Improvements in Machines for Opening Trenches in Paved Streets, of which the following is a specification.

My invention relates to a machine primarily designed for cutting the surface of an asphaltum paved street preparatory to digging a trench for laying water or other pipes in the street, and the object thereof is to produce a machine that will cut through the asphaltum surfacing material so that the part where the trench is to be dug may be removed without injury to the other parts of the pavement and also to cut or break the concrete foundation so that the same can be removed without injury to the other parts of the pavement. I accomplish this object by the machine described herein and illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of my improved machine. Fig. 2 is a plan of the same with a part of the saw frame omitted. Fig. 3 is a bottom plan of the mechanism shown in Fig. 2, with parts broken away for clearness of illustration. Fig. 4 is a front end view of a portion of the mechanism. Figs. 5 and 6 are details of portions of the mechanism.

In the drawings 10 is the base frame which is preferably rectangular in shape and is formed of suitable channel iron with proper cross and stay braces. At the front of the frame is the front truck 11 which supports the front end of the machine. To this truck is secured the steering post 12 on the top of which is affixed the steering wheel 13 by means of which the direction of the machine is controlled when traveling. Near the rear end of the base frame and revolvably mounted in suitable bearings is the rear axle 14 on the outer ends of which are secured the traction wheels 15 and 16. These wheels consist of an outer rim 17, a web 18, and hub 19, and a gear rim 20 and 20^a which is secured to the web intermediate the hub and outer rim. The gear rim 20 of wheel 15 meshes with a pinion 21 loosely mounted on shaft 22, gear rim 20^a of wheel 16 meshes with pinion 23 which is loosely mounted on the other end of shaft 22. The inner ends of these pinions 21 and 23 terminate clutch members 24 and

25. Clutch member 24 is adapted to be engaged by the sliding clutch member 26 which is splined on shaft 22 and when thus engaged pinion 21 is locked to shaft 22 and rotates therewith. Clutch member 25 is adapted to be engaged by clutch member 27 which is splined on shaft 22 and when thus engaged pinion 23 is locked to shaft 22 and is rotated therewith. Secured to shaft 22 and preferably in the center thereof is a sprocket wheel 28 on which is a sprocket chain 29, which passes over sprocket wheel 30 secured upon shaft 31. Shaft 31 is revolvably mounted in bearings 32 and 33 which are secured to the top frame 34. The front end of the top frame is secured to the front guide frames 35 and the rear end of the top frame is secured to the rear guide frame 36. The top frame is covered by a flooring 37 only shown in Fig. 1, being omitted in the other views for clearness of illustration. Upon this flooring and to the top frame is secured engine 38 which is provided with a driving shaft 39. This engine is preferably a gas or gasoline engine but any suitable make of engine can be used.

Upon the driving shaft of the engine are fly wheels 40 and 40^a, and sprocket wheels 41 and 42. Sprocket wheel 41 is connected by sprocket chain 43 with sprocket wheel 44 which is rigidly mounted upon shaft 31, whereby when the engine is operating shaft 31 is rotated. In the front guide frames and vertically movable therein is the saw frame 45, in the bottom of which is mounted the saw shaft 46. On this shaft and splined thereto are saws 47 which can be adjusted at any desired distance apart on said shaft. These saws are designed to cut through the asphaltum surface of an asphalt paved street, and are set as far apart as it is desired to have the asphalt surface cut at the top of the trench. In the top of the saw frame is revolvably mounted the saw driving shaft 48 to which is secured sprocket wheel 49 which is connected by sprocket chain 50 to sprocket wheel 51 mounted upon and secured to shaft 31. Sprocket chain 50 is kept taut by tightener wheel 52 which is mounted in the end of pivoted lever 53 the other end of which is secured to the front guide frame. A spring 54 is connected to said lever and to the top frame as best shown in Fig. 1 and holds said tightener wheel in engagement with the sprocket

wheel. On shaft 48 is also mounted pinion 55 which meshes with idler gear 56, and idler gear 56 meshes with the second idler 57, and idler 57 meshes with gear 58, which is mounted upon and secured to shaft 46. To the top of the saw frame and in threaded engagement therewith and at each side thereof are height regulating screws 59 and 60. These height regulating screws 59 and 60 are revolubly mounted in the front guide frames and one of said screws preferably 59 is provided with an operating wheel 61 by means of which the screws may be rotated. Screw 59 is provided with a sprocket wheel 62 and screw 60 is provided with a sprocket wheel 63 and these sprocket wheels are connected by chain 64 so that both screws may be operated together to raise or lower the saw frame, which is done to regulate the depth at which the saws are to cut the surface of the pavement or to remove the same wholly above the surface thereof when moving the machine from point to point.

In the rear guide frame and vertically movable therein is a hammer 65 which is provided with one or more chisels 66 which break the surface of the concrete 67 when they are dropped thereon as hereafter explained. This hammer is guided in its vertical movement by T-shaped guides 68 which are rigidly secured in their upper portions to the rear guide frame. The lower portion of these guides are secured to the upper portions by hinged joints one of which 69 is shown in section in Fig. 6, and also shown in dotted lines in Fig. 1. Pins 70 and 71 are secured to the lower end of these T-shaped guides and project through slots in the rear guide frame one of which slot 72 is shown in Fig. 1. Eye-bolts 73 and 74 are mounted on these pins and passed through suitable bearings in the frame and have secured upon their inner end tension springs 75 and 76 best shown in Fig. 2. This construction is provided so that the chisels can project rearwardly as shown in dotted lines in Fig. 1 as the machine is being operated, whereby it is possible to operate the hammer while the machine is moving forward slowly and while the saws are operating slowly to cut the asphaltum surface 77. On shaft 31 is rigidly secured sprocket wheel 78 which is connected by sprocket chain 79 with sprocket wheel 80 rigidly secured upon shaft 81. On shaft 81 is also secured bevel gear 82 which meshes with bevel gear 83 secured upon shaft 84. Shaft 84 has secured thereto worm gear 85 which engages worm wheel 86 which worm wheel is rigidly secured upon shaft 87.

On shaft 87 is rigidly secured the supplementary traction wheel 88. Shaft 87 is revolubly mounted in the swing frame 89 which is carried by shaft 81. A yoke 90 straddles wheel 88, and a shaft 91 is swivelly connected

to said yoke. This shaft at its lower portion is screw threaded and passes through a large nut 92 which is secured in a plate 93 which is secured to bearings 94 mounted on the top frame. Nut 92 has collars at each end thereof one of which is screwed upon the body of the nut in order to permit the body of the nut to pass through plate 93. On the top of shaft 91 is an operating wheel not shown, by means of which the supplementary traction wheel may be raised from contact with the surface of the street or be caused to engage the same and to support the whole rear portion of the machine if desired. If desired the supplementary traction wheel 88 could be omitted. If omitted the driving speed of wheels 15 and 16 should be slow enough for the working speed of the machine, and additional sprocket wheels and chains would be provided with appropriate clutches to give axle 14 an appropriate speed for moving the machine from place to place. A screw 95 is used to lock the front truck against oscillation if desired.

In the operation of my machine the saws will be regulated on shaft 46 the required distance apart and then secured against movement by set screws 94, the appropriate clutch will be thrown in to give the saws their required motion and the machine its forward motion. The saw frame will be fed down until the saws cut into the surface of the pavement through the asphaltum surfacing to the concrete base. As soon as the machine has moved along a sufficient distance to bring the hammer over the surface cut by the saws the hammer is set to work and the central portion of the trench between the saw kerfs is broken by the hammer which is operated in the manner of deep well drilling rigs.

It will be observed that the hammer is not as wide as the top of the trench, as it is only necessary that a central strip be broken by machinery, and that if the whole surface between the saw kerfs were broken by the hammer there would be danger of injuring the parts adjacent to the trench. The cutting of the asphaltum surfacing by the saws does not injure any of the adjacent part which is not to be removed and leaves a good edge for repair work, which is much superior to the present method of doing such work.

Having described my invention what I claim is:—

1. In a machine of the character described herein the combination of a base frame; traveling supporting means for said base frame; guide frames secured to said base frame near the front thereof; a saw frame mounted in said front guide frames, and vertically movable therein; means to adjust and hold said saw frame at any desired height with reference to the other parts of the machine, a shaft revolubly mounted in said frame; saws

mounted on said shaft and adjustable thereon; and mechanism to operate said shaft.

2. In a machine of the character described herein, the combination of a base frame; 5 traveling supporting means for said base frame; guide frames secured to said base frame near the front thereof; a saw frame mounted in said front guide frames; means to vertically adjust and hold at any desired 10 height with reference to the other parts of the machine said saw frame in said guide frames; a shaft revolubly mounted in said saw frame; circular saws mounted on said shaft and adjustable thereon; and mechan- 15 ism to operate said shaft.

3. In a machine of the character described herein, the combination of a base frame; traveling supporting means for said base frame; guide frames secured to said base 20 frame near the front thereof; a vertically movable saw frame mounted in said front guide frames; adjustable circular saws revolubly mounted in said saw frame; mechanism to operate said saws; a rear guide frame se- 25 cured to said base frame; a vertically movable hammer mounted in said rear guide frame; a chisel secured in said hammer; and mechanism for operating said hammer.

4. In a machine of the character described 30 herein, the combination of a base frame; a rear driving truck secured to said base frame; a front guiding truck secured to the front of said base frame; mechanism for driving said rear truck in either direction; means for guid- 35 ing said front truck; guide frames secured to said base frame near the front thereof; a saw frame mounted in said front guide frames; means to vertically adjust said saw frame in said guide frames; adjustable circular saws 40 revolubly mounted in said saw frame; mechanism to operate said saws; a rear guide frame secured to said base frame; a vertically movable hammer mounted in said rear guide

frame; a chisel secured in said hammer; and mechanism for operating said hammer.

5. In a machine of the character described 45 herein, a base frame; a rear guide frame secured to said base frame, said guide frame having the lower portion thereof pivotally connected to the upper portion, said lower 50 portion being held spring pressed in vertical alinement with the upper portion; a vertically movable hammer mounted in said rear guide frame; a chisel removably secured in said hammer; and mechanism for operating 55 said hammer.

6. In a machine of the character described herein, the combination of a base frame; a rear driving truck secured to said base frame; mechanism for driving said rear truck in 60 either direction; a guiding truck secured to the front of said base frame; means for operating said truck; guide frames secured to said base frame near the front thereof; a saw frame mounted in said front guide frames; 65 means to vertically adjust said saw frame in said guide frames; adjustable circular saws revolubly mounted in said saw frame; mechanism to operate said saws; a rear guide frame secured to said base frame; said rear guide 70 frame having the lower portion thereof pivotally connected to the upper portion, said lower portion being held spring pressed in vertical alinement with the upper portion; a vertically movable hammer mounted in said rear guide 75 frame; a chisel removably secured in said hammer; and mechanism for operating said hammer.

In witness that I claim the foregoing I have hereunto subscribed my name this 1st 80 day of August, 1907.

JAMES M. HENDRON.

Witnesses:

G. E. HARPHAM,
S. B. AUSTIN.