

E. A. ANDERSON.
TILE DITCHING MACHINE.
APPLICATION FILED OCT. 1, 1908.

911,564.

Patented Feb. 9, 1909.

3 SHEETS—SHEET 1.

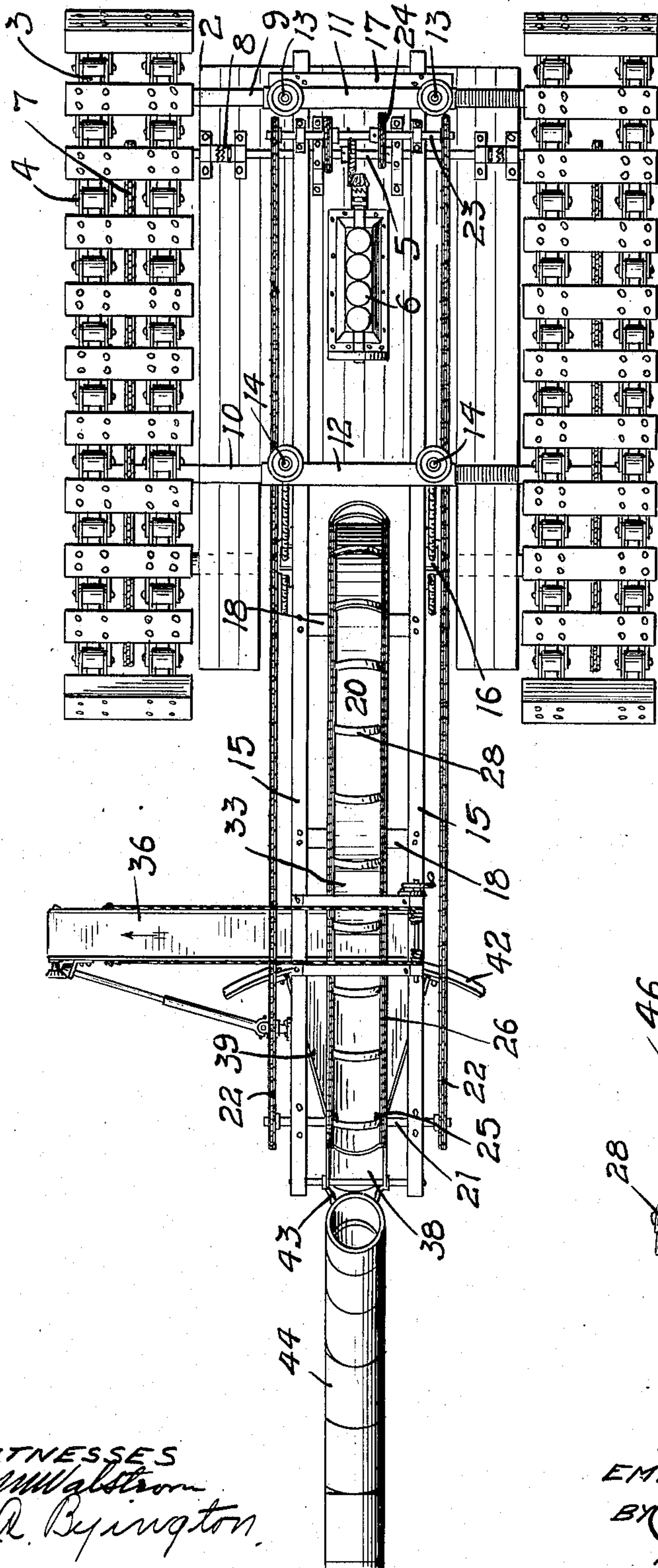


Fig 1

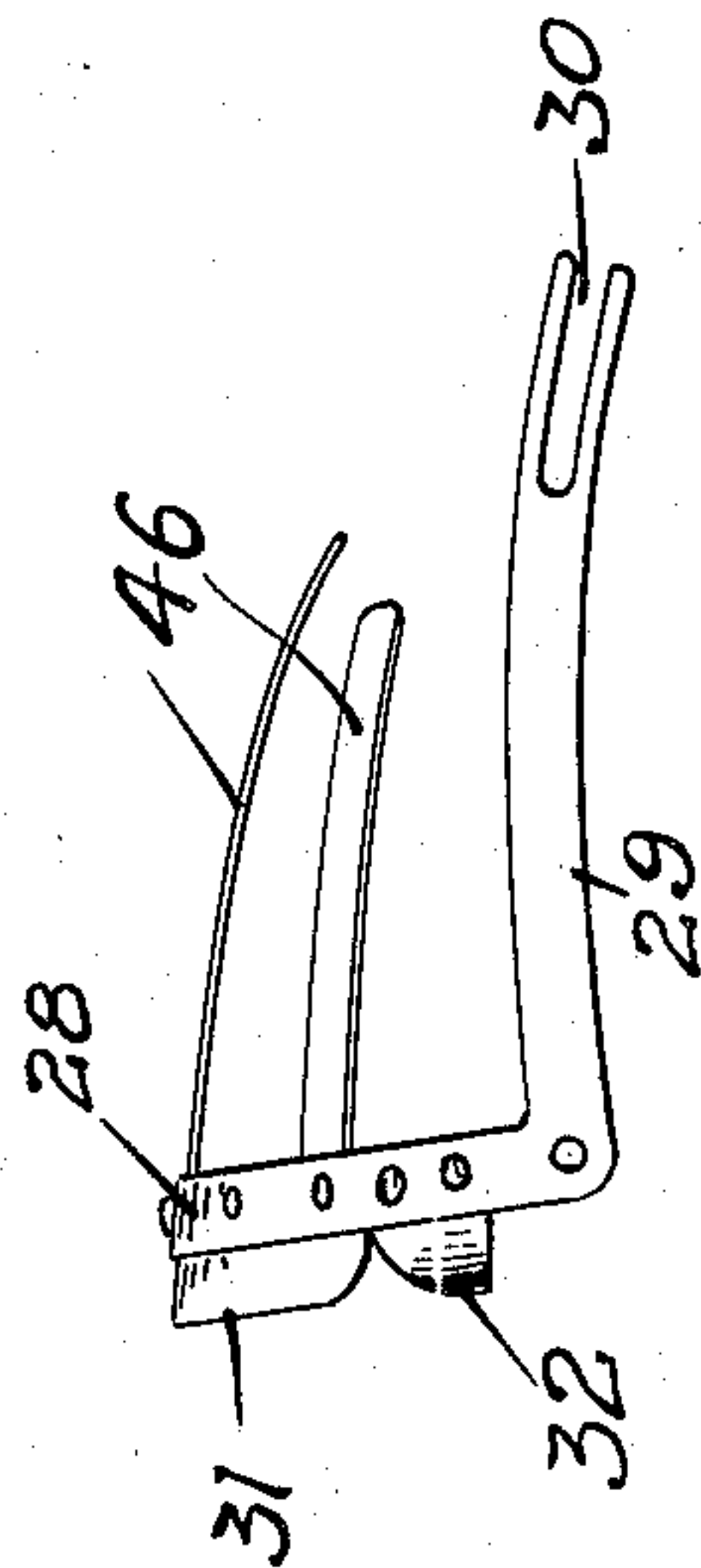


Fig 8.

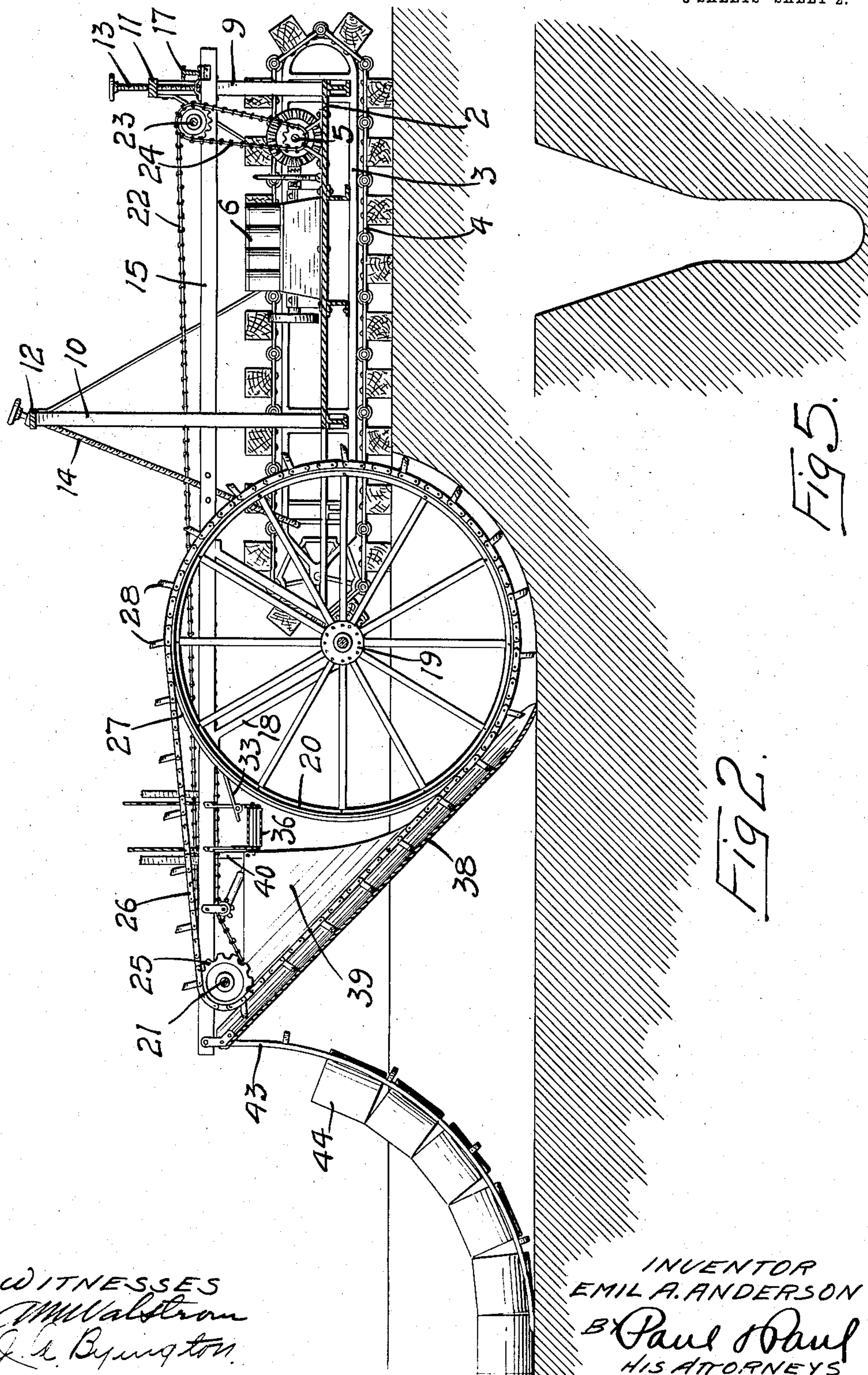
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WITNESSES
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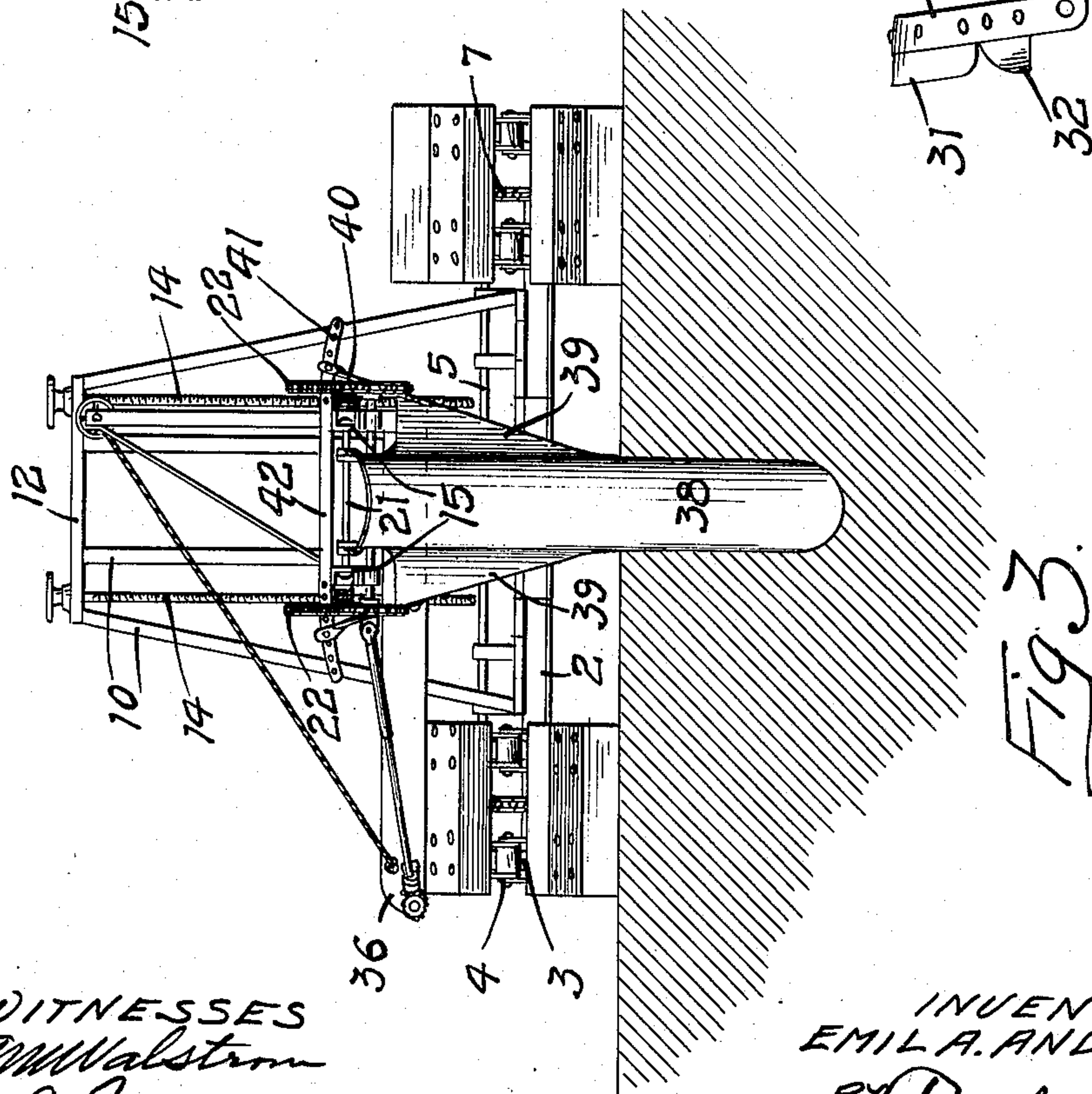
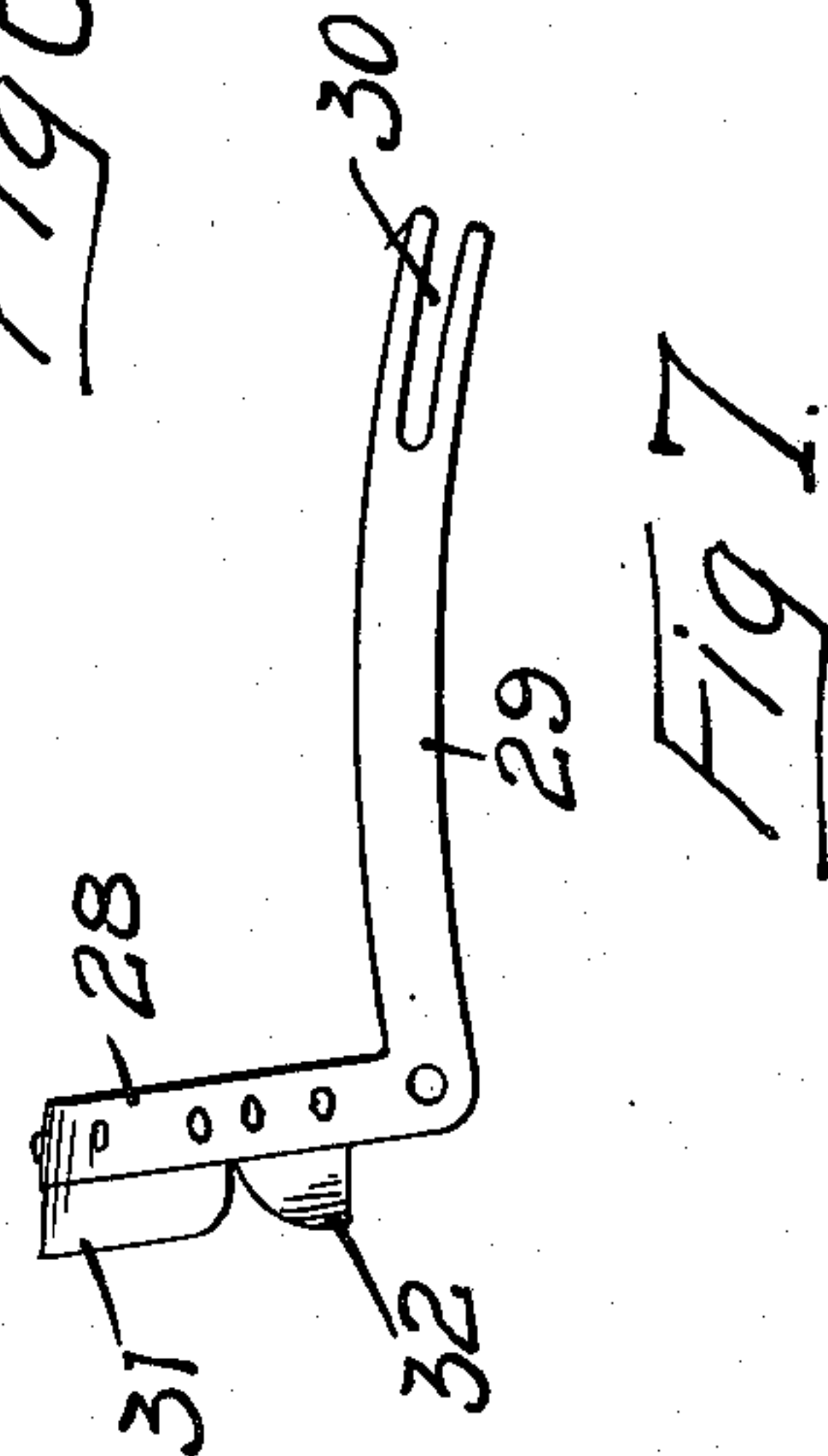
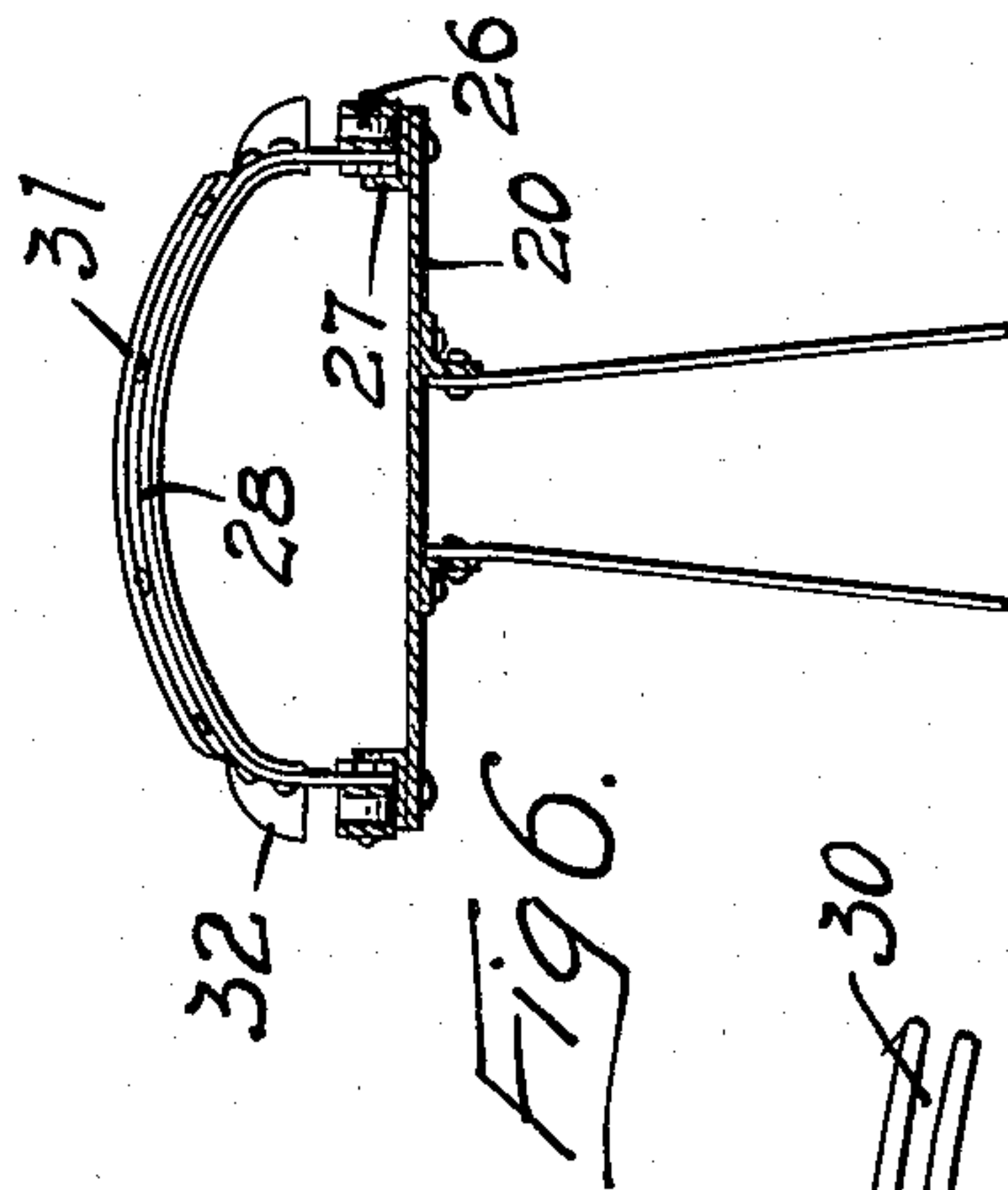
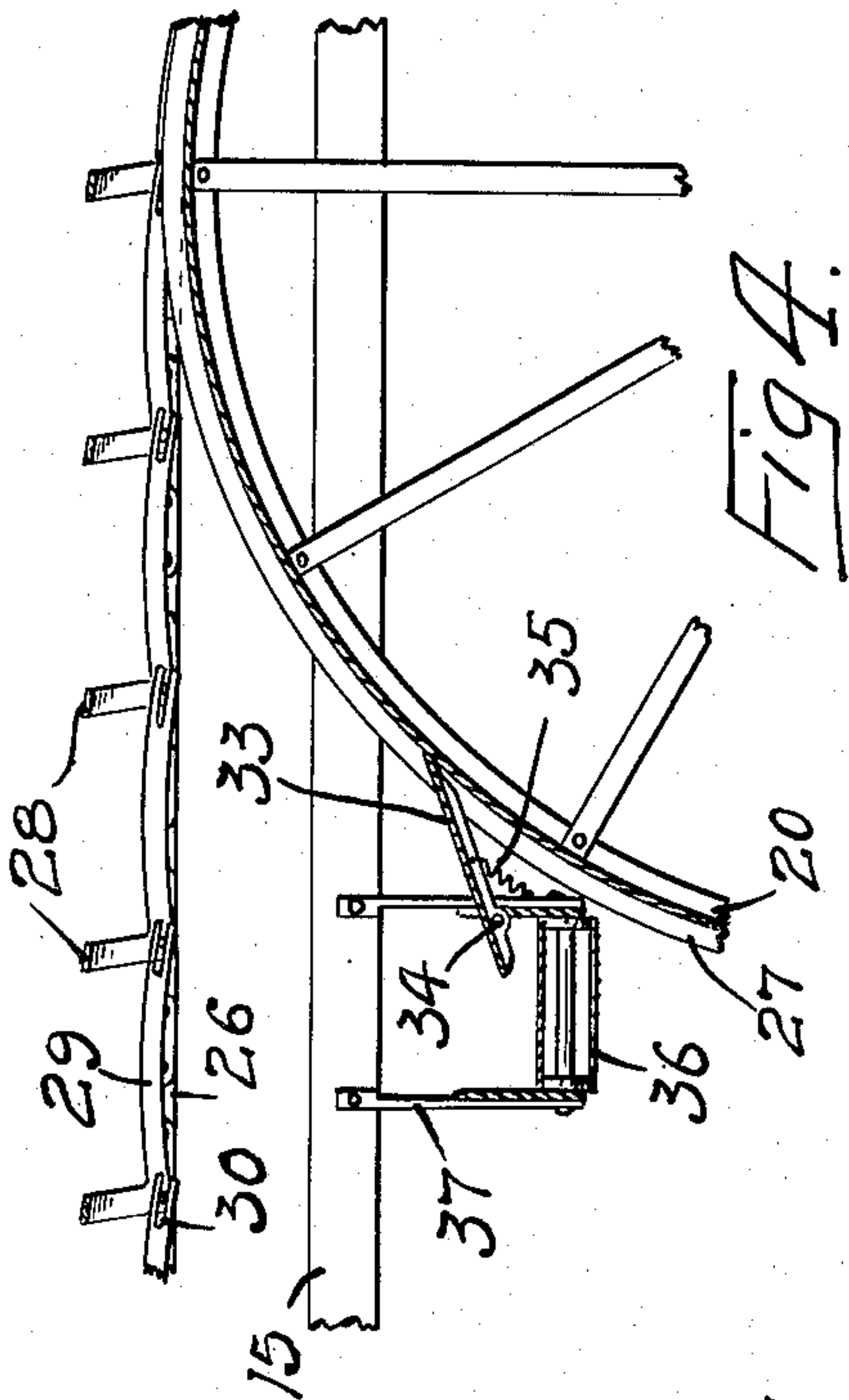
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

EMIL A. ANDERSON, OF SWEA CITY, IOWA.

TILE-DITCHING MACHINE.

No. 911,564.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed October 1, 1908. Serial No. 455,698.

To all whom it may concern:

Be it known that I, EMIL A. ANDERSON, of Swea City, Kossuth county, Iowa, have invented certain new and useful Improvements in Tile-Ditching Machines, of which the following is a specification.

My invention relates to ditching machines of the type wherein the ditch is dug and the tile laid as the machine moves along.

10 The object, of my invention is to provide an improved means for excavating the material from the ditch and delivering it at the side.

15 A further object is to provide means for preventing the walls of the ditch from caving in after the passage of the excavating belt and where there is too much water in the ditch to permit immediate laying of the tile.

20 Other objects of the invention will appear from the following detail description.

The invention consists generally in various constructions and combinations all as hereinafter described, and particularly pointed out in the claims.

25 In the accompanying drawings forming part of this specification, Figure 1, is a plan view of an excavating machine embodying my invention, Fig. 2, is a longitudinal sectional view of the same, Fig. 3, is a rear view, 30 Fig. 4, is a detail view showing the manner of delivering the excavated material to the side delivery carrier, Fig. 5, is a transverse section of a ditch showing the sloping sides. Fig. 6, is a detail view illustrating the construction of the wheel whereon the excavating belt is supported. Fig. 7, is a detail view 35 of a section of the excavator belt, Fig. 8, is a similar view illustrating a modified construction.

40 In the drawing, 2 represents a frame supporting rails 3 whereon the traction belts 4 are mounted. These traction belts are already in use, and I make no claim to the same in this application. 5 is a drive shaft 45 geared to the engine 6 and extending out on each side beyond the traction frame and having drive belts 7 through which the traction belts are operated. Clutches 8 are provided by means of which either one of the 50 belts may be rendered operative or inoperative as desired. Upon the frame 2, standards 9 and 10 are mounted in pairs, those of the same pair being connected by cross bars 11 and 12. Screws 13 and 14 are mounted 55 in said cross bars and support rails 15, the

screws 14 having swiveled connections 16 with said rails to permit vertical adjustment of the excavator belt frame. A cross bar 17 connects the forward ends of the rails 15, holds them in parallel relation with one another, and prevents their backward movement when subjected to strain, said bar engaging at such time, the upright standards 9.

60 In the rear of the traction belts on each rail 15, I provide a depending hanger 18 having bearings for the hub 19 of an excavator wheel 20, said wheel being adapted to rise and fall with the rails 15, and accommodate itself to the depth of the ditch that is being dug. At the rear end of the rails 15, is a 65 shaft 21 driven at each end by belts 22 which are driven from a shaft 23 on the forward end of said rails, said shaft 23 having a driving connection 24 with the shaft 5. The shaft 21 has driving sprockets 25 for belts 26 75 which pass around the excavator wheel 20 bearing on its periphery and are held in place thereon by angle bar rails 27. Upon these belts, a series of yokes 28 are mounted each having a part in the form of an arch extending across the periphery of the excavator wheel and arms 29 extending rearwardly and having slots 30 to receive the pivot pins of links in the rear of the arched portions to 80 allow the yokes to accommodate themselves to the comparatively small diameters of the drive sprockets 25. The arched portions 28 are provided with a centrally arranged excavator blade 31 and smaller side blades or scoops 32. These blades are adapted to dig 85 into the soil and as the belt follows the periphery of the excavator wheel, the material will be deposited upon the surface of the wheel between the guide rails 27. On the 90 down side of this wheel, I provide a scraper 33 pivoted at 34 and held in yielding engagement with the surface of the wheel by a spring 35. A side delivery carrier 36 is supported by hangers 37 and is adapted to receive the material scraped from the wheel by 100 the blade 33, and deliver it at the side of the machine. As the excavator wheel revolves, the scraper sliding thereon, will keep the surface clean and as fast as the material is lifted out of the ditch by the excavator blades or 105 shovels and deposited on the wheel it will be removed by the scraper and discharged at the side of the machine.

In the rear of the drive sprockets 25, I provide a plate 38 hinged at its upper end on the 110

rails 15 and having a lower end that is adapted to slide on the bottom of the ditch in the rear of the excavator wheel. This plate is in the form of a trough and the excavator
 5 shovels will slide down therein and be guided thereby to the bottom of the ditch. Upon this plate, or trough, I provide upwardly extending wings 39 of thin material having forward cutting edges and arms 40 at their
 10 upper ends that are adjustable in holes 41 in a bar 42, which extends transversely of the machine. These wings are adapted to bear on the side walls of the ditch and are adjusted toward or from one another to obtain
 15 the desired slope of the ditch walls, the edges of the wings cutting the material off the sides of the ditch and directing it into the trough 38 to be carried forward and delivered to the excavator wheel by the shovel blades 31
 20 and 32. I am thus able by the adjustment of these wings to regulate the curvature of the ditch walls according to the character of the soil that is being excavated. Where the soil has a tendency to cave and fill up the
 25 ditch, I may adjust these wings a greater distance apart so that there will be more slope to the walls and less tendency for the material to slide and fill up the ditch. In a damp heavy soil, the wings may be adjusted nearer
 30 together.

I have illustrated a ditch in Fig. 5, wherein an incline is shown extending to a point midway between the top and bottom of the ditch. A slope of this kind is employed where the
 35 machine is operating in the water and where the tile cannot be laid until the water has been drained off. In such soil the banks if cut straight up and down as the machine is moved along, would cave in behind the ma-
 40 chine and destroy the ditch, as fast as it was dug. By providing means for sloping the banks of the ditch, I am able to successfully operate the machine in soil that is wet or under water and drain off the water and lay
 45 the tile without danger of the banks caving in. This device for sloping the side walls of the ditch, I therefore regard as an important feature of my invention.

In the rear of the trough 38, I provide
 50 curved bars 43 whereon a series of tile 44 are laid and allowed to slide down into the bottom of the ditch as the machine moves along.

In Fig. 8, I have illustrated a slightly modified construction to adapt the machine for
 55 sandy soil. This modification consists in blades or fingers 46 extending rearwardly from each of the arched portions 38 for the purpose of holding the material in place and preventing its premature discharge from the
 60 excavator wheel.

I claim as my invention:

1. In a ditching machine, an excavator wheel arranged to revolve in a vertical plane, an excavator belt carried by said wheel and
 65 having a series of excavator blades or

shovels, said blades being adapted to discharge the excavated material upon the periphery of said wheel and means for gathering said material from said wheel.

2. In a ditching machine, an excavator wheel arranged to revolve in a vertical plane, an excavator belt carried by said wheel and provided with a series of excavator blades or shovels which are adapted to gather up the excavated material and deposit it upon
 70 the periphery of said wheel and a scraper blade arranged to contact with the periphery of said wheel and guide the material therefrom, substantially as described.

3. In an excavating machine, an excavating wheel arranged to revolve in a vertical plane, an excavator belt having a series of blades or shovels mounted thereon, said shovels being adapted to gather up the material and deposit it upon the periphery
 80 of said wheel, a scraper blade arranged to contact with the surface of said wheel and scrape the material therefrom and a side delivery carrier arranged to receive the material from said scraper blade.

4. In a ditching machine, the combination with a frame, of a wheel supported thereon, guides mounted on the periphery of said wheel on each side of the center thereof, belts arranged to engage said guides,
 90 a series of shovels or blades carried by said belts and extending across the periphery of said wheel from one belt to the other, said shovels being adapted to gather up the material and deposit it upon said wheel and
 95 means for gathering up the material from said wheel.

5. In a ditching machine, the combination with a frame, and means for adjusting it vertically, of an excavator wheel carried
 100 by said frame, an excavator belt having a series of shovels arranged to deliver the material upon said wheel and means for scraping material off the periphery of said wheel.

6. In a ditching machine, the combination with an excavator wheel and belt, of a trough arranged at an incline in the rear of said wheel and adapted to receive said belt and wings mounted on said trough and
 105 capable of adjustment toward or from each other, for the purpose specified.

7. In a ditching machine, the combination with a frame, of an excavator wheel and belt, a trough hinged at its upper end in the rear of said wheel and inclined forwardly and downwardly from its hinge and having
 110 a lower end adapted to travel on the bottom of the ditch and means provided on each side of said trough and engaging the side walls of the ditch for the purpose specified.

8. In a ditching machine, the combination with a frame, of an excavator belt having a series of shovels and means provided in the rear of said belt for engaging
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the side walls of the ditch and sloping the same to the desired angle, substantially as described.

5 9. In a ditching machine, the combination with a frame, and means for excavating the material from the ditch and wings having forward cutting edges provided in the rear of said excavating means and adapted to slope the side walls of the ditch, 10 to prevent them from caving in, substantially as described.

15 10. In a ditching machine, the combination with a trough of an excavator belt operating therein, said trough being arranged at an incline and extending into the ditch and wings provided on each side of said trough and adapted to engage the side walls of the ditch and cut away the same to the desired slope, and the material being 20 directed by said wings into said trough, substantially as described.

25 11. In a ditching machine, the combination with an excavator belt having a series of shovels, of a trough arranged to receive said belt, sheet metal wings mounted on said trough and capable of adjustment

toward and from one another, said wings engaging the side walls of the ditch and directing the material therefrom into said trough, substantially as described.

30 12. In a ditching machine, an excavator belt, comprising sprocket chains, yokes pivoted thereon and consisting of an arched portion and rearwardly extending arm portions, said arm portions having longitudinal slots to receive the pivots, said links 35 and excavator shovels mounted on said arched portions substantially as described.

40 13. In an excavator belt, a series of yokes, each comprising an arched portion and rearwardly extending arms having slots therein, shovels mounted on said arched portions and guards projecting rearwardly from said arched portions for the purpose 45 specified.

In witness whereof, I have hereunto set my hand this 15th day of September, 1908.

EMIL A. ANDERSON.

Witnesses:

O. R. ROWLEY,
C. W. PEARSON.