

Feb. 14, 1933.

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1,897,951

METHOD AND APPARATUS FOR BLASTING PIPE

Filed Feb. 2, 1932

4 Sheets-Sheet 1

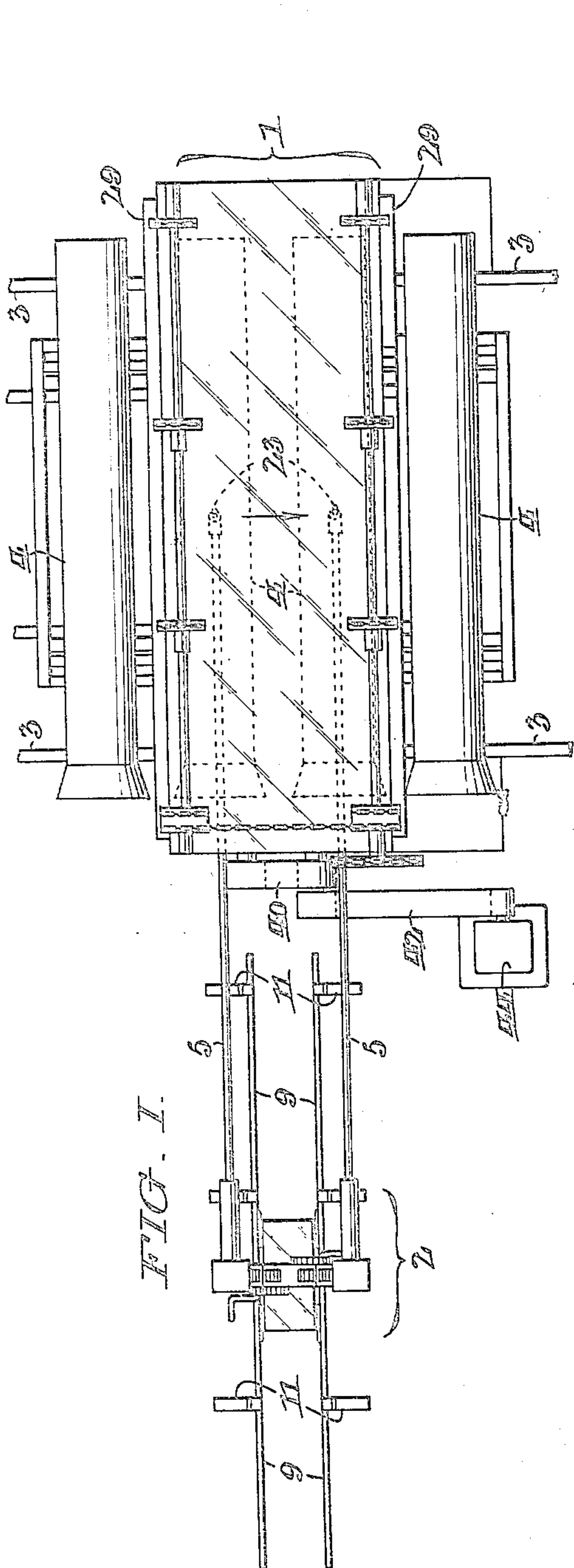


FIG. I.

WITNESSES

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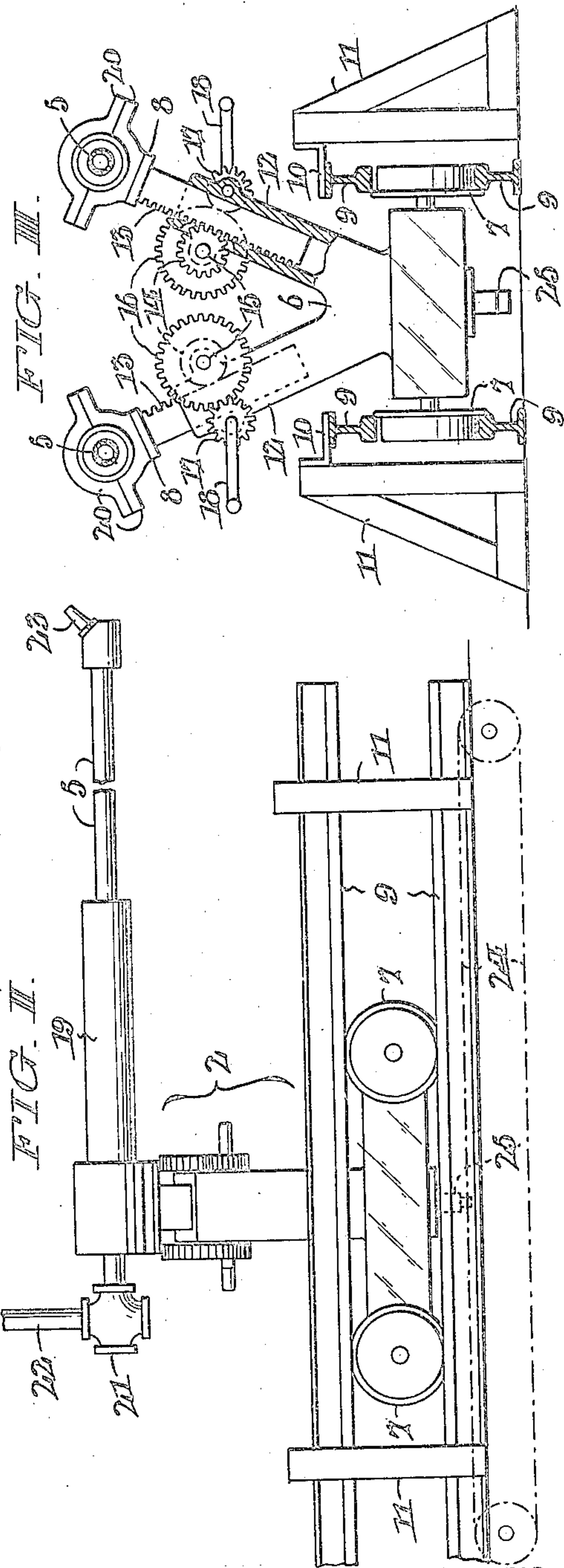


FIG. II.

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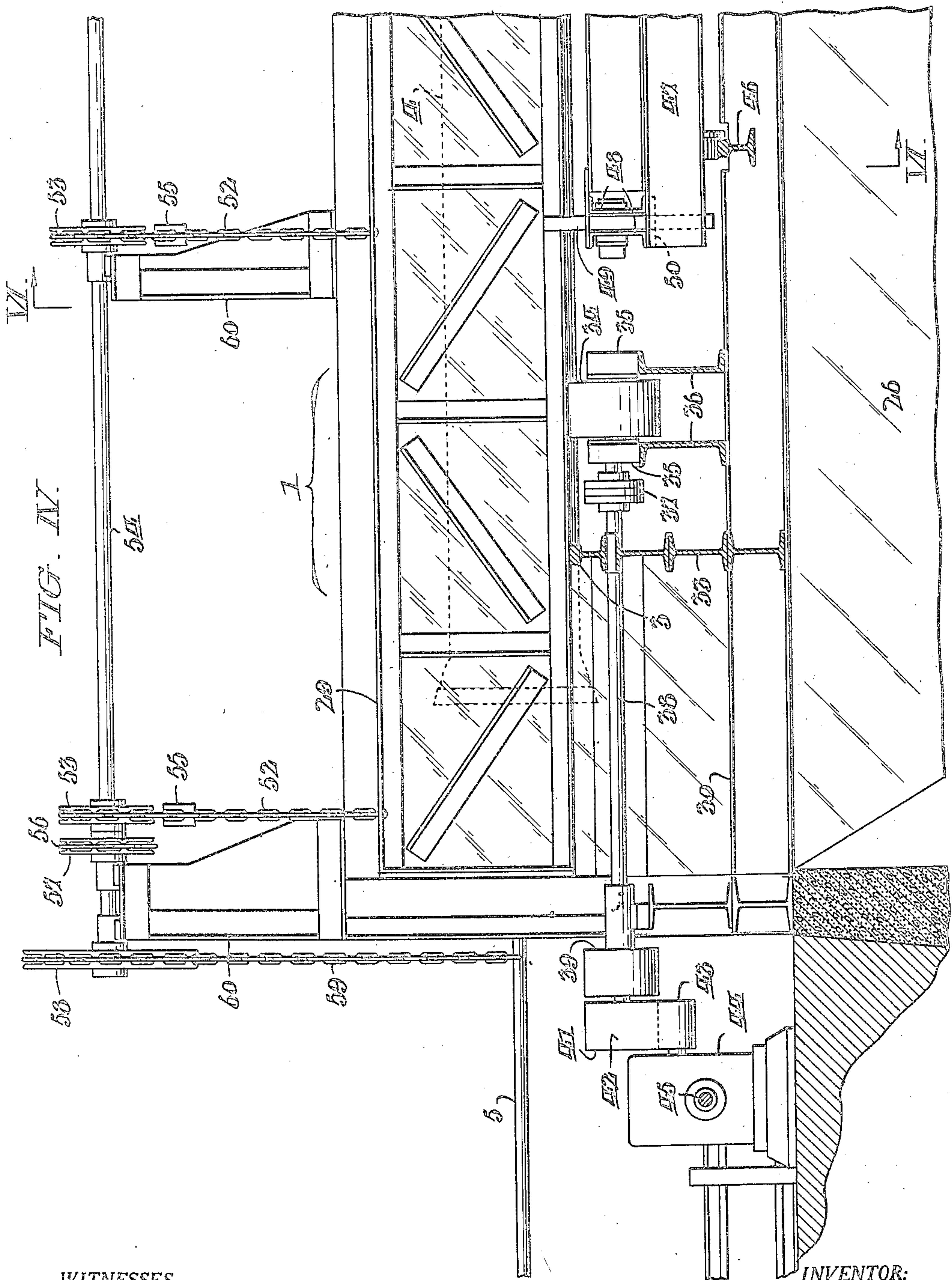
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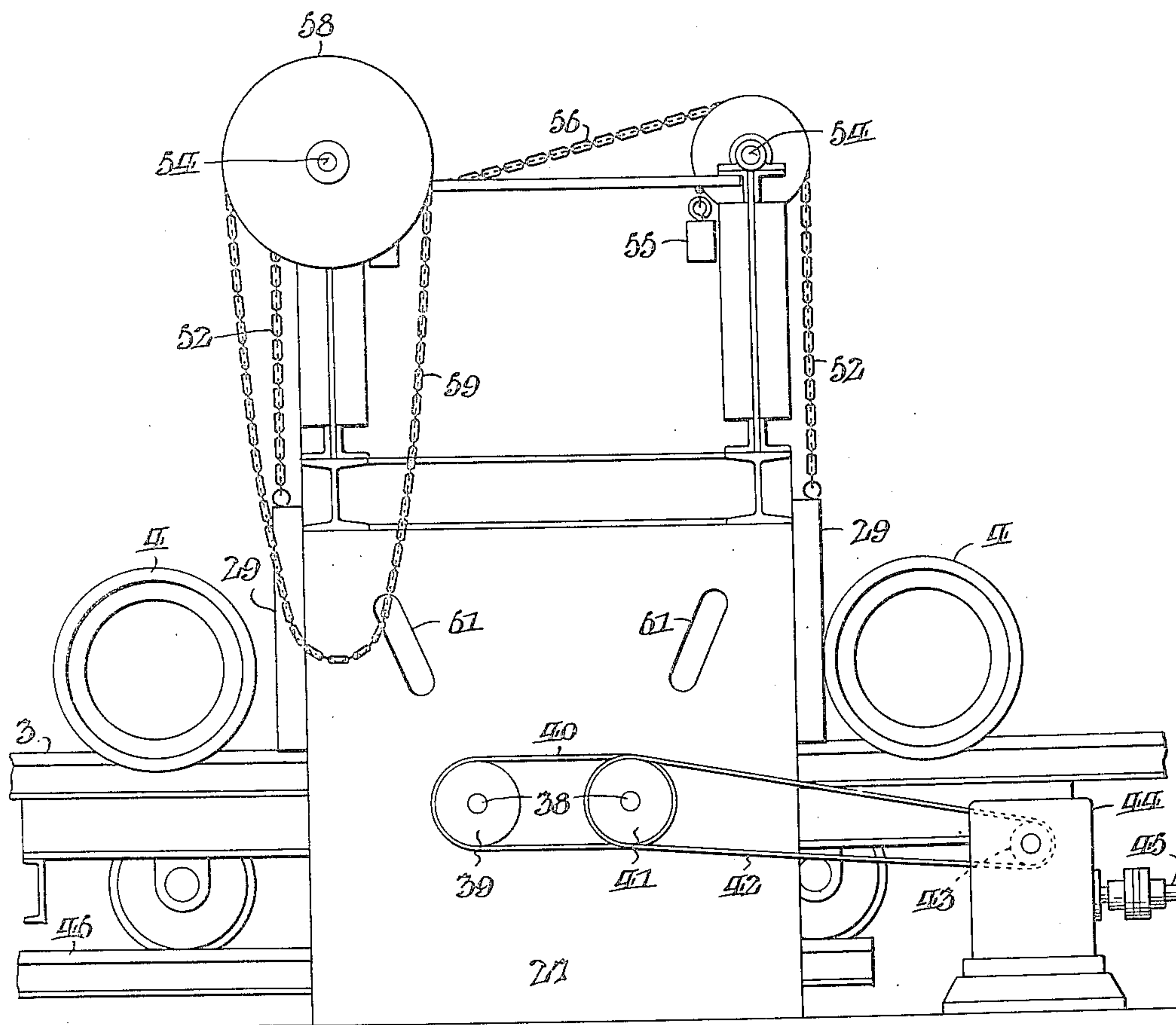
1,897,951

METHOD AND APPARATUS FOR BLASTING PIPE

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FIG. V.



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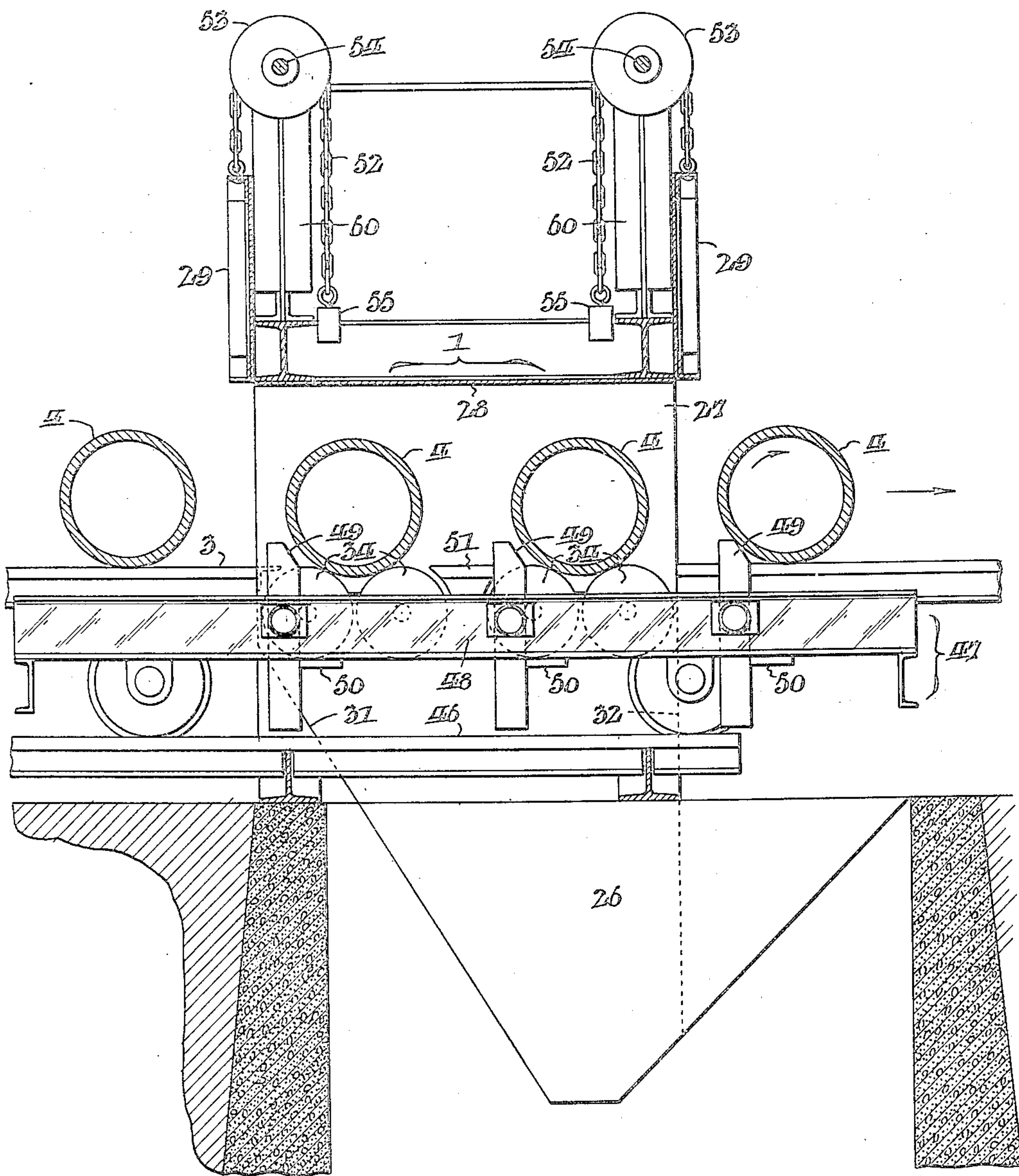
1,897,951

METHOD AND APPARATUS FOR BLASTING PIPE

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FIG. VII.



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METHOD AND APPARATUS FOR BLASTING PIPE

Application filed February 2, 1932. Serial No. 590,351.

This invention relates to a method and apparatus for interiorly cleaning pipe or like cylindrical objects by means of a blast laden with abrasive material.

5 The principal object of the invention is to simplify and expedite the operations involved in cleaning a succession of cast iron pipes as they are conveyed from one station in a foundry to another, though the practice of
10 the invention may be applied with equal advantage to the cleaning or surfacing of other cylindrical objects.

Other more specific objects and advantages characterizing my invention will become
15 more fully apparent from the description hereinafter of one example of the practice of the invention, having reference to the accompanying drawings, whereof:

20 Fig. I represents a plan view of a complete sand blasting machine embodying my invention.

Fig. II represents an enlarged side elevation of the blow pipe carriage of the same.

25 Fig. III represents an end elevation of the blow pipe carriage with a portion thereof shown in cross section.

30 Fig. IV represents an enlarged side elevation of one end of the dust collecting enclosure within which the blasting operation is performed, with the doors of such enclosure closed.

Fig. V represents an end elevation of the dust collecting enclosure; and,

35 Fig. VI represents a cross section of the same, taken as indicated by the lines VI—VI of Fig. IV, with the doors opened.

40 With particular reference to Fig. I, wherein the complete sand blasting machine is illustrated, there is shown a dust collecting enclosure, comprehensively designated at 1, a blow pipe carriage similarly designated at
45 2, and a runway in the form of parallel skids or rails 3 upon which pipes 4 are conveyed to the dust collecting enclosure preparatory to a blasting operation. The blow pipe carriage 2 is, in the present example of the invention, equipped with two blow pipes 5
50 spaced apart in parallel relation and adapted to enter simultaneously a pair of pipes 4 within the dust collecting enclosure 1, and

there to deliver a blast of air laden with sand, or other abrasive material, against the interior surfaces of the pipes.

As shown in Figs. II and III, the blow pipe carriage 2 comprises a forked stand 6, 55 mounted on wheels 7, and adjustable supports 8 which carry the blow pipes 5 and serve to maintain them in the desired positions relative to the longitudinal axes of the pipes to be blasted. Adjacent to one end of the dust
60 collecting enclosure 1, there is a track for the carriage 2 consisting of oppositely disposed pairs of rails 9 with the upper pair of rails inverted and the carriage wheels 7 engaged between the upper and lower rails in such
65 manner as to guide the carriage in a direction parallel to the axes of the pipes 4. The upper rails 9 are shown supported by brackets 10 attached to posts 11 which are suitably
70 braced and secured to the underlying foundation. The forked stand 6 of the blow pipe carriage 2 includes two arms 12 which are slotted or hollowed to accommodate toothed
75 racks 13 on the adjustable supports 8 for the blow pipes 5. Each rack 13 meshes with a pinion 14, and each pinion 14 is connected by a shaft 15 with a gear 16. The gears 16 in
80 turn mesh with gears 17 to which handles 18 are fitted. The pinions 14 and the gears 16 and 17 are suitably mounted on the arms 12 of the forked stand 6 so that a turning movement of the handles 18 will cause the blow
85 pipe supports 8 to be adjusted radially of the stand 6. Hence in an obvious manner the blow pipes 5 may be positioned toward or away from the longitudinal axes of the pipes
90 4 to enter the pipes at the desired distance from their interior surfaces, and thus the machine may be adjusted to take care of pipes of different diameters.

Each blow pipe 5 is fitted within and surrounded by a tube 19 gripped between oppos-
95 ing clamp members 20 of the support 8. At one end of each blow pipe 5 a suitable fitting 21 is attached, this fitting serving as a connection to a flexible hose 22 through which
100 the medium for the blasting or cleaning operation is supplied. At the opposite end of each blow pipe 5 there is a nozzle 23 directed preferably at such an angle as to cause the blast

to be issued upward and forward and to impinge upon the interior surface of the pipe at a short distance in advance of the nozzle.

As a means for propelling the blow pipe carriage 2, there is shown diagrammatically an endless chain 24, a link of which engages a pin 25 depending from the blow pipe carriage. The endless chain 24 may be driven by any suitable means, such as a reversible motor, to propel the blow pipe carriage 2 toward or away from the corresponding end of the dust collecting enclosure 1.

As shown in Fig. IV, the dust collecting enclosure 1 overlies a pit 26 into which sand and dust resulting from the pipe cleaning operation falls, and comprises a rectangular box including end walls 27, a roof 28 and sliding doors 29, supported on a framework of I-beams 30. As indicated at 31 and 32, the side walls of the pit 26 extend upward to points near the bottom edges of the sliding doors 29 so as to form a substantial enclosure for the pipes 4 during the sand blasting operation. The parallel skids or rails 3, which serve as a runway for the pipes 4, are mounted on pedestals 33 made up of I-beams.

As the means for rotating the pipes 4, friction rollers 34 are employed, there being two sets of such rollers at each end of the enclosure 1. The rollers 34 are supported in suitable bearings 35 which are mounted upon channel beams 36. Of the rollers 34, those two which are located centrally of the dust collecting enclosure near that end thereof at which the blow pipes enter, serve as driving rollers; while the others serve as idle rollers for supporting the pipes 4 during their rotation. To the driving rollers 34 there are connected through flexible couplings 37 two driving shafts 38 which at their outer ends are provided with pulleys 39. The pulleys 39 are cross-connected by a belt 40 as shown in Figs. I and V. On one of the driving shafts 38 there is an additional pulley 41 which is connected by a belt 42 to a pulley 43 associated with a speed reducer 44. The shaft 45 of the speed reducer 44 is adapted to be driven by a motor or other convenient source of power. Centrally of the dust collecting enclosure 1 there is a track comprising rails 46 upon which a pipe conveyor in the form of a car 47 is adapted to be propelled. To the side sills 48, which are shown as channel beams, of the conveyor car 47, there are hinged dogs or pawls 49 which are adapted to engage the pipes 4 and to progress them along the rails 3. Associated with each dog or pawl 49, there is a stop 50 at the underside of the conveyor car which permits the dogs or pawls to swing downward from their normal vertical positions in a clockwise direction, but which obstruct a counterclockwise movement. The dogs or pawls 49 are thus adapted to engage the pipes 4 and to convey them in the direction indicated by the arrow in Fig. VI to the

dust collecting enclosure 1 and onto the rollers 34. The space between the sets of rollers 34 at each side of the dust collecting enclosure is bridged by a rail section 51 so that the pipes 4 may be progressed through the enclosure by means of the conveyor car 47 without difficulty, with the car 47 travelling in the direction indicated by the arrow. With reverse movement of the conveyor car 47, the hinged dogs or pawls 49 are caused to swing outward upon impact with the pipes 4, and to pass under such pipes.

For operating the sliding doors 29 I preferably employ sprocket and chain mechanism as hereinafter described. At spaced intervals along each door 29, as shown in Figs. IV and V, chains 52 are attached to the upper edges of the doors, the chains 52 leading upward to sprockets 53, located on parallel shafts 54 at the sides of the enclosure 1, and terminating in counterweights 55 at the other side of the shafts 54. The shafts 54 are interconnected by a chain 56, the ends of which are secured to sprockets 57 on the shafts 54. Attached to that shaft 54 which is disposed at the entrance side of the dust collecting enclosure 1, there is an additional sprocket 58 carrying a hand chain 59. In an obvious manner, by manipulation of the hand chain 59, the shafts 54 at each side of the dust collecting enclosure 1 are turned simultaneously to raise the doors or to lower them. The counterweights 55 are so proportioned as to substantially balance the weight of the doors so that the interconnecting chain 56 between the shafts 54 is kept taut at all times. The parallel shafts 54 are conveniently supported by pedestals 60 extending upward from the roof 28 of the dust collecting enclosure 1.

The operation of the apparatus as thus described is as follows: When it is desired to clean interiorly a series of pipes 4 while conveying them from one station in a foundry to another, the conveyor car 47 is propelled by hand to the particular station where the pipes are received after they have been cast. The conveyor car 47 then picks up a set, of say three in number, and moves such pipes along the rails 3 to the sand blasting station. At the sand blasting station two of the pipes 4 are caused to enter within the dust collecting enclosure, the doors 29 of which have in the meanwhile been opened, and the third pipe is deposited on the rails 3 at the receiving end of the enclosure. Thereafter the doors 29 are closed and the blow pipe carriage 2 is caused to be propelled along its rails 9 toward the dust collecting enclosure 1 with the nozzles 23 passing through the slots 60 in the wall 27 at the end of the enclosure 1 and projecting interiorly within the ends of the pipes 4 there located.

The blow pipe carriage 2 is then temporarily halted while the blasting medium is turned on, by a valve associated with the

flexible hose 22 leading to the blow pipes 5. With the sand blast issuing from the nozzles 23 against the interior surfaces of the pipes 4, the motor for operating the driving rollers 34, through the speed reducer 44, is started, and the pipes 4 are caused to rotate. Thereafter the blow pipe carriage 2 is further propelled so that the nozzles 23 penetrate each pipe throughout the length thereof. The sand blast is thus caused to impinge upon the entire area of the interior pipe surfaces so as to clean them of scale or the like and produce a smooth surface.

After the pipes within the enclosure 1 have been cleaned, the sand blast is turned off, the blow pipe carriage 2 is returned to its original position, and the motor for driving the rollers 34 is stopped. The doors 29 of the enclosure 1 are then opened, and by means of the conveyor car 47 the pipes 41 which have been subjected to the cleaning operation are advanced to a station beyond the dust collecting enclosure 1. The conveyor car 47 is then returned to pick up a new set of pipes, the return of the conveyor car automatically disengaging the pipes which have been operated upon.

It will be apparent from the above description that the machine of my invention not only accomplishes efficiently the cleaning of pipes in a short period of time, but also renders such cleaning operation a part of the operations involved in conveying pipes from one station in a foundry to another.

While I have described a particular machine and a particular method of cleaning pipes, it will be apparent that the machine and method of this invention may be applied to the cleaning of other cylindrical objects, and it will be further apparent that the particular embodiment of my invention herein illustrated and described represents merely one example of the physical instrumentalities which may be employed, and that numerous changes may be made in the form of such instrumentalities without departing from the spirit of my invention as defined in the annexed claims.

Having thus described my invention, I claim:—

1. Apparatus for blasting pipe or like cylindrical objects comprising friction rollers for rotating the object to be treated, a dust collecting enclosure housing said friction rollers, rails leading to said enclosure, means for conveying the object along said rails to said enclosure, a carriage movable in the direction of the length of the object, and a blow pipe on said carriage adapted to project interiorly of the object, said blow pipe having a nozzle for delivering a blast against the surface of said object.

2. Apparatus for blasting pipe or like cylindrical objects comprising friction rollers for rotating the object to be treated,

a runway leading to said friction rollers, a conveyor having hinged pawls thereon for progressing the object along said runway to said friction rollers, a carriage movable in the direction of the length of the object at said friction rollers, and a blow pipe on said carriage adapted to project interiorly of the object, said blow pipe having a nozzle for delivering a blast against the surface of said object.

3. Apparatus for blasting pipe or like cylindrical objects comprising friction rollers for rotating the object to be treated, a dust collecting enclosure housing said friction rollers, rails leading through said enclosure, a conveyor having hinged pawls thereon for progressing the object along said rails to said friction rollers and therebeyond, a carriage movable in the direction of the length of the object at said friction rollers, and a blow pipe on said carriage adapted to project interiorly of the object, said blow pipe having a nozzle for delivering a blast against the surface of said object.

4. Apparatus for blasting pipe or like cylindrical objects comprising means for concurrently rotating a plurality of objects to be blasted with their axes in parallel relation, a carriage movable in a direction parallel to said objects, said carriage having a forked stand, and blow pipes corresponding in number to the objects to be blasted supported on said stand, said blow pipes being adapted to project interiorly of said objects for delivering blasts against the surfaces thereof.

In testimony whereof, I have hereunto signed my name at Florence, New Jersey, this 29th day of January, 1932.

LOUIS A. CAMEROTA.