No. 761,404. PATENTED MAY 31, 1904.

H. A. ROBINSON.

SEWER PIPE INVERTING DEVICE.

APPLICATION FILED FEB. 24, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

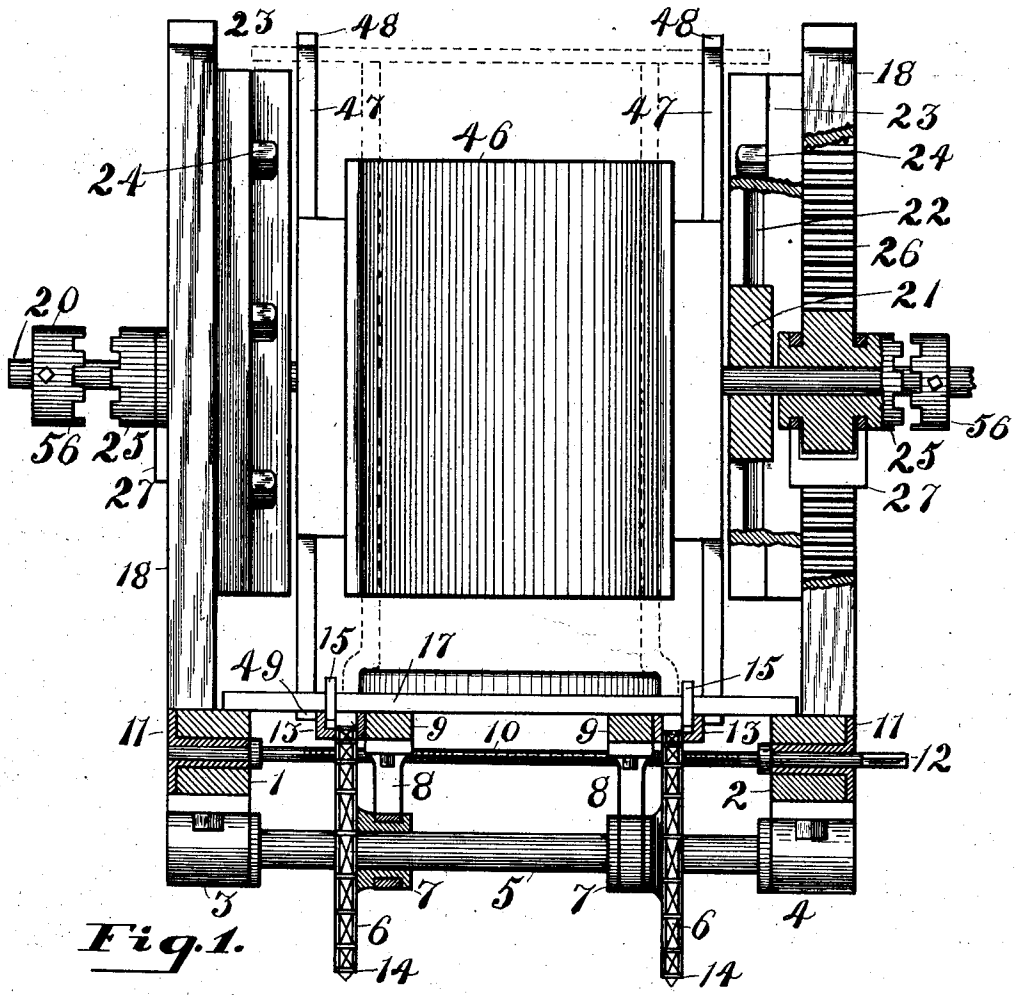


Fig. 1.

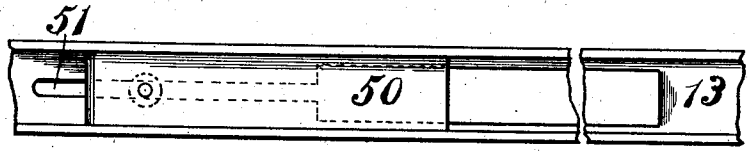


Fig. 2.

Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

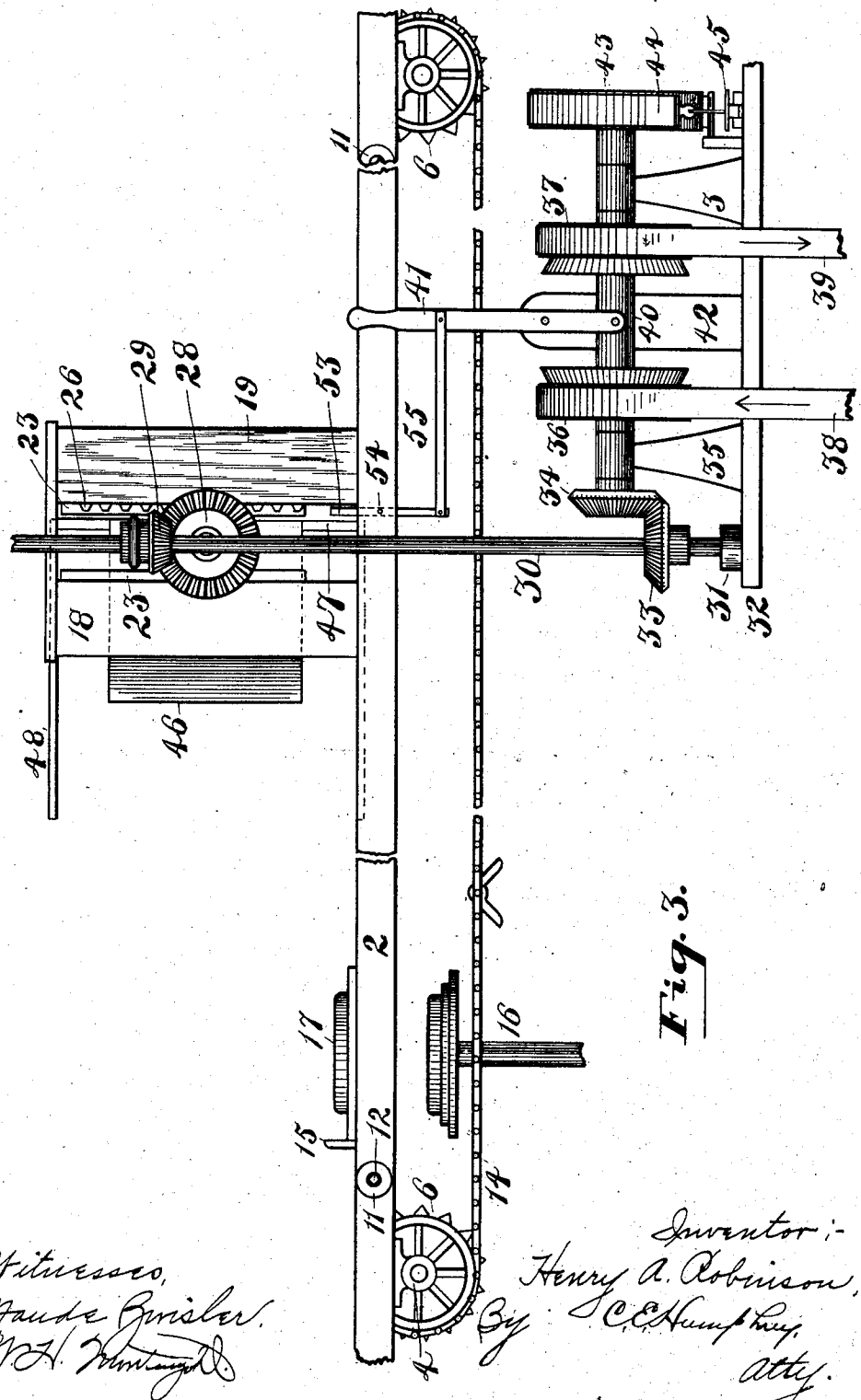


Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY A. ROBINSON, OF AKRON, OHIO.

SEWER-PIPE-INVERTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 761,404, dated May 31, 1904.

Application filed February 24, 1904. Serial No. 194,996. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. ROBINSON, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Sewer-Pipe-Inverting Devices, of which the following is a complete specification.

My invention relates to machines for inverting sewer-pipe after it comes from the forming-press and previous to its placement in the drying-room preliminary to its burning in a kiln.

The objects of my invention are to produce a machine which will receive the green sewer-pipe from a press after its severance from a continuous tube of plastic clay, convey it to an inverting device, which will invert the same from a position wherein the socket end is downward into a position upon a suitable board with the socket end upward, and from thence to a drying-room, where it is to remain until ready for instalment in a kiln for burning.

Other objects of my invention are to so construct this device as to render its manipulation and control by an operator easy, rapid, and positive at all times and to depend as little as possible upon automatic devices, which have heretofore proven a failure in the control and inverting of pipes of large diameter.

In inverting sewer-pipe, which is comparatively soft and green when issuing from a press, the manipulation thereof with regard to small-diameter pipe is comparatively easy and is accomplished by one or two workmen without difficulty; but where the pipe manufactured reaches the diameter of fifteen inches and up the weight thereof, due to the increased thickness of the walls of the pipe, is so great as to require a large number of workmen in its inversion, which adds exceedingly to the cost of the pipe and to the liability of damage in turning.

To the accomplishment of the aforesaid objects my invention consists in the peculiar and novel construction, arrangement, and combination of parts hereinafter described, reference being had to the accompanying drawings, forming a part hereof.

In the accompanying drawings, in which similar reference-numerals indicate like parts in the different figures, Figure 1 is an end view looking from the left of Fig. 3 with certain portions of the framework of the machine broken to better illustrate the construction thereof; Fig. 2, a detail of the sprocket-chain trough, and Fig. 3 a side elevation and diagrammatic view of the entire machine.

In the drawings, 1 2 represent, respectively, two long timbers or supports, on which the entire mechanism to be hereinafter described is located. These timbers may form a portion of the floor of the building or be independent thereof, as the requirements of the case prove most efficacious. Extending between these side frames 1 and 2 and mounted in bearings 3 4 are shafts 5, on which are mounted sprocket-wheels 6, having inwardly-turned extended hubs 7, splined and arranged to slide longitudinally on the shafts 5. Surrounding the shafts 7 and fitting into grooves therein are brackets 8, the upper ends of which are fastened to bars 9. These brackets 8 are off-turned and meet the bars 9 at a distance from the outside of the periphery of the sprocket-wheels 6. Immediately below the point of union between the brackets 8 and the bars 9 are threaded openings in the brackets 8, through which pass right and left handed threaded shafts 10, which have bearings 11 in the timbers 1 and 2, and each shaft is provided at one end with a squared end 12, onto which can be placed a wrench for the necessary revolution thereof, so that by revolving the shafts 10 simultaneously the sprocket-wheels 6 are carried toward and away from each other, due to the revolution of the shaft 10. Fastened to the outside of the bars 9 are troughs or ways 13, along the bottom portions of which run endless sprocket-chains 14, which pass around the sprocket-wheels 6 and receive motion therefrom. In operating these sprocket wheels and chains power is generally applied to the shaft at the opposite end of the machine from that shown in Fig. 1, so as to keep the upper half of the chain taut at all times, and this power may be applied by belts, gears, or any of the well-known means for commuting power thereto. On the outside preferably, but if occasion requires them may

be placed on either side of the sprocket-chains 14, are dogs 15, which are in the shape of a right-angled triangle, with the pivot therefor near the point of the right angle, and this pivot generally consists of a pin extended from the side of the sprocket-chains 14. These dogs are arranged to travel with the chains and pass up onto and along the troughs 13. At the left end in Fig. 3 the two frames 1 and 2 pass on either side of the central line of a sewer-pipe press, the socket-former 16 of which is arranged to pass between the frames thereof. In the manufacture of sewer-pipe the pipe is formed with its socket end downward, and the former 16 is lowered sufficiently far to permit the placing thereon of a former-board 17. It is then raised until the former-board meets and is accurately placed under the socket end of the issuing sewer-pipe, and then the former is lowered slowly in unison with the pressure on the press, which causes the pipe to issue therefrom in a continuous tube until a definite length has been expelled, when it is cut from the issuing tube and the pipe left upon the board 17.

In the case now being described the former-head will be lowered until the board 17, with its superimposed piece of pipe upon it, is resting upon the bars 9, and, if desired, also upon the frames 1 and 2. This board as it rests upon the supports just described will be directly in the path of and will be encountered by the oncoming dogs 15, mounted on the sprocket-chains 14, and will be carried forward by them until it reaches the mechanism to be described. The mechanism by which this pipe is inverted consists of oppositely-disposed upright frames 18 19, between which and transverse thereto is a shaft 20. This shaft has for its bearings blocks 21, slidable in grooves 22 in brackets 23, bolted by bolts 24 to the inside of the frames 18 19. In order to hold this shaft at a definite place vertically, I place on each end of the shaft spur-gears 25, which mesh into racks 26, fastened to the inner edge of the uprights 19. These gears 25 have surrounding each of their hubs dogs 27, which are arranged when swung, either by hand or a spring, to engage and catch onto the teeth of the racks 26, and thus hold the shaft 20 at a definite vertical distance above the frames 1 and 2. This shaft 20 is rotated by having on its outer end a bevel-gear 28, which meshes into a bevel-pinion 29 on an upright shaft 30, the lower end of which is seated in a step 31 on a foundation 32 and is provided near its lower end with a bevel-gear 33, in turn meshing into another bevel-gear 34 on a counter-shaft. (Indicated, but not shown.) The bevel-gear 28 on the shaft 20 has a large hub, (not shown,) from which projects an arm the end whereof is formed with a loop, which is arranged to inclose and sustain the hub of the pinion 29 and cause the bevel 29 to vertically slide on the shaft 30 irrevolubly, so as to keep in mesh with the bevel-gear 28 as it is raised and lowered in a manner to be later described. This counter-shaft, on which is mounted the gear 34, is supported by brackets 35 and has on it loose friction-clutch pulleys 36 and 37, driven by belts 38 and 39, respectively. Midway between the pulleys 36 and 37 is a double friction-clutch 40, arranged to be swung in either direction and engage the clutch situated in either of the pulleys 36 and 37. This clutch is operated by a hand-lever 41, pivoted on a standard 42, mounted on foundation 32 or otherwise, as experience may dictate. On the outer end of this shaft is mounted a tight pulley 43, over which is a band-brake 44, controlled by a foot-lever 45. From this description it will be seen that the shaft 20 may be revolved in either direction, and its revolution can be controlled by the movements of the hand-lever 41.

Mounted on the shaft 20 by bolts or in any preferred or desired manner is a cradle 46, which is adapted to receive the body or cylindrical portion of the pipe, and bolted on either side of the back of this cradle 46 are vertical arms 47, from which extend forward integral horizontal arms 48 and 49.

The operation of this device is as follows, and it is presumed in this description that the inverting device will be adjusted with reference to the size of the pipe which the machine is to invert. For instance, if the machine is to invert a large pipe the cradle 46 will substantially identically fit the exterior of the pipe to be inverted, and the arms 48 and 49 will be extended upwardly and downwardly far enough to have the arms 49 pass under the former-board, on which the pipe is carried, and have the arms 48 sufficiently high to permit the placing of a mold-board on top of the green pipe, between it and the under side of the arms 48, so that when the pipe is inverted it will rest upon the mold-board and be sustained by the arms 48, this being permitted by the fact that the bolts which hold the arms 48 and 49 enter slots to allow this vertical adjustment. As the pipe moves forward on the former-board it reaches a position just nicely within the cradle 46, at which time the dogs on the chains will pass downward into an opening cut in the troughs 13, and which openings are provided with adjustably-sliding covers 50, which limit and regulate the amount of opening necessary to cause these dogs to drop down and release their hold upon the back edge of the former-board. These sliding covers 50 are held in place by bolts which pass through slots 51 in the bottom of the troughs, so that their position can be regulated with such nicety as to cause the dogs to tilt and stay tilted with their upper ends unsupported to encounter the mold-board, onto which the sewer-pipe has been placed after inversion. In approaching the cradle the former-board

17 passes over and onto the arms 49, and as soon as the former-board 17 has ceased its forward motion the operator throws the lever 41 to the right, which causes the operation of the clutch 36 and the rotation thereby of the shaft 20 and cradle 46, which is continued until the pipe has been completely inverted and deposited upon the mold-board (indicated in dotted lines) upon the bars 9, and by this time the dogs will have emerged from the opening in the bottom of the troughs and will encounter the rear end thereof and carry forward the mold-board bearing the sewer-pipe to the dry-house or any preferred or desired place. The former-boards 17 are then successively returned to the press end of the device, to be used over and over again.

In order to stop the inverting of the pipe, I have found that by placing a lever 53 in the path of the rear end of the arms 48 they will encounter it, and by swinging it on this pivot 54 cause it, by means of the link 55, to operate the lever 41 and throw the clutch 36 out of operation, which thereby ceases its inverting motion, and it can be returned to its former position empty by throwing the clutch 41 to the left in Fig. 3.

Experience has shown in inverting large pipe that after the pipe has passed the upper center of its turning-point it is sometimes necessary to throw the clutch 41 out of engagement by hand and depend upon the brake 44 to allow the slow steady lowering of the heavy pipe onto the bars 9. This, however, is not always necessary, but is used as an auxiliary when needed.

In order to adjust the vertical position of the cradle to meet the various requirements of different-sized pipes, I place on each end of the shaft 20 square-jawed clutches 56, which are fast to and revolve with the shaft 20, which is at all times freely revoluble in the blocks 21 and through the gears 25.

By forcing the clutches 56 into engagement with corresponding formations placed in the outer edges of the hubs of the gears 25 and by rotating the shaft 20 by means of the power mechanism heretofore described the gears will travel upward or downward along the rack 26 to any position which it is desired to place them, and when so placed the dogs 27 are swung into appropriate teeth in the rack 26 and the clutches 56 released from engagement and the mechanism of inversion is ready, as before.

Of course it is entirely obvious that any well-known device for raising and lowering a shaft horizontally may be employed to raise the cradle-shaft 20, and it may be accomplished by mechanism operated by hand with equal success.

What I claim, and desire to secure by Letters Patent, is—

1. The combination in a machine of the class designated of constantly-traveling parallel means for receiving pipe from a press and conveying it to an inverting device, an inverting device placed to receive pipe from said conveying means and means for regulating the distance between said conveying means.

2. The combination in a machine of the class designated of constant-traveling means for conveying pipe from a press to an inverting device, an inverting device for receiving the pipe from the conveying means arranged to revolve upon a horizontal axis, means to operate said conveying means, means for raising and lowering the said axis and means of connecting said raising and lowering means with the means which operate the conveying means.

3. The combination in a machine of the class designated of conveying-chains for conveying sewer-pipe from a forming-press to an inverting device, dogs attached to the said chains to engage the boards supporting said pipe, troughs forming ways for said chains and dogs in their transit and means to regulate the distance between the said troughs.

4. The combination in a machine of the class designated of conveying-chains for conveying sewer-pipe from a forming-press to an inverting device, dogs attached to the said chains to engage the boards supporting said pipe, troughs forming ways for said chains and dogs, said troughs being provided with openings adjustable as to length to permit the descent therein of portions of said dogs and arrest their engagement with said boards.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

HENRY A. ROBINSON.

In presence of—
J. H. LONG,
C. E. HUMPHREY.