Feb. 23, 1926.

1,574,433

W. J. MacKENZIE

CONCRETE PIPE BEND MACHINE

Filed June 2, 1924

3 Sheets-Sheet 1

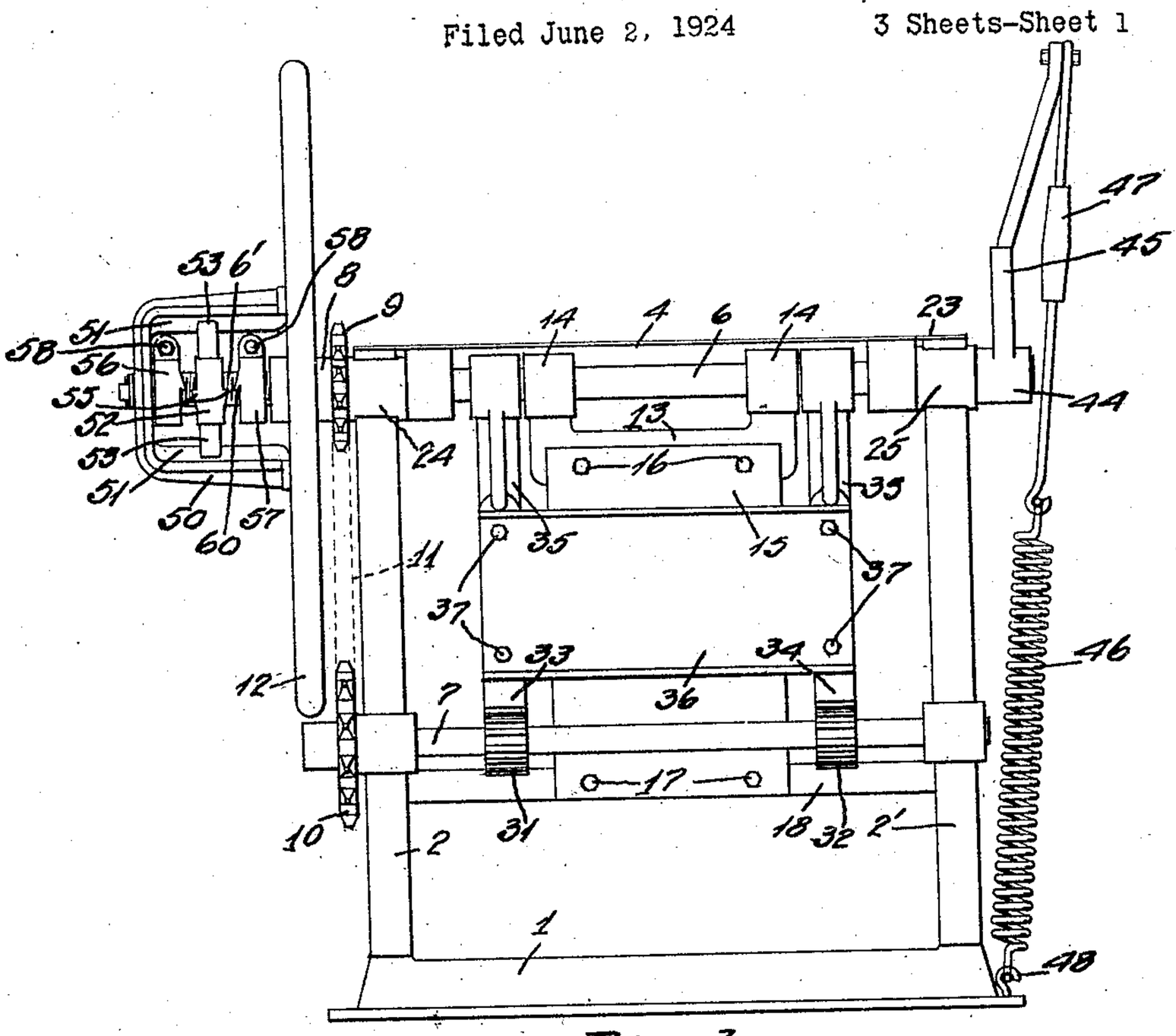


Fig. 1.

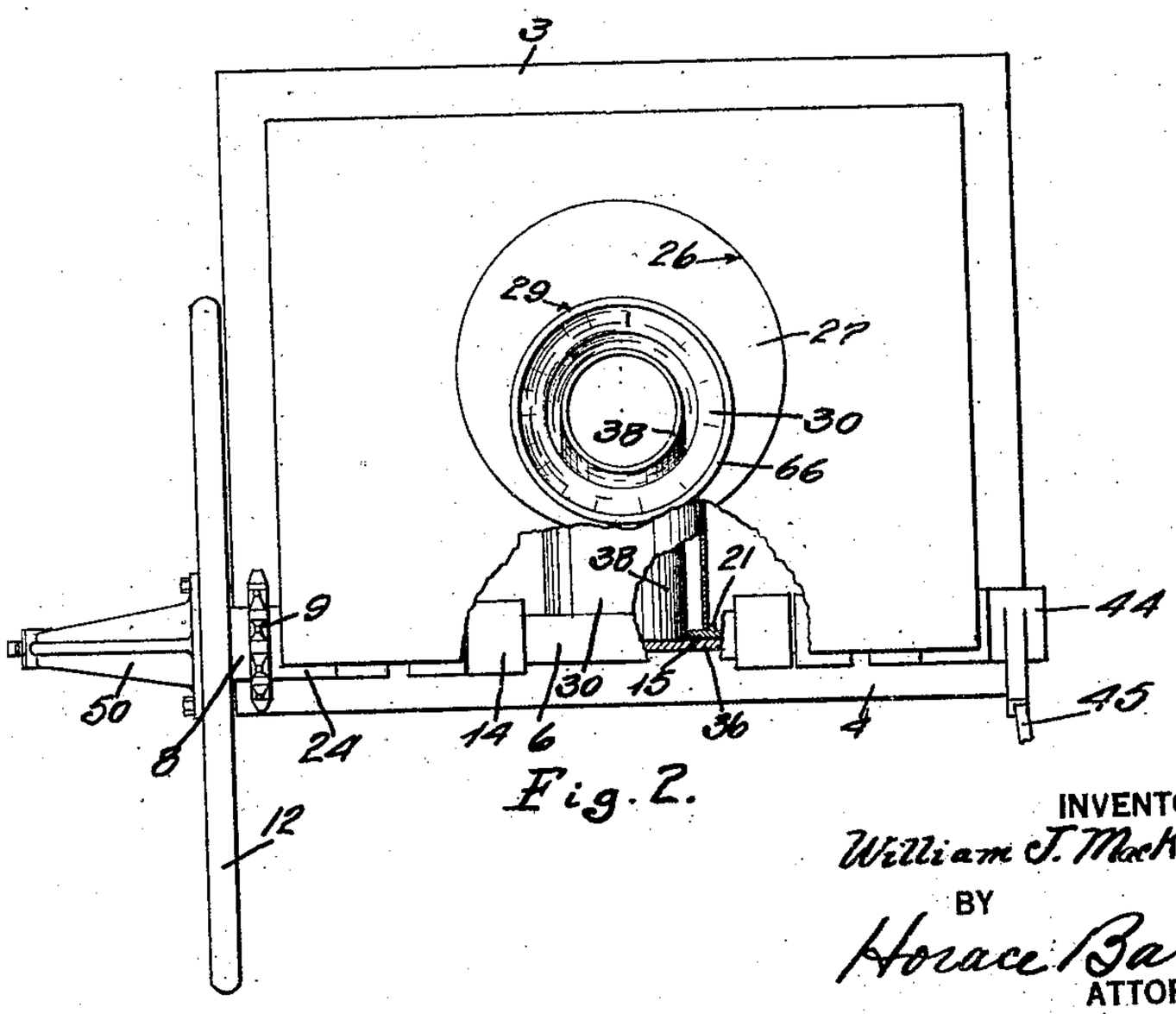


Fig. 2.

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CONCRETE PIPE BEND MACHINE

Filed June 2, 1924 3 Sheets-Sheet 2

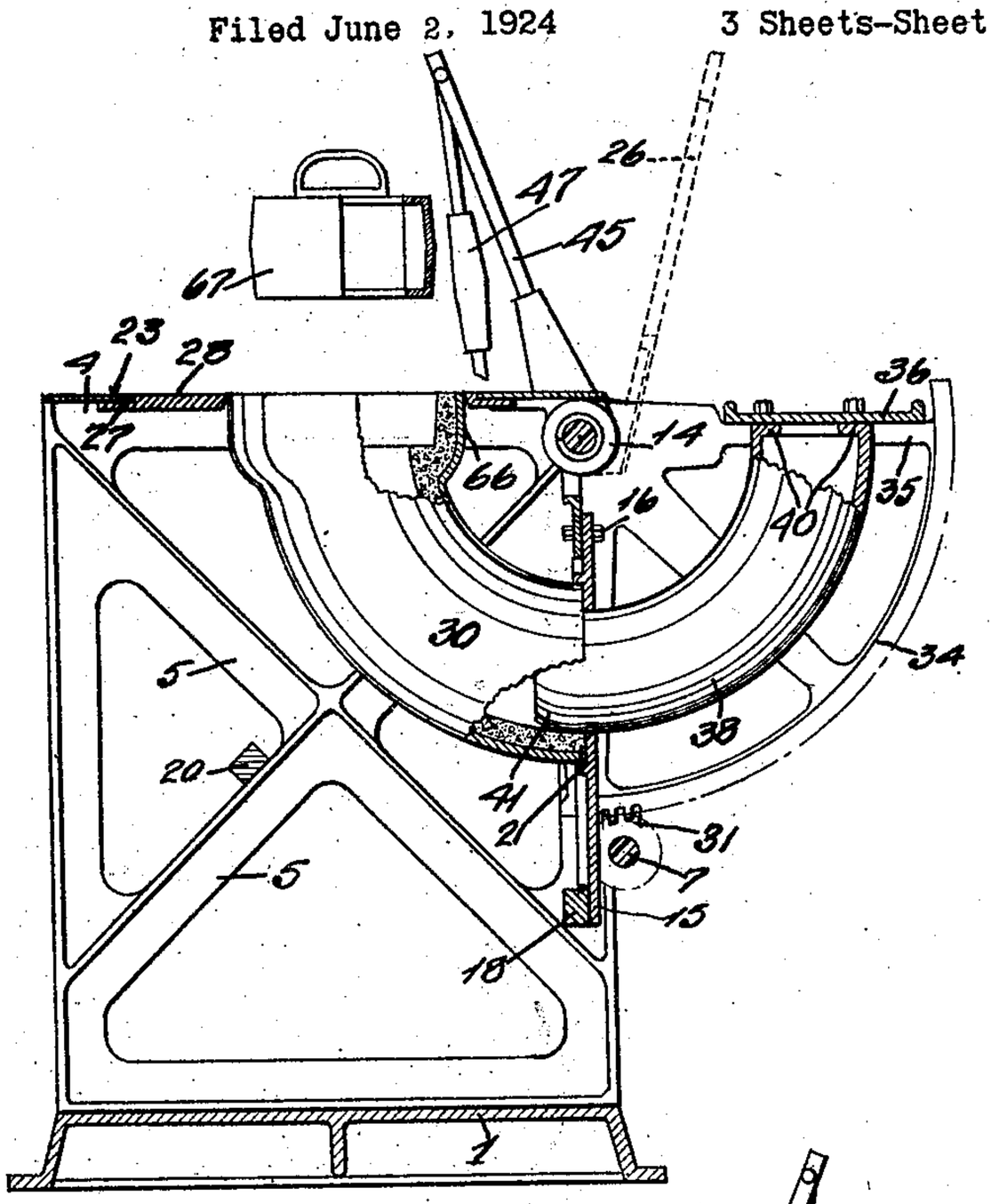


Fig. 3.

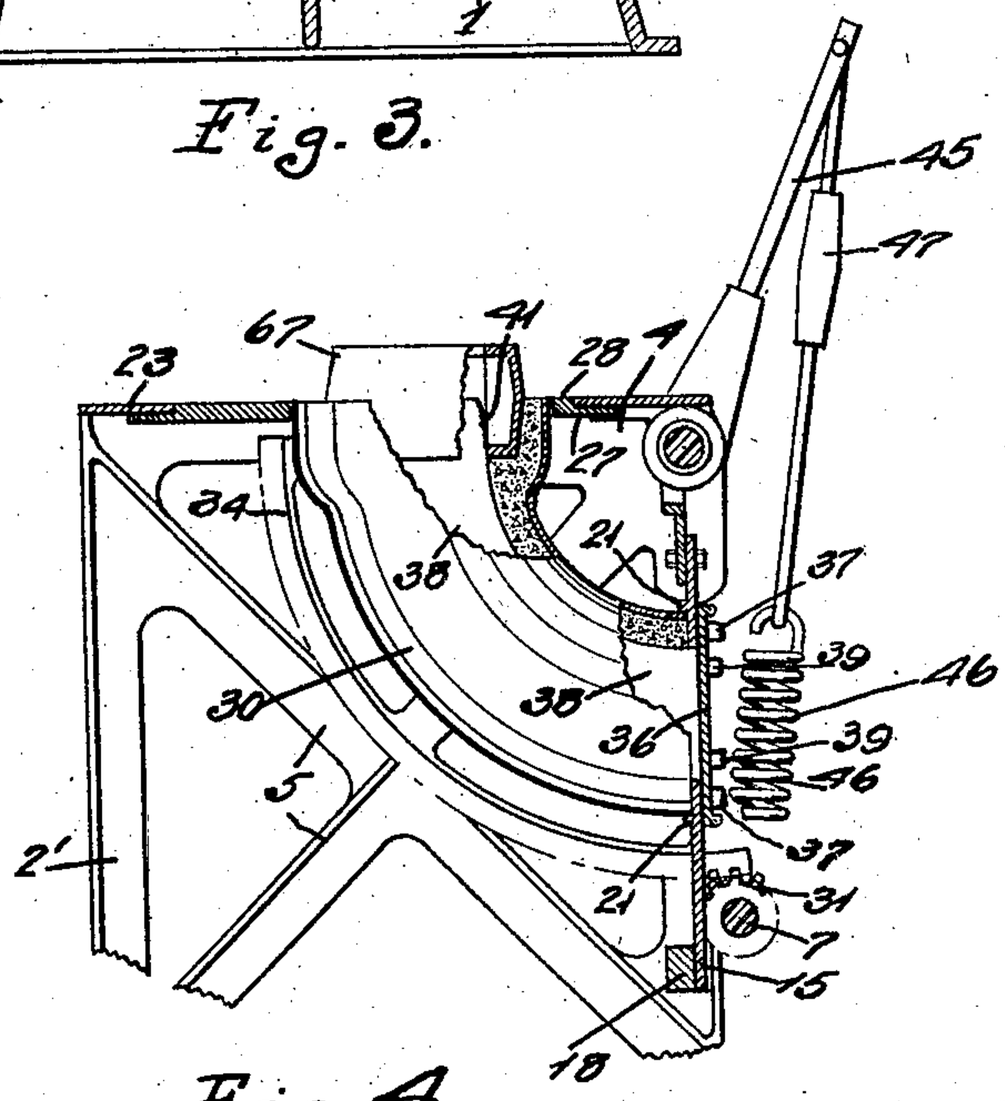


Fig. 4.

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CONCRETE PIPE BEND MACHINE

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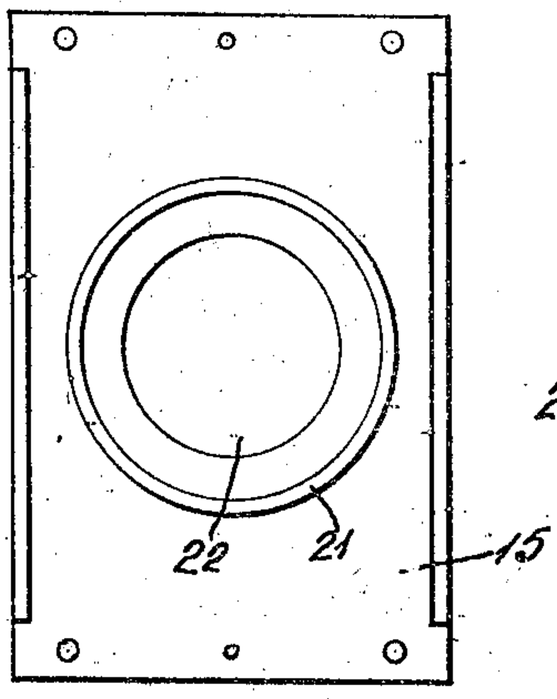


Fig. 5.

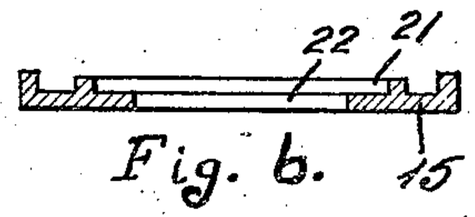


Fig. 6.

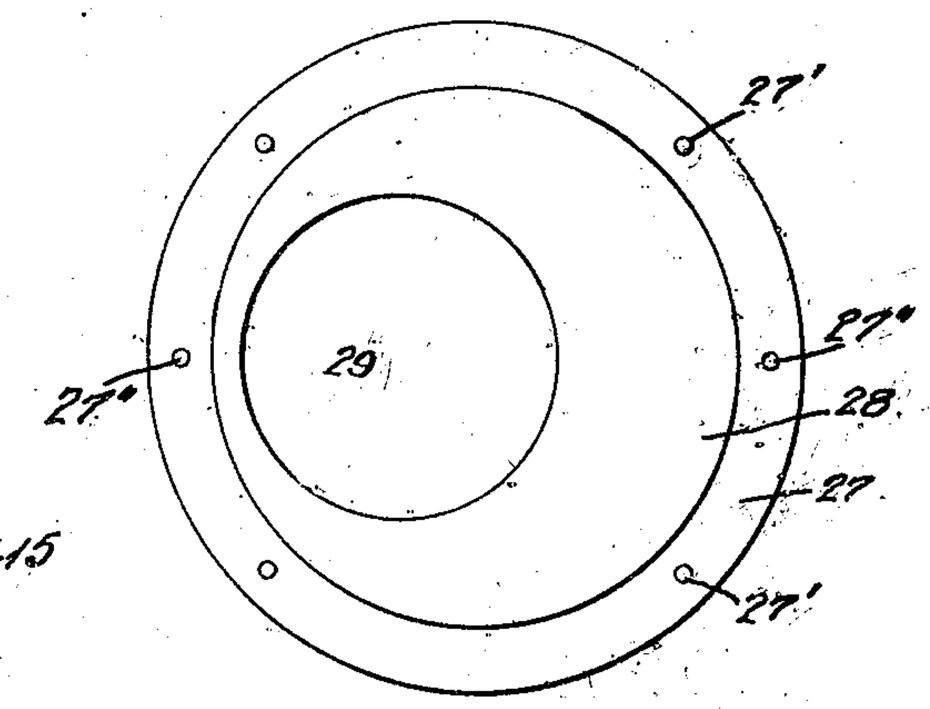


Fig. 7.

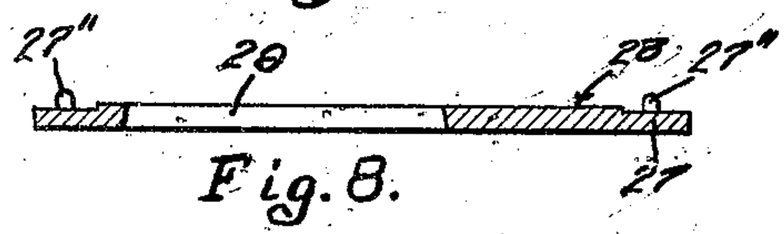


Fig. 8.

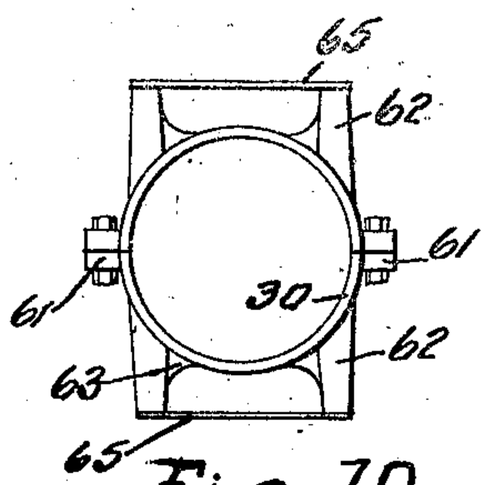


Fig. 10.

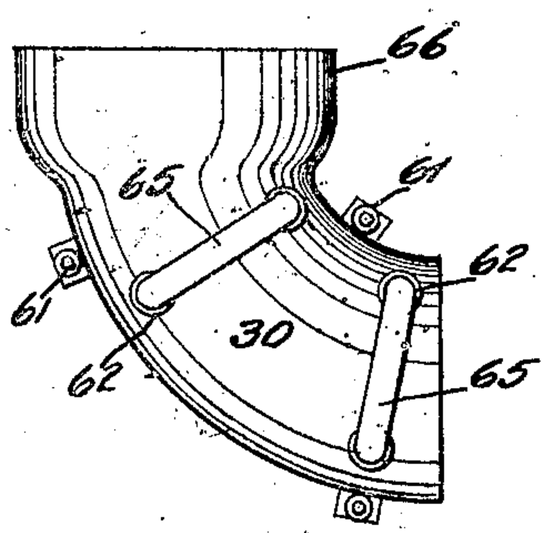


Fig. 9.

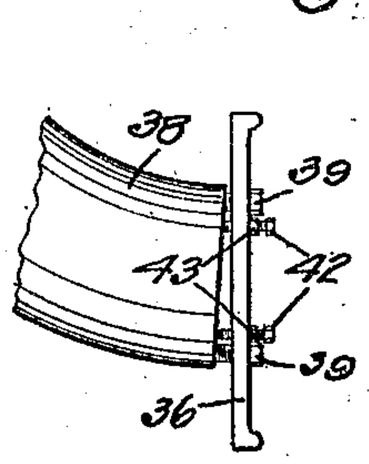


Fig. 12.

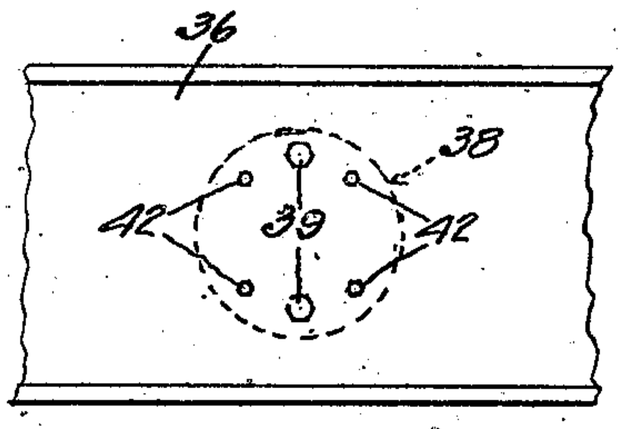


Fig. 11.

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Patented Feb. 23, 1926. 1,574,433

UNITED STATES PATENT OFFICE.

WILLIAM J. MacKENZIE, OF PORTLAND, OREGON.

CONCRETE-PIPE-BEND MACHINE.

Application filed June 2, 1924. Serial No. 717,221.

To all whom it may concern:

Be it known that I, WILLIAM J. MacKENZIE, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Concrete-Pipe-Bend Machines, described and claimed in the following specification.

This invention relates to improvements in machines for making bends or elbows for sewer-pipe from concrete or other plastic material.

The object of the invention is to provide a machine of the above described character wherein concrete pipe-bends of quarto-circular configuration or less may be molded with accuracy and despatch.

It is also an object of the invention to provide a separable mold of novel construction, together with means to secure the mold within the machine in rigid, aligned position at both its ends and subject to instant removal upon the completion of the pipe-bend.

A further object of the invention is the provision of a mold-core of improved construction rigidly mounted in the machine; means to adjustably center the core relative to the mold; and means to effect the withdrawal of the core from the mold after the pipe is molded.

A still further object of the invention is the provision of improved stop devices for the core actuating mechanism.

Other objects and advantages and objects relating to operative parts and construction, and in the combinations thereof will hereinafter appear in the detailed description to follow.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a view in side elevation of an embodiment of my invention.

Fig. 2 is a top plan view of the same, partly broken away.

Fig. 3 is a view in vertical cross section with the platform shown as raised in broken lines and parts of the mold and core broken away.

Fig. 4 is a partial view similar to Fig. 3 showing certain operative parts of the machine in another position.

Fig. 5 is a detached plan view of the mold-plate element of the invention.

Fig. 6 is a cross sectional view of the same.

Fig. 7 is a top plan view of a mold-receiving disk.

Fig. 8 is a view in cross section of the same.

Fig. 9 is a view in side elevation of a sectional mold.

Fig. 10 is a view of the same in end elevation.

Fig. 11 is a fragmentary rear view of the core-board element.

Fig. 12 is a view in side elevation of the same showing a portion of the core attached thereto.

Referring to said views, the reference numeral 1 indicates a base upon which is built and secured a rigid frame-work of rectangular configuration consisting in upright side-frames 2 and 2′ connected at their upper ends by front and rear beams 3 and 4, respectively. Said side frames are each formed with corresponding integral diagonal braces 5.

A transversely disposed shaft 6 is mounted to oscillate adjacent the top of said side frames and an arbor 7 is journaled for rotation therebelow in parallel relation. A sleeve 8 is rotatably mounted on said shaft 6 upon which a sprocket wheel 9 is keyed. A sprocket wheel 10 is keyed to said arbor in vertical alignment with said sprocket 9 while they are operatively connected by a chain 11. A hand-wheel 12 is keyed upon said sleeve 8 adjacent the frame whereby the sprockets and chain are actuated.

13 indicates a hanger swingingly mounted on said shaft 6 by apertured bosses 14 to which a mold-plate 15 is secured at its upper end by screws 16. The lower end of said plate is rigidly secured in vertical position by screws 17 to a transverse bar 18 supported on said side frames. Said mold-plate when in the position described and illustrated is at right angles to the upper horizontal plane of said frame-work and is adapted to support the lower end of a mold for forming so-called "quarter-bends", that is, having a curvature of ninety degrees. When an "eighth-bend" mold is to be supported, or one making an elbow of forty-five degrees, the lower end of said plate 15 is secured in a similar manner at its lower end to a bar 20 mounted on the diagonal braces 5, the hanger 12 turning to any angle

desired. Any other degree of angularity or angular relation between the ends of the pipe-bend may be provided for by suitably mounting a supporting bar similar to bars 18 or 20 upon which to secure the plate 15.

Said plate 15 is formed with a circular ridge 21 on its inner face and an aperture 22 is concentrically positioned therein. A different plate is used with each different diameter of pipe molded wherein the ridge 21 and the opening 22 are of suitable size with respect to the pipe to be formed.

A platform 23 of steel plate is hingedly mounted upon said shaft 6 through apertured swinging brackets 24 and 25. Said platform when lowered entirely covers the upper side of said frame-work and is formed with a symmetrically disposed circular opening 26 of a diameter to receive the upper ends of molds of the largest size for which the machine is adapted.

To accommodate molds of lesser size at their upper or bell-ends supplemental disks 27 are provided. Each said disk is circular in form and of slightly larger diameter than the platform opening 26 and has a concentric circular raised portion 28 adapted to fit within said opening from underneath with its upper surface flush with the upper surface of the platform. Said disk is further formed with an eccentric circular opening 29 of sufficient diameter to receive the upper end of the mold for which it is intended. Disks 27 are provided having respectively a suitably sized opening 29 for each size of pipe-mold used on the machine except the largest size which are receivable in the platform opening 26, the diameter and radius of the pipe determining the size and eccentricity of the openings therein. Said disks are secured to the platform by means of bolts (not shown) extending through holes 27′ of said disks and through said platform. Pairs of dowel-pins 27″ are provided projecting upwardly from the respective disks upon opposite sides of said opening 29 and adapted to protrude within corresponding holes in the platform whereby correct positioning of the disk relative to the platform may be guaranteed to always bring the eccentric opening 29 in true alignment relative to the core.

A pipe-bend mold 30 used with my machine consists of two half-sections divided in the plane of their curvature and are more particularly described hereinafter. Their small or spigot end is supported within the circular ridge 21 of the plate 15 and their upper end is supported in the opening 26 of the platform in the case of the largest sized molds or in the openings 29 of the respective disks, as seen in Fig. 3.

Toothed pinions 31 and 32 are keyed on the arbor 7 in spaced relation and toothed segmental gears 33 and 34 in mesh therewith, respectively, are pivotally supported on the shaft 6. The rear radius members 35 of said segments rigidly support a core-board 36 disposed transversely therebetween secured by screws 37.

A hollow core 38 of suitable exterior size and radius to correspond with the mold employed is rigidly mounted upon said core-board by means of screws 39 extending through an annular internal flange 40 at the butt end of said core. The opposite end of said core is rounded, as at 41, to admit of the core being easily withdrawn from the newly formed pipe. Adjustment screws 42 positioned at the four corners of a square inscribed within the circular perimeter of the core mounted thereon extend through the core-board 36 and bear upon said flange 40 whereby the core may be adjusted into exact register with the interior of the mold and in true circular relation with its pivotal center. After suitable adjustments of said screws 42 and locking the same with lock-nuts 43 thereon, the screws 39 are tightened to rigidly maintain the core in its set position.

A sleeve 44 is keyed on shaft 6 from which an arm 45 extends upwardly and rearwardly at an angle of approximately forty-five degrees from the vertical position of the core-board when the latter is in its lowered or vertical position. A tension spring 46 is connected to said arm through the intermediary of a turn-buckle 47 and is connected at its lower end to the base, as at 48, approximately in a vertical line through the axis of said shaft. In such position said spring counterbalances the core 38 while in the mold. The arm 45 travels over the center of said shaft in the rocking movements of said shaft as the core is withdrawn and when the core has been fully withdrawn, as shown in Fig. 3, the arm 45 will extend at substantially the same angle as before upon the opposite side of said shaft and thereby the spring 46 will counterbalance the core in its outermost position.

Numeral 50 indicates a U-shaped yoke rigidly connected to said hand-wheel 12 and turning freely at its outer end upon a screw-threaded extension 6′ of said shaft. Opposing flanges 51 are formed on the inner sides of the yoke. A screw-threaded nut 52 is mounted on said shaft extension in threaded engagement therewith within the yoke and is formed or provided with bifurcated lugs 53 extending in opposite directions and slidably engaging said flanges 51, respectively. Said nut is further formed with stop-lugs 55 on opposite sides thereof. Adjustable split-collars 56 and 57 are positioned upon said extension upon opposite sides of said nut. Said collars are preferably screw-threaded and may be clamped to the shaft in set positions by means of bolts

58 extending through the split portion of the respective collar. Each said collar is formed with a lug 60 opposing the respective stop-lug 55 of said nut.

The shaft 6 due to its entrainment by the segments 33 and 34 moves in opposite rotary directions from the movements of the hand-wheel 12 and in much slower motion. The rotation of the hand-wheel and yoke causes the nut 52 to thread along said shaft-extension and to bring the respective stop-lugs 55 into engagement with the lug 60 of either collar 56 or 57 according to the direction in which the hand-wheel is turned thus bringing the mechanism to a stop at adjusted positions. The stops thus provided may be made with extreme accuracy, it is positive in its action and readjustments to other set positions are readily made.

The mold 30, as stated, is composed of two half-sections and are detachably connected at their joints by any suitable devices, such as illustrated at 61. Each half-section is formed with pairs of legs 62 integrally connected to the body of the mold and connected together by webs 63. A strip 65 extends across the ends of each pair of legs forming a bearing for the mold upon the floor as well as providing handles with which the mold may be manipulated. There are preferably two such pairs of legs on each half-section of the quarter-bend molds. In the case of the eighth-bend molds but one such pair of legs may be used on each half-section and when positioned upon the floor the mold will rest upon the one pair of legs and the bell-flange 66 of the mold.

The operation of my improved machine may be briefly described as follows: With the core maintained in its withdrawn position shown in Fig. 3 a mold 30 is placed in operative position as shown in said view having its opposite ends supported in the circular flanges 21 and its upper or bell-end within the opening 26 of the platform or within the opening 29 of one of said disks of suitable size. The hand-wheel 12 is then actuated by the operator to advance the core within the mold in concentric relation. Plastic pipe material may then be poured or shoveled into the mold surrounding said core and tamped to form a dense mass.

When said material nearly reaches the top of the mold a bell-core 67 is inserted in the top over the rounded end of said core 38 to center it in the mold. The upper portion of the mold is then filled with concrete material and the top edge smoothed or finished off whereupon the core may be removed by the reverse action of the hand-wheel 12, as described.

The platform 23 may then be swung upwardly and the mold with the contained molded pipe readily removed from the machine by means of the handles 65 connected to the legs 62 of the mold upon which it may be rested upon the floor of the factory. By means of said handles the mold-parts may be easily separated and the green pipe removed from the sections when desired.

Having described my invention, what I claim is:

1. In a pipe-bend machine, a shaft having a screw-threaded end, an actuating wheel revolubly mounted on said shaft, a yoke rigidly secured to said wheel, a nut engaged upon said threaded end of said shaft and slidably associated with said yoke to turn therewith, thereby being caused to move longitudinally upon the shaft, said nut being provided with a stop-lug, and a collar adjustably connected to said shaft-end providing a stop to engage said stop-lug of said nut.

2. In a pipe-bend machine, a shaft having a screw-threaded end, an actuating wheel revolubly mounted on said shaft, a yoke rigidly secured to said wheel, a nut engaged upon said threaded end of the shaft and slidably associated with said yoke to turn with the wheel and thereby caused to move longitudinally upon the shaft, said nut being provided with stop-lugs on its opposite sides, and a collar adjustably connected to the shaft upon each side of said nut, each collar being provided with a lug engageable by the respective stop-lugs to stop the machine at adjusted positions.

3. In a pipe-bend machine, a shaft mounted for oscillation in the machine and having a screw-threaded end, a core-supporting structure keyed to said shaft, operative mechanism whereby said core-supporting structure may be oscillated, and co-operating means associated with said wheel and said shaft to cause the core-supporting structure to stop at predetermined positions.

4. In a pipe-bend machine, a shaft mounted for oscillation in the machine and having a screw-threaded end, a core-supporting structure keyed to said shaft, operative mechanism may be oscillated in opposite rotary directions from said wheel, a yoke rigidly connected to said wheel, a nut slidably connected in said yoke and caused by the rotary movements thereof to move longitudinally upon said shaft-end, and adjustable means whereby the travel of said collar upon said shaft may be interrupted to bring the core-supporting structure to a stop at predetermined positions.

5. In a pipe-bend machine, a platform having a circular opening therein to receive one end of a pipe-mold, and a disk rigidly secured in said opening having an opening eccentric with said opening in the platform to accommodate pipe-molds of lesser curvature.

6. In a pipe-bend machine, a frame, a platform hingedly mounted in said frame

having a circular opening, and a disk secured in said opening having an opening eccentric with the opening in the platform.

7. In a pipe-bend machine, a platform having a circular opening to receive the ends of pipe-molds of largest diameter, a disk adapted to be rigidly secured in said opening having an opening eccentric with the platform opening to receive molds of lesser diameters, and means to position said disk symmetrically with respect to said two openings.

8. In a pipe-bend machine, a horizontally disposed shaft, a core-support keyed to said shaft, a core rigidly mounted on said support, means to oscillate said core-support with said shaft through an arc of ninety degrees wherein said core is swung to either side of a line perpendicular to said shaft, an arm secured to said shaft and extending therefrom to swing upon opposite sides of said shaft, and a counter-balance for said core secured to said arm.

9. In a pipe-bend machine, a horizontally disposed shaft, a core-support keyed to said shaft, a core rigidly mounted on said support, means to oscillate said core-support, an arm secured to said shaft extending oppositely to said core, and a counter-balance device including a spring secured at one end to said arm and at its other end at a point substantially in a vertical line with said shaft.

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