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Patented Mar. 6, 1900.

J. WRIGLEY.

APPARATUS FOR FORCING WIRES, WIRE ROPES, CABLES, &c., THROUGH CONDUITS.

(Application filed Mar. 11, 1899.)

(No Model.)

3 Sheets—Sheet 1.

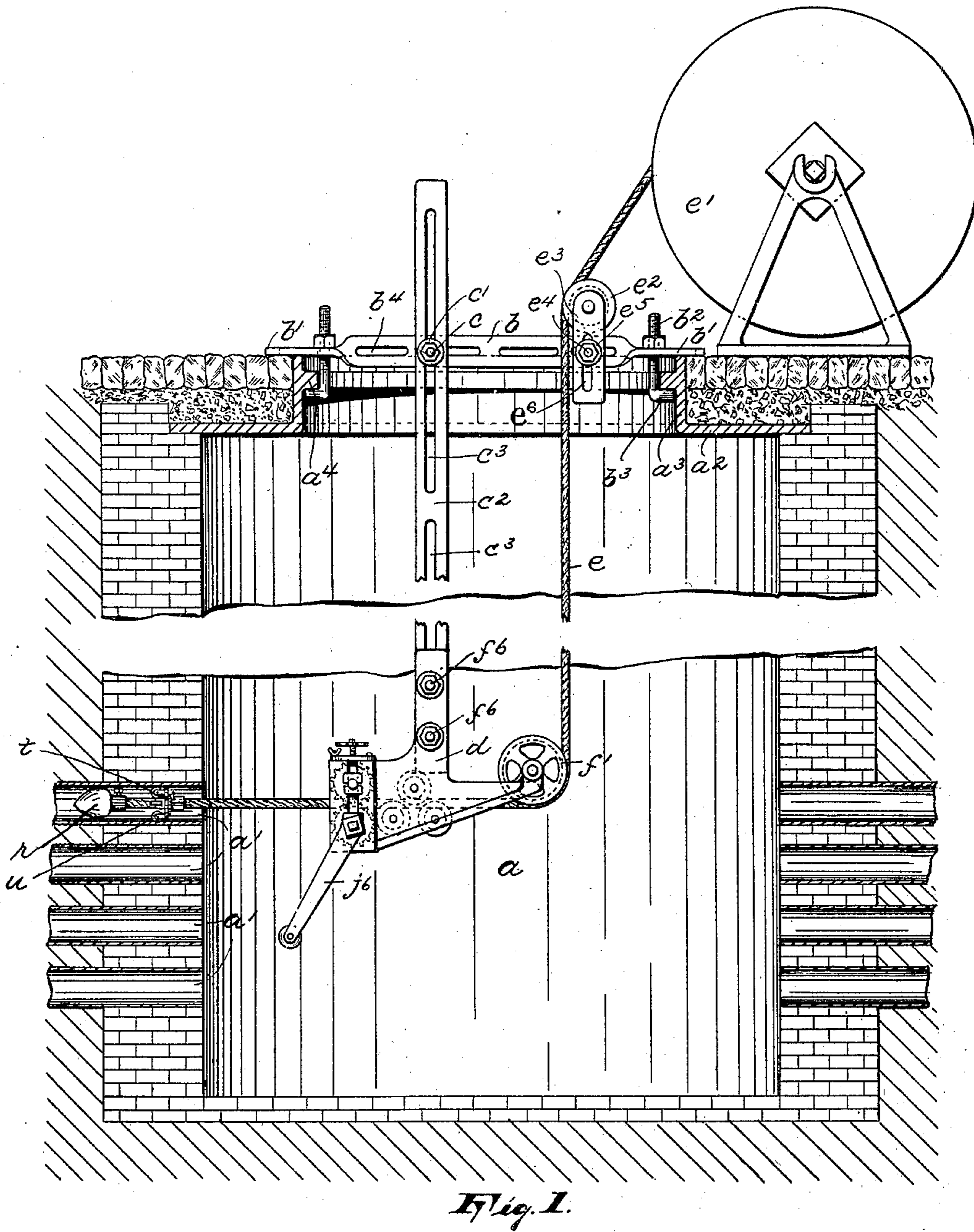


Fig. 1.

WITNESSES:

INVENTOR

Wm. J. Bell.
Robert. J. Lillyth

John Wrigley,
BY
Gartner & Steward,
ATTORNEYS

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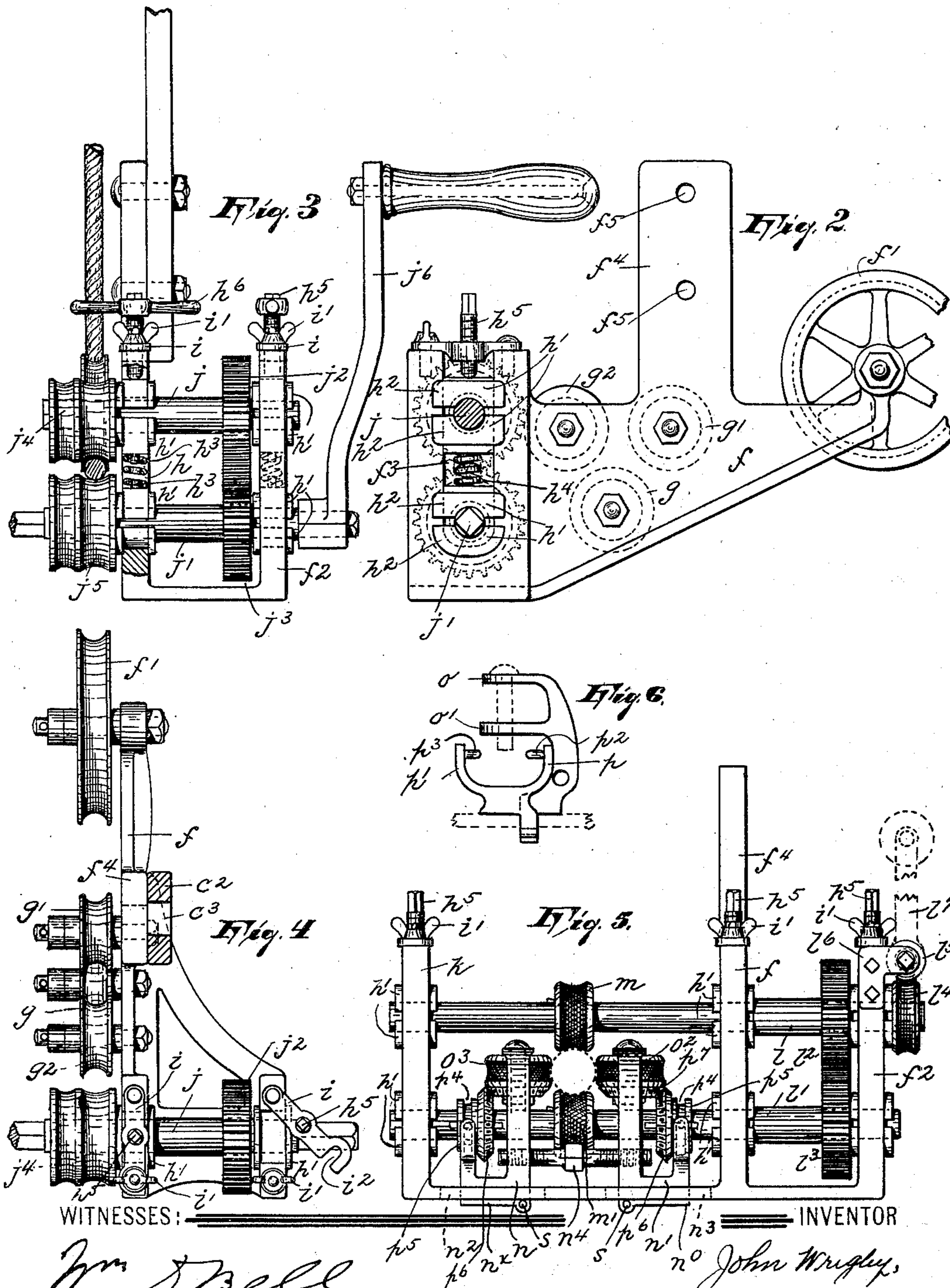
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(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

J. S. Bell.
Robert J. Pollock

INVENTOR

John Wrigley,
BY
Garner & Steward
ATTORNEYS

No. 644,884.

Patented Mar. 6, 1900.

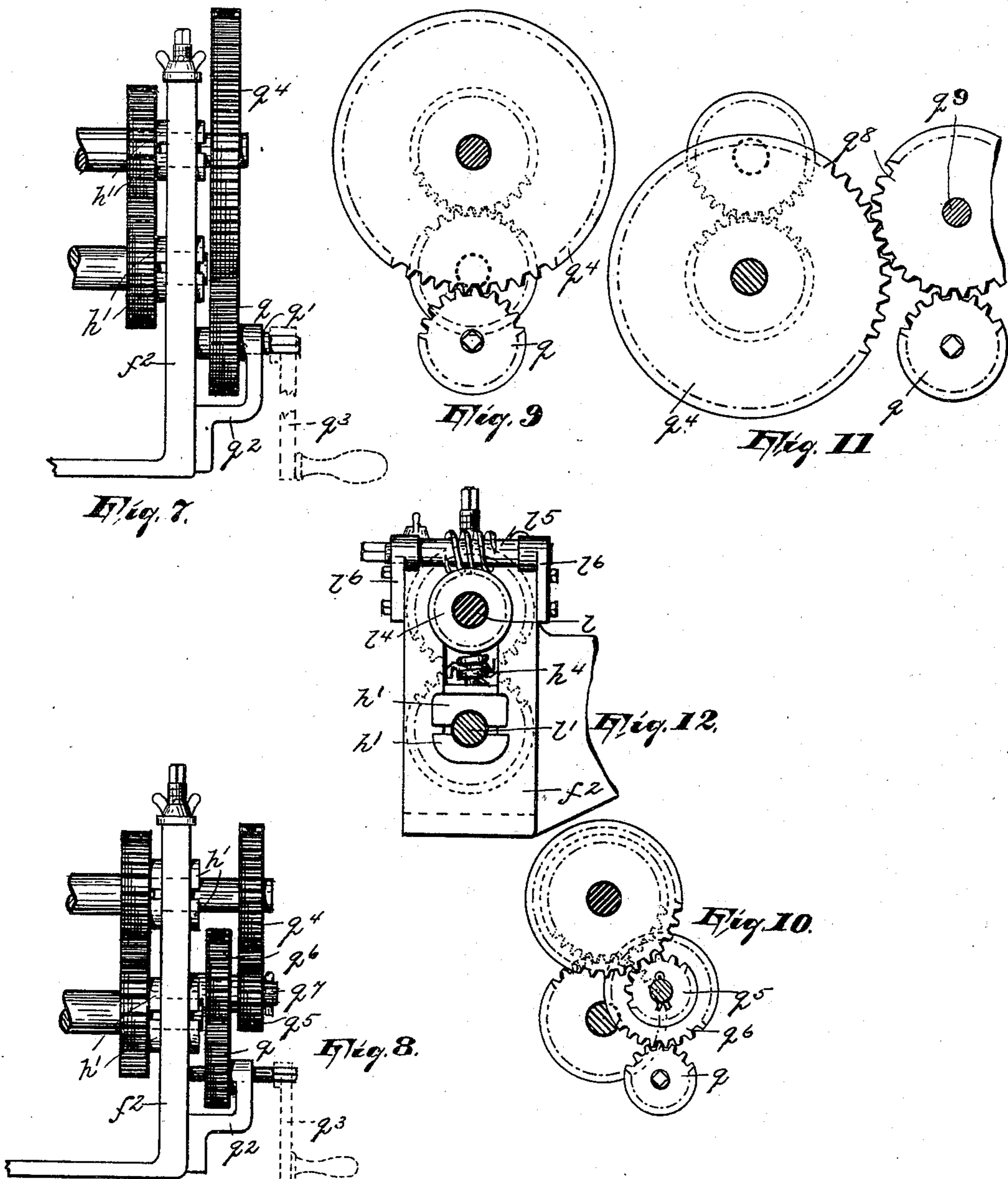
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(No Model.)

(Application filed Mar. 11, 1899.)

3 Sheets—Sheet 3.



WITNESSES:

INVENTOR

Wm. D. Bell.
Robert J. Pollitt.

John Wrigley,
BY
Gartner & Steward
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN WRIGLEY, OF ELMIRA, NEW YORK.

APPARATUS FOR FORCING WIRES, WIRE ROPES, CABLES, &c., THROUGH CONDUITS.

SPECIFICATION forming part of Letters Patent No. 644,884, dated March 6, 1900.

Application filed March 11, 1899. Serial No. 708,652. (No model.)

To all whom it may concern:

Be it known that I, JOHN WRIGLEY, a citizen of the United States, residing in Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Apparatus for Forcing Wires, Wire Ropes, Cables, &c., Through Conduits, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus for forcing wire or wire ropes or cables, &c., through pipes, piping, tubing, or other conduits.

The object of the invention is to provide an apparatus adapted to the above-mentioned purposes which shall be simple and durable in construction and whose parts shall be so formed and disposed that the apparatus may be operated with thorough effectiveness and convenience.

The invention consists in the improved apparatus for forcing wire or wire ropes or cables, &c., through pipes, piping, tubing, or other conduits and in the combination and arrangement of the various parts of the said apparatus, substantially as will be hereinafter pointed out, and finally embodied in the clauses of the claim.

My invention is fully illustrated in the accompanying drawings, wherein—

Figure 1 is a sectional view through a manhole and conduits leading into the same, showing my improved apparatus for driving wire or wire ropes or cables, &c., through said conduits arranged in said manhole. Fig. 2 is an enlarged view of a portion of the apparatus as shown in Fig. 1—that is to say, in side elevation. Fig. 3 is an enlarged view showing in front elevation that portion of the apparatus which is shown in Fig. 2, a portion of said apparatus being broken away. Fig. 4 is an enlarged top plan view of that portion of the apparatus which appears in Fig. 2. Fig. 5 is a view in front elevation of a modified form of a portion of the apparatus. Fig. 6 is a front view of a certain detail portion of the

apparatus shown in Fig. 5. Fig. 7 is a view showing in front elevation a portion of another modified form of my invention. Fig. 8 is a view showing in front elevation a portion of still another modified form of my invention. Figs. 9 and 10, respectively, are plan or diagrammatic views illustrating the arrangement of the gearing which is shown in Figs. 7 and 8. Fig. 11 is a plan or diagrammatic view illustrating yet another arrangement of the said gearing, and Fig. 12 is an end view of a portion of the modified form of the apparatus which appears in Fig. 5.

In said drawings, *a* designates a well or manhole into which leads one or more conduits *a'* and which is provided with a metallic top plate *a²*, having an opening therein constituting the entrance to the manhole, said opening being surrounded by an upwardly-extending flange *a³*, integrally formed on the plate *a²* and provided with an inwardly-projecting bead or rib *a⁴*, whereupon the usual removable cover for said manhole is sustained.

b designates a flat bar whose end portions *b'* are deflected into a plane at right angles to the general plane of said bar, said end portions being adapted to rest upon the flange *a³* of the plate *a²* and to be clamped thereto by bolts *b²*, having their lower ends formed with hooks *b³*, which engage the rib or bead *a⁴*.

The bar *b* has several longitudinal slots *b⁴*, one of which is adapted to receive a bolt *c*, carrying washers *c'* and constituting a device for adjustably securing to the bar *b* a vertical elongated hanger *c²*, which is also provided with longitudinal slots *c³*, one of which is penetrated by said bolt *c*.

d designates the driving mechanism proper. This mechanism is adjustably secured to the hanger *c²* in a manner hereinafter described.

e denotes the wire or wire rope or electric or other cable, as the case may be, which is adapted to be driven by the mechanism *d* into one of the conduits *a'* and which is fed from a suitably-supported reel *e'* to said mechanism over a roller *e²*, that is journaled in a bracket *e³*, sustained on the bar *b* by a bolt *e⁴*, having washers *e⁵* and penetrating one of the slots *b⁴* of the bar *b* and a longitudinal slot *e⁶* in said bracket.

The frame of the mechanism *d* consists of

a plate f , in the rear end of which is journaled a guide-roller f' and near the other end of and from which projects laterally and then upwardly a bracket f^2 , having a vertical slot f^3 , which is open at the top. Midway between the ends of said plate f extends upwardly a vertical projection f^4 , having two or more openings f^5 , adapted to be penetrated by bolts f^6 , whereby the mechanism d is adjustably suspended from the hanger c^2 , said bolts f^6 being received by the lower slot c^3 of said hanger.

g g' g^2 are rollers which are journaled in the plate f and which are so disposed as to best serve the function for which they are intended—namely, to straighten the wire or cable after it leaves the guide-roller f' and before it reaches the driving means proper. It is to be remarked that I do not wish to limit myself to the number or exact disposition of these straightening-rollers g g' g^2 , which I have shown in the drawings.

The driving means proper, which I have above referred to, may be thus described: The plate f is provided with a slot h , which is situated in opposition to the slot f^3 of the bracket f^2 and which is open at the top the same as said slot f^3 . In these slots are arranged divided bearing-blocks h' , each member of which has flanges h^2 , between which the edge of the slot is adapted to be received and which act to hold the bearing-blocks in place, at the same time permitting their movement longitudinally in said slots. The adjacent faces of the adjoining members in each pair of the divided bearing-blocks are provided with pins h^3 , which project into and prevent lateral displacement of a spiral spring h^4 , that is disposed between said members. i designates a bridge-piece which surmounts the bracket f^2 and which is pivoted at one side of the slot therein, being adapted to be swung around so as to bridge said slot, its free end being held in place by a thumb-screw i' , which a recess i^2 in said bridge-piece receives. Another bridge-piece similar in every particular to the one just described is arranged in a corresponding disposition upon the plate f , being adapted to bridge its slot h . These bridge-pieces receive screws h^5 , each having a suitable handle h^6 and adapted to bear at its lower end against the top of the uppermost divided bearing-block, so as to removably secure the pair of bearing-blocks in position.

In the divided bearing-blocks are journaled shafts j j' , carrying intermeshing pinions j^2 j^3 , respectively, which are mounted on said shafts between the plate f and the bracket f^2 and also carrying feed-rolls j^4 j^5 , between which the wire or cable is fed and whereby it is driven. It should be noted that in the preferred form of my apparatus these feed-rolls are not situated between the bracket f^2 and the plate f , but are mounted on the free ends of the shafts j j' outside of the frame, which the plate and its bracket constitutes. This

arrangement is most convenient, because by virtue of it the wire or electric cable may be released laterally from the rolls.

The end of one of the shafts j j' , preferably the lower one, is squared and receives a crank j^6 , whereby said shaft may be driven, and consequently the feed-rolls rotated.

It will be observed that in the use of that form of the apparatus which I have thus far described it will be only necessary after passing the wire or cable over the rollers e^2 and f' to place the same between the feed-rolls, then turn the bridge-pieces i into their operative position, and then manipulate the screws h^5 in order to force the upper shaft j downwardly, so as to effect the necessary clamping of the cable between said feed-rolls before operating the crank j^6 , so as to drive said cable. As will be obvious, the springs h^4 are adapted to act to normally force the divided bearing-blocks apart, so that when the screws h^5 are unscrewed the grip upon the wire or cable will be automatically released. If desired, the peripheral or bearing surfaces of the feed-rolls j^4 j^5 , which, it should be stated, are concave, may be serrated. This is shown in connection with the corresponding devices of the modified form of my invention shown in Fig. 5 and hereinafter to be described.

In Figs. 5, 6, and 12 I have shown a driving mechanism wherein several feed-rolls are employed instead of but two for driving the wire or cable. The frame for this mechanism is substantially similar to the frame for the mechanism already described, with the exception that, besides the bracket f^2 , which projects laterally and upwardly from the plate f , said plate f is also provided with another bracket k , which extends from the other side of said plate somewhat farther than the bracket f^2 , being otherwise substantially similar thereto. The plate f carries the guide-roller f' and has the upwardly-extending projection f^4 the same as the corresponding plate for the mechanism hereinbefore described. The plate f and the brackets f^2 and k carry divided bearing-blocks h' , the arrangement and construction of and the manner of mounting and holding in place said bearing-blocks being substantially the same as has been described with reference to the mechanism shown in the first four figures. The bearing-blocks in the mechanism now being referred to form journals for two or more shafts l l' , having intermeshing pinions l^2 l^3 , respectively, whereby motion is transmitted from the one to the other. One of these shafts, preferably the upper one, carries a worm-wheel l^4 , that is driven by a worm l^5 , journaled in bearing-plates l^6 , secured to the bracket f^2 and having a crank l^7 .

m m' designate two or more feed-rolls having concave and serrated peripheral surfaces, said feed-rolls being mounted upon the shafts l l' ; n n' , two or more movable or adjustable brackets having flanges n^0 n^x , which project through slots n^2 n^3 in the horizon-

tal portion of the bracket k and which are connected and adapted to be moved simultaneously toward or away from each other by a double bolt n^4 . Each bracket has a pair
 5 of parallel horizontal arms $o o'$, in which are journaled feed-rolls $o^2 o^3$, substantially similar to the feed-rolls $m m'$ already described. Each of said brackets is also provided with a pair of vertically-extending arms $p p'$, carrying
 10 pins $p^2 p^3$, respectively, each of which is adapted to engage an annular groove p^4 , formed in a collar p^5 , that constitutes an integral portion of beveled pinions p^6 , that are keyed onto the shaft $l l'$. The beveled pinions
 15 p^6 intermesh with an integral beveled pinion p^7 on each of the feed-rolls $o^2 o^3$, there being two or more beveled pinions p^6 .

In view of the above description it will be seen that when the double-ended bolt n^4 is
 20 operated the brackets will be moved toward or away from each other, so as to tighten or release the grip of the rolls $o^2 o^3$ upon the wire or cable. The rolls $m m'$ are of course operated in a manner already described.

25 s designates a pin that penetrates that portion of each bracket $n n'$ which protrudes downwardly through the horizontal part of the brackets k , said pin being adapted to prevent an upward tilting of the bracket n or n'
 30 which the drawing together of said brackets $n n'$ in order to grip the cable has a tendency to effect.

In Figs. 7 to 11, inclusive, I have illustrated several systems of gearing whereby
 35 different degrees of power of driving the horizontal shafts may be secured. In Figs. 7 and 9 the power is taken from a small pinion q , carried upon a shaft q' , journaled in the bracket f^2 and an auxiliary bracket q^2 and
 40 driven by a crank q^3 onto a larger pinion q^4 , which is carried upon one of the horizontal shafts above referred to. In Figs. 8 and 10 the arrangement of the gearing is similar to that shown in Figs. 7 and 9, with the excep-
 45 tion that the power is transmitted from the smaller pinion q to the larger pinion q^4 through a pair of intermediate pinions q^5 and q^6 , that are rigidly secured together and are journaled upon a stub-shaft q^7 , which projects
 50 from the bracket f^2 , one of said pinions $q^5 q^6$ being larger than the other and in mesh with the pinion q . In the diagrammatic view Fig. 11 a single pinion q^8 is adapted to transmit power from the smaller pinion q to the
 55 larger pinion q^4 , being journaled upon a stub-shaft q^9 , which may project from the bracket f^2 the same as the stub-shaft q^7 .

If desired, the wire or cable e may carry a tool r for cleaning the conduit, or, if desired
 60 or necessary, in order to facilitate the operation of driving the wire or cable through said conduit carriages t , having rollers u , may be clamped onto said wire or cable. I have shown and described in Letters Patent Nos.
 65 599,089 and 614,597, issued, respectively, February 15, 1898, and November 22, 1898, a clean-

ing-tool and carriage suitable for the purposes above referred to.

By virtue of the fact that my apparatus is so constructed that it can be variously ad-
 70 justed not only may the driving mechanism be brought into alinement with a selected conduit, whatever the position thereof, but different sizes of cables, &c., can be accom-
 75 modated and the grip of the several feed-rolls can be increased or diminished at will, accordingly as the cable is a heavy or light one and it is more or less difficult to force it through the conduit.

Having thus fully described my invention, 80 what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for forcing or driving wire, wire rope, cables or the like through
 85 conduits, the combination of the forcing or driving means proper and means for adjustably suspending said driving means in an operative position relatively to the conduit, substantially as described.

2. In an apparatus for forcing or driving
 90 wire, wire rope, cables or the like from a manhole through conduits communicating therewith, the combination of the driving or forcing means proper and means for adjustably
 95 suspending said driving means in an operative position relatively to the conduits and consisting of a bar adapted to bridge the mouth of the manhole and a hanger carrying
 100 said driving means at its lower end and adjustably secured to said bar, substantially as described.

3. In an apparatus for forcing or driving wire, wire rope, cables or the like from a man-
 105 hole through conduits communicating therewith, the combination of the forcing or driving means proper, a slotted bar adapted to bridge the mouth of said manhole, a slotted
 110 hanger, a bolt penetrating the slots in said hanger and the bar, said driving or forcing means proper being secured to the lower end of said hanger, a slotted bracket, a bolt pene-
 115 trating a slot in said bar and in the bracket, and rollers carried by said bracket and the driving or forcing means proper, substantially as described.

4. An apparatus for forcing or driving wire, wire rope, cables or the like through conduits,
 120 consisting of a suitable frame, revoluble shafts adjustably mounted in said frame, intermeshing pinions connecting said shafts, and coacting feed-rolls carried on said shafts, substantially as described.

5. In an apparatus for forcing or driving wire, wire rope or cables or the like through
 125 conduits, a suitable frame comprising a plate and a bracket projecting therefrom, revoluble shafts adjustably mounted in said plate and the bracket, intermeshing pinions mounted on said shafts, and coacting feed-rolls carried on said shafts, said plate and the bracket
 130 being disposed on opposite sides of the pinions and said pinions being spaced from the

feed-rolls by one of them, substantially as described.

6. In an apparatus for forcing or driving wire, wire rope, cables or the like through
5 conduits, a suitable frame comprising a plate and a bracket projecting therefrom, revoluble shafts mounted in said plate and the bracket, intermeshing pinions mounted on
10 said shafts, coacting feed-rolls carried on said shafts, said plate and the bracket being disposed on opposite sides of the pinions and said pinions being spaced from the feed-rolls by one of them, springs arranged in said
15 bracket and the plate and between the shafts, and means for adjusting said shafts relatively to each other, substantially as described.

7. In an apparatus for forcing or driving wire, wire rope, cables or the like through
20 conduits, a suitable frame comprising a plate and a bracket projecting therefrom, revoluble shafts mounted in said plate and the bracket, intermeshing pinions mounted on said shafts, coacting feed-rolls carried on said
25 shafts, said plate and the bracket being disposed on opposite sides of the pinions and said pinions being spaced from the feed-rolls by one of them, flanged bearing-blocks for said shafts mounted in said plate and the
30 bracket, springs disposed between said bearing-blocks, and suitably-mounted adjusting-screws adapted to act against one of said bearing-blocks in each pair, substantially as described.

8. In an apparatus for forcing or driving
35 wire, wire rope, cables or the like through conduits, a suitable frame comprising a plate and a bracket projecting therefrom, said plate and the bracket being provided with slots each open at one end, revoluble shafts mounted in
40 said plate and the bracket, intermeshing pinions mounted on said shafts, coacting feed-rolls carried on said shafts, said plate and the bracket being disposed on opposite sides of the pinions and said pinions being spaced
45 from the feed-rolls by one of them, flanged and divided bearing-blocks for said shafts mounted in the slots of said plate and the bracket, springs disposed between said bearing-blocks, movable bridge-pieces mounted
50 on said plate and the bracket and each spanning the open end of the slot therein, and a

screw mounted in each bridge-piece and adapted to act against the adjoining bearing-block, substantially as described.

9. An apparatus for forcing or driving wire, 55
wire rope, and electric cables or the like through conduits, consisting of a suitable frame, revoluble shafts mounted in said frame, means for transmitting power from one of
60 said shafts to the other, said frame consisting of a plate and brackets projecting oppositely therefrom, movable brackets mounted in one of the brackets of said frame, coacting feed-rolls carried by said shafts, other coacting feed-rolls carried by said movable brackets, and
65 means for transmitting power from one of said shafts to said last-named feed-rolls, substantially as described.

10. An apparatus for forcing or driving wire, 70
wire rope, and electric cables or the like through conduits, consisting of a suitable frame, revoluble shafts mounted in said frame, means for transmitting power from one of
75 said shafts to the other, said frame consisting of a plate and brackets projecting oppositely therefrom, movable brackets mounted in one of the brackets of said frame, coacting feed-rolls carried by said shafts, other coacting feed-rolls carried by said movable brackets, means
80 for transmitting power from one of said shafts to said last-named feed-rolls, and means for adjusting the movable brackets and the feed-rolls carried thereby relatively to each other, substantially as described.

11. An apparatus for forcing or driving wire, 85
wire rope, and electric cables or the like through conduits, consisting of a suitable frame, revoluble shafts adjustably mounted in said frame, suitably-journaled feed-rolls operatively connected to said shafts, intermeshing
90 pinions carried by said shafts, straightening-rolls journaled in said frame, a guide-roller journaled in said frame, and driving means operatively connected to one of said shafts, substantially as described. 95

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of March, 1899.

JOHN WRIGLEY.

Witnesses:

W. BENJAMIN,
EDW. MCMAHON.