E. L. UPP.

AUTOMATIC DUMP TROUGH OPERATING APPARATUS.

APPLICATION FILED DEC. 16, 1920.

1,398,818.

Patented Nov. 29, 1921.

5 SHEETS—SHEET 1.

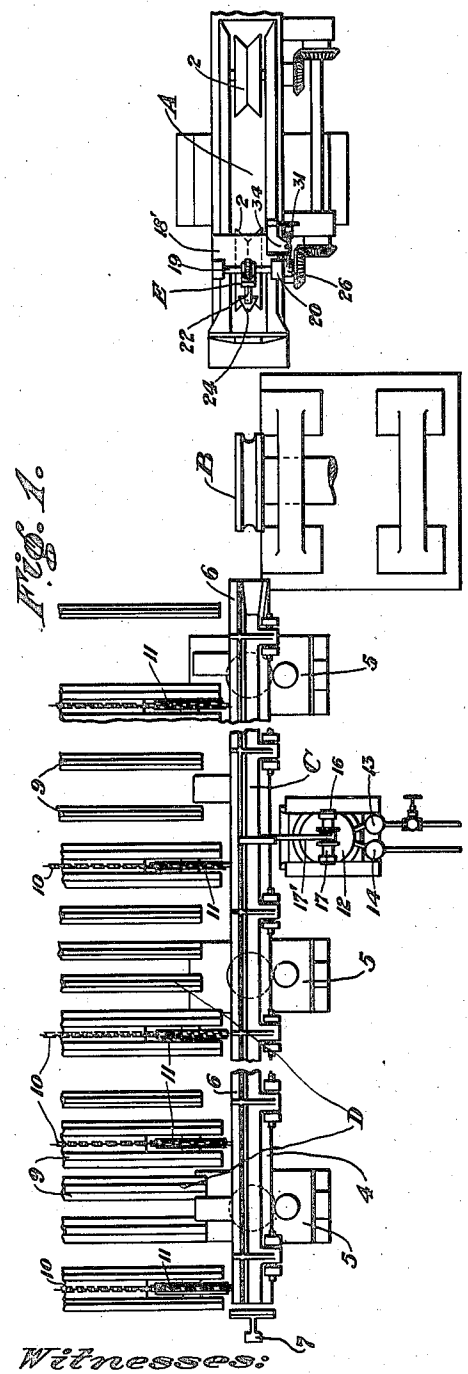


Fig. 1.

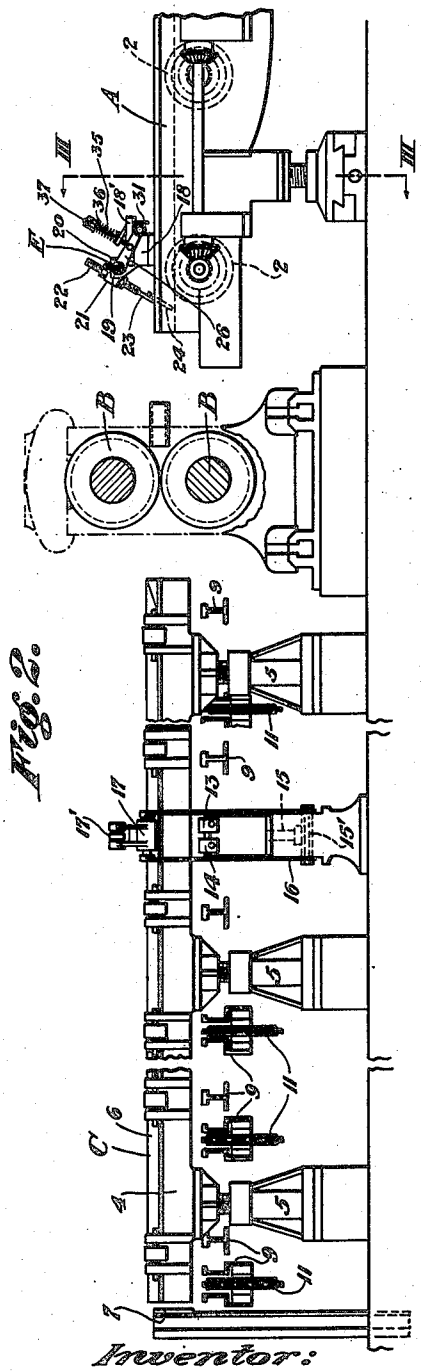


Fig. 2.

Witnesses:
Edwin Ernst

Inventor:
Edwin L. Upp
by D. Anthony Usina
his Attorney

E. L. UPP.

AUTOMATIC DUMP TROUGH OPERATING APPARATUS.

APPLICATION FILED DEC. 16, 1920.

1,398,818. Patented Nov. 29, 1921.

5 SHEETS—SHEET 2.

Fig. 3.

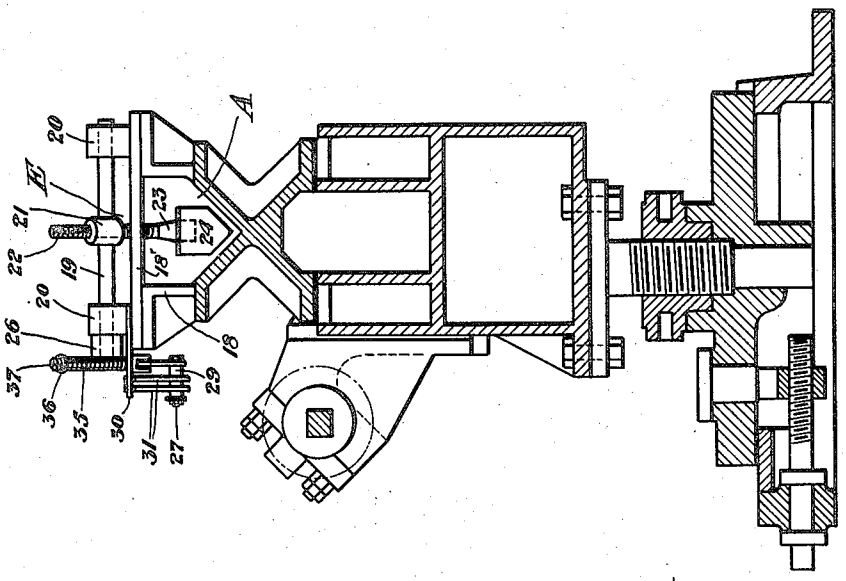
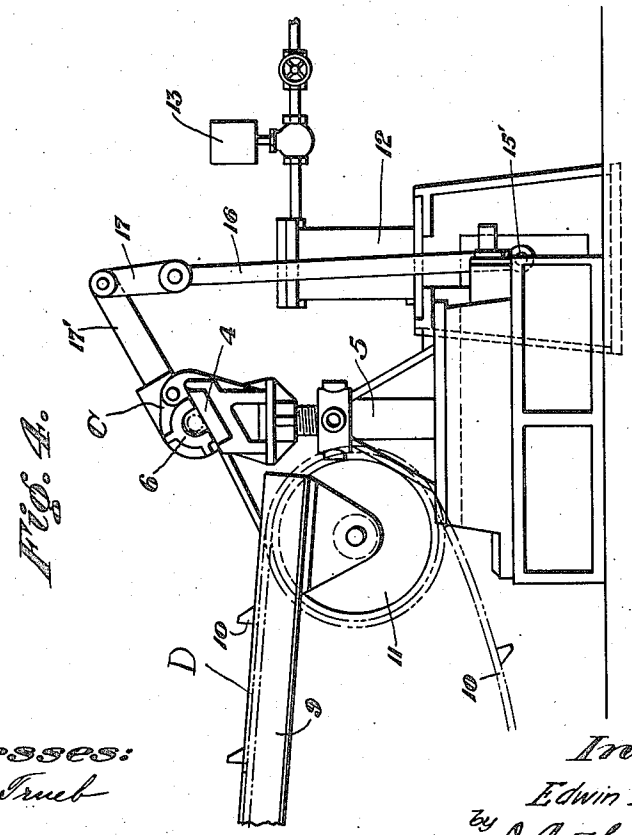


Fig. 4.



Witnesses:
Edwin Trueb

Inventor:
Edwin L. Upp
by D. Anthony Usina
his Attorney

E. L. UPP.

AUTOMATIC DUMP TROUGH OPERATING APPARATUS.

APPLICATION FILED DEC. 16, 1920.

1,398,818. Patented Nov. 29, 1921.

5 SHEETS—SHEET 3.

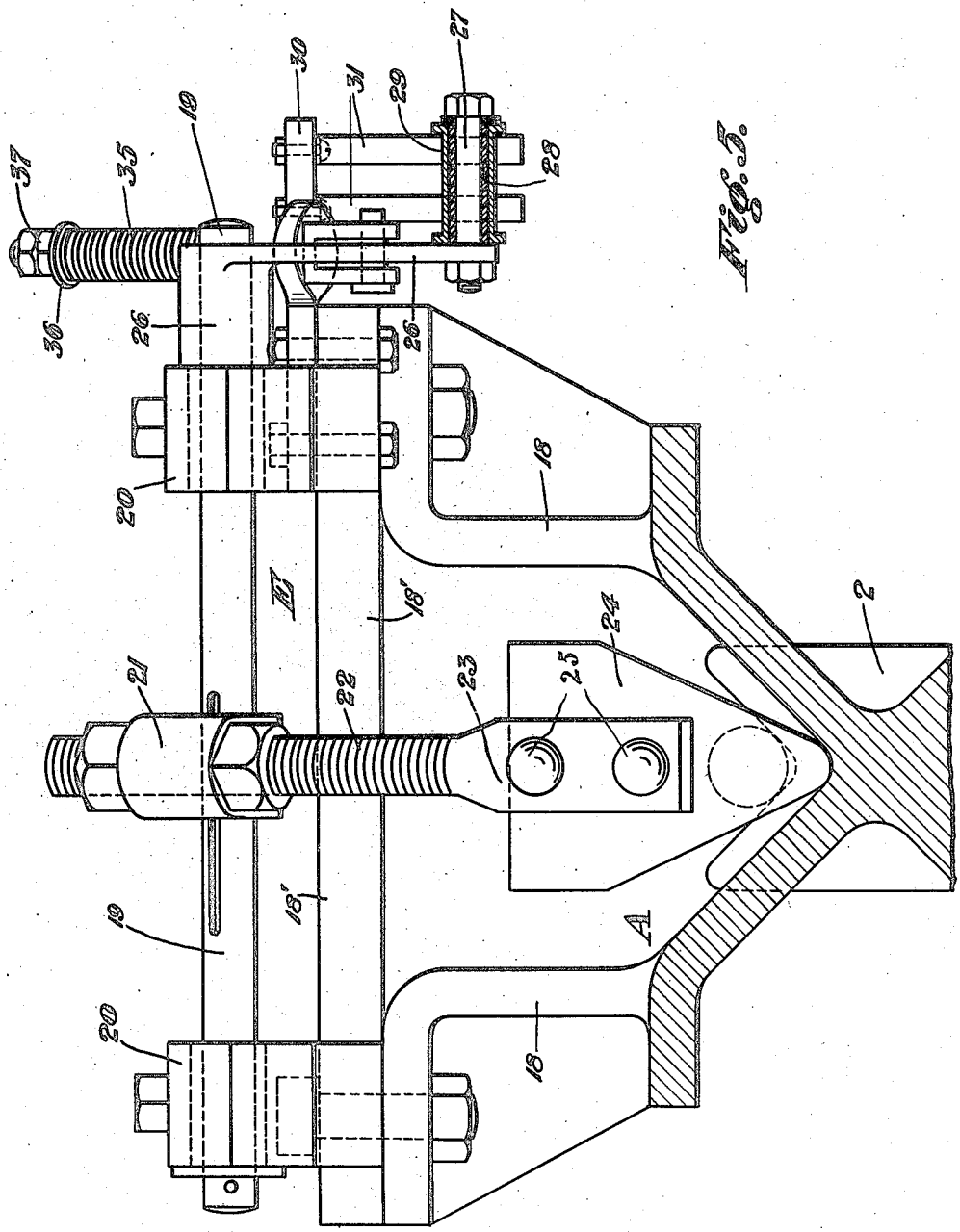


Fig. 3.

Witnesses:
Edwin Trueb

Inventor:
Edwin L. Upp
by D. Anthony Usina
his Attorney

E. L. UPP.

AUTOMATIC DUMP TROUGH OPERATING APPARATUS.

APPLICATION FILED DEC. 16, 1920.

1,398,818. Patented Nov. 29, 1921.

5 SHEETS—SHEET 4.

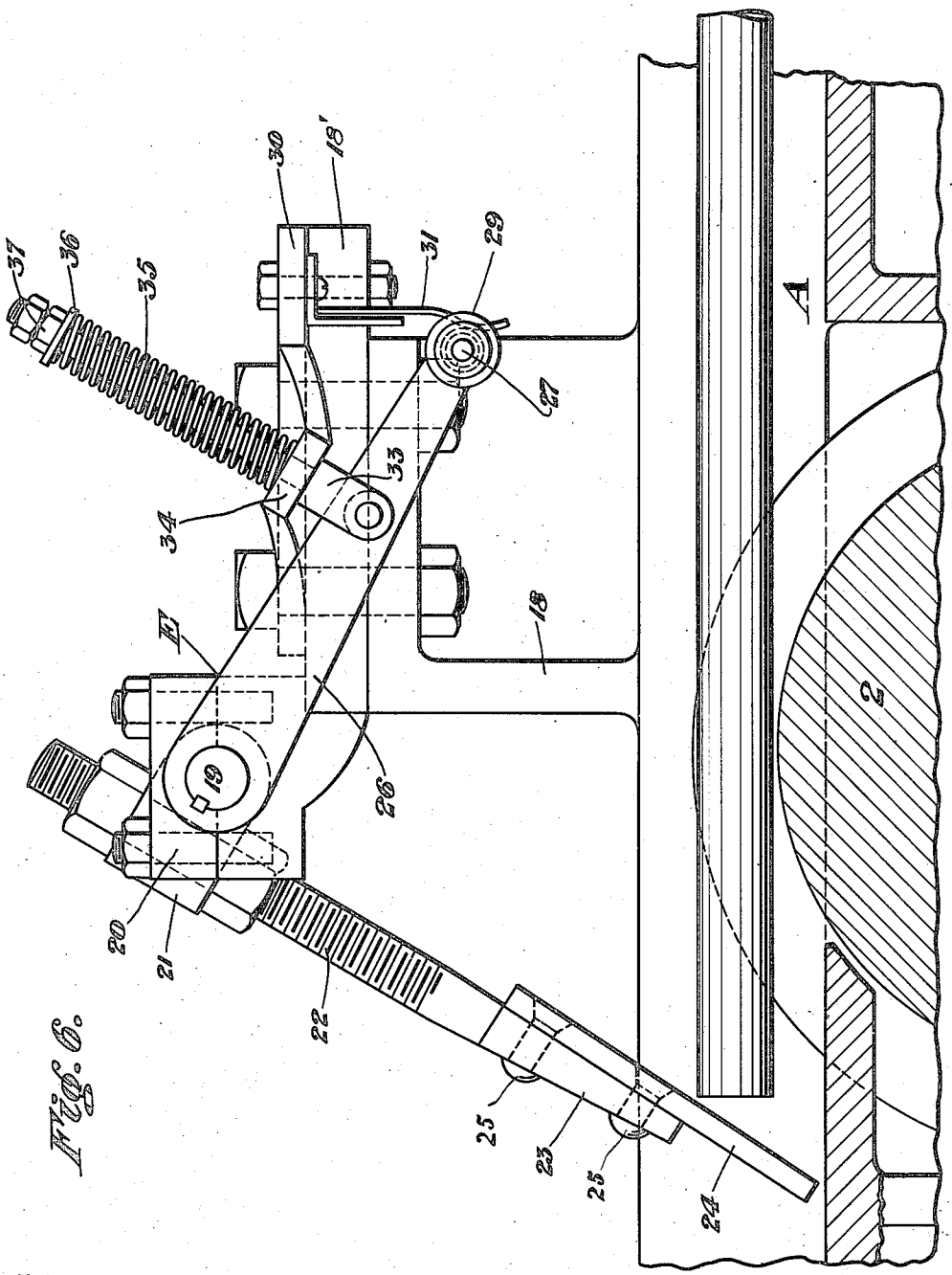


Fig. 6.

Witnesses:
Edwin Trueb

Inventor:
Edwin L. Upp
by D. Anthony Usina
his Attorney

E. L. UPP.

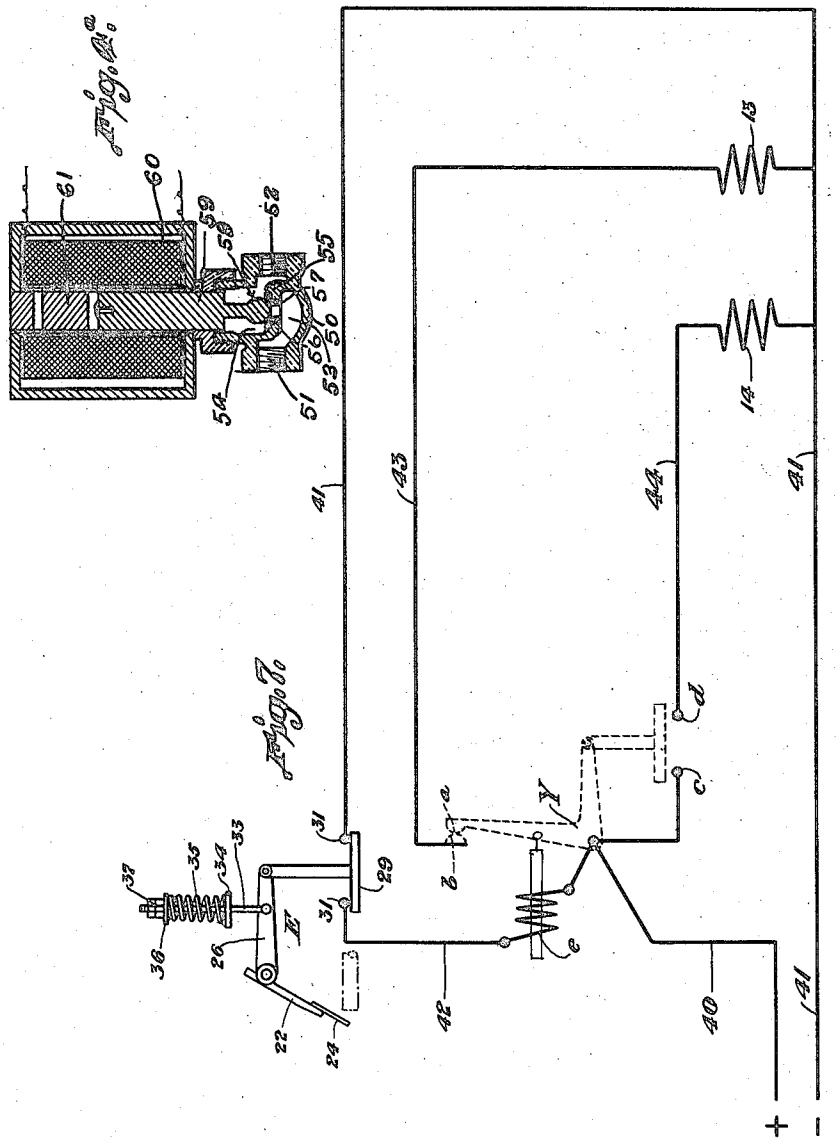
AUTOMATIC DUMP TROUGH OPERATING APPARATUS.

APPLICATION FILED DEC. 16, 1920.

1,398,818.

Patented Nov. 29, 1921.

5 SHEETS—SHEET 5.



Witnesses:
Edwin Trueb

Inventor:
Edwin L. Upp
by D. Anthony Howe
his Attorney

UNITED STATES PATENT OFFICE.

EDWIN L. UPP, OF LORAIN, OHIO, ASSIGNOR TO NATIONAL TUBE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

AUTOMATIC DUMP-TROUGH-OPERATING APPARATUS.

1,398,818. Specification of Letters Patent. Patented Nov. 29, 1921.

Application filed December 16, 1920. Serial No. 431,228.

To all whom it may concern:

Be it known that I, EDWIN L. UPP, a citizen of the United States, and resident of Lorain, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Automatic Dump-Trough-Operating Apparatus, of which the following is a specification.

This invention relates to pipe handling apparatus for pipe mills, and more particularly to the dumping troughs by which the pipes or tubes are received endwise from the sizing rolls, cross rolls, or other point of discharge and are delivered transversely of their length into position to be transferred sidewise to a cooling table or conveyer alongside the dumping trough, upon which the sized pipes or tubes are stored while being cooled from the high temperature at which they are received by the cooling table.

One object of my invention is the provision of pipe handling apparatus having novel means controlled by the pipes as they pass into the sizing rolls, cross rolls or similar apparatus for automatically raising the cover of the dumping trough to deliver a pipe or tube to the cooling table, and automatically lowering the cover of the dumping trough again before the entrance of the next succeeding pipe.

Another object of the invention is to provide a trough dumping apparatus that will be positive and quick acting, thereby preventing pinching of the pipes under the cover of the dumping trough.

Still another object of the invention is to provide an apparatus that will normally hold the trough cover in raised position, and will automatically lower said cover as a pipe approaches the sizing rolls, and hold said cover in its lowered position until the pipe has passed through said sizing rolls.

Heretofore the dump trough cover has been raised and lowered by a manually operated air cylinder, and as must be the case when manual operation is used, more or less inaccurate operation occurred which caused considerable loss of material and time, since inaccurate operation of the trough cover causes the pipes to become pinched or jammed. The present apparatus entirely eliminates the possibility of such inaccurate operation since the dump trough cover is raised and lowered automatically by apparatus controlled by the passage of the pipe into the sizing rolls.

In Figure 1 is a top plan view of the pipe handling apparatus, including the sizing rolls, dump trough and a portion of the cooling table, constructed in accordance with my invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a sectional elevation on the line III—III of Fig. 2.

Fig. 4 is an end elevation of the dump trough and cooling table.

Fig. 4ª is a sectional elevation, on a larger scale, showing details in the construction of the magnetically controlled valves used with my improved apparatus.

Fig. 5 is an enlarged cross section through the in-going trough of the apparatus, showing a front elevation of the main control switch.

Fig. 6 is an enlarged side elevation of a portion of the in-going trough of the apparatus, showing a side elevation of the main control switch.

Fig. 7 is a wiring diagram for the apparatus.

Referring particularly to the drawings, the letter A designates the trough of the apparatus which is mounted on the in-going side of the rolls B, which may be sizing rolls, straightening rolls or any like device. The trough A has suitable power driven rolls 2 therein to carry the pipe forward to the sizing rolls B.

A receiving dump trough C is positioned on the outgoing or delivery side of the stand of sizing rolls (or cross rolls or similar apparatus), this trough comprising a suitably inclined bottom 4 adjustably mounted upon supports 5 and having a tilting cover of tunnel like cross-section hinged thereto. The trough is located so as to receive within its "tunnel" the pipes or tubes as discharged from between the rolls B and is arranged to tilt or lift on its hinges so as to dump the pipe, which, when the trough tilts, rolls down the inclined bottom 4 of the trough C and upon the receiving side of the cooling table D. A stop 7 is provided to limit the lengthwise travel of the pipes or tubes within the trough, although ordinarily the pipes will not reach the stop, but will be brought to rest by frictional engagement with the bottom 4 and sides of the tunnel in the tilt-

ing trough before striking the stop 7 except when the other parts of the apparatus fail to function properly.

The cooling table D comprises suitable skids 9 arranged to receive the pipes or tubes as they leave the dump trough C, and is provided with suitable chain conveyers 10 trained over sprockets 11 and adapted to convey the pipes or tubes along the table while they are cooling. The cooling table D is not a part of this invention, except as it is included in the general combination. Therefore, it will not be illustrated or described in detail since any of the well known cooling table constructions may be used.

The tunnel-like cover 6 of the dump trough is raised and lowered by a pneumatic cylinder 12 having magnetically operated inlet and outlet valves 13 and 14 respectively.

The valves 13 and 14 (as is shown in Fig. 4[a]) comprise a valve body 50 of the globe type having screw threaded apertures 51 and 52 opening into the chambers 53 and 54, respectively. These chambers are separated by the integral wall 55, this wall having a chamber connecting opening 56 therein, in which a valve seat 57 is removably mounted. A valve member 58, which is adapted to engage the seat 57 in closing the valve, is formed on the lower end of the plunger 59 of the solenoid forming the valve operating mechanism. The plunger 59 is reciprocably mounted within the solenoid coil 60 so as to lift and thereby open the valve when the coil 60 is energized and to drop and close the valve when the coil is deenergized.

A core or plug 61, secured within the coil 60 above the plunger 59, coacts with the end of the movable core or plunger 59 in forming an air gap therebetween, which permits of the plunger dropping rapidly when the coil 60 is deënergized.

The valves 13 and 14 form a detail of the apparatus and, while the type shown and described is preferred, it is to be understood that any other suitable form of valve may be used.

The cylinder 12 is provided with a piston rod 15 of usual construction, which has a cross head 15′ secured thereon adjacent to its lower end. Side bars or levers 16 are pivotally secured to the cross head 15′ and have their upper ends connected by the link 17 to the lever 17′, which is rigidly secured to the cover 6. As the inlet valve is opened, fluid pressure will be admitted to the cylinder 12, thereby forcing down the piston rod 15, which in turn will pull down the side bars 16, link 17, and lever 17′, and thereby opening or raising the trough cover 6. The inlet valve 13 is adapted to normally remain open, thereby holding the cover 6 in raised position.

The main control switch E of the operating mechanism is located above the in-going trough A, and has a tripping lever extending down into said trough so as to be in the path of travel of the pipe.

The switch E is supported on suitable brackets 18 mounted on the edges of the trough A and having a plate 18′ secured thereto. A shaft 19 is journaled in suitable bearings 20 secured on plate 18′, and has a screw holder keyed thereon intermediate its ends. A screw threaded trip lever 22 is mounted in the holder 21 so as to be adjusted vertically relative to said holder. The lever 22 has its lower end flattened as at 23, and has a striking plate 24 secured thereto by rivets or bolts 25.

One end of the shaft 19 has a lever 26 keyed thereon which has a pin 27 extending at right angles from its lower end, provided with an insulating sleeve 28 and an outside copper or other metal sleeve 29.

An insulating plate or bracket 30 is secured to the plate 18′ and extends beyond the same. Copper or other metal fingers 31 are secured to the plate or bracket 30 and are adapted to contact with the sleeve 29 on the pin 27.

The forked lower end of a pin 33 is pivotally secured to the lever 26, and extends upwardly through a plate 34 secured to the plate 18′ and extending outwardly over and above the lever 26. A coil spring 35 is mounted around the pin 33 above the plate 34, and has its upper end bearing against a washer ring 36 which bears against adjusting nuts 37 screw threaded on the upper end of the pin 33. The spring operates to normally hold the lever 33 in position so that the sleeve 29 on pin 27 will be in contact with the fingers 31, and also serves to limit and prevent excessive throw of the lever 22 when it is struck by an in-going pipe.

In Fig. 7 I have shown a wiring diagram used in connection with the switch E to operate the magnetically operated valves 13 and 14 of fluid pressure cylinder 12.

In the diagram of Fig. 7, 40 designates the plus or positive feed line, and 41 the negative or return line. The circuit is from line 40 to a magnetically operated contactor Y which is connected to switch E by a line 42, then to the return or negative line 41. Contactor Y is a single pole, single throw electric switch, with contacts *a* and *b* for making a circuit to the magnetically operated inlet valve 13 of the pneumatic or fluid pressure cylinder, and contacts *c* and *d* for making a circuit to the magnetically operated outlet valve 14 of the cylinder, and having an operating magnetic coil *e* so arranged that when the coil is energized, the contacts *a* and *b* are closed, and the contacts *c* and *d* are open, and when the coil *e* is not energized the contacts *a* and *b* are open and the contacts *c* and *d* are closed by gravity.

Contact *b* is connected by the line 43 to the magnetic inlet valve 13 which is in turn connected to the return or negative line 41.

Contacts *c* and *d* are connected by a line 44 to the magnetically operated outlet valve 14 which in turn is connected to the return or negative line 41.

Assuming that no pipe is under the lever 22, and that therefore switch E is in its normal closed position, a circuit will be completed through the line 40, the magnetic coil *e* of contact Y, the line 42 to the sleeve 29 and the fingers 31 of the switch E, to the return line 41. As the circuit is completed it will energize the coil *e* of the switch Y, thereby closing the contacts *a* and *b* and making an auxiliary circuit from the line 40 through the contacts *a* and *b*, the line 43, to the magnetically operated inlet valve 13 to the line 41. As the circuit is completed through the magnetically operated valve 13 it will energize the coil of the valve operating mechanism, thereby opening said valve.

Assuming now that a pipe has struck the lever 22 of the switch E, the circuit through sleeve 29 and fingers 31 will be broken, thereby deënergizing the coil *e*, causing the contacts *a* and *b* to separate, and the circuit through line 40, contacts *a* and *b*, line 43, and magnetic coil of the magnetically operated inlet valve 13 to be broken, and allowing contactor Y to close contactors *c* and *d* by gravity, thereby making a circuit from the coil of the line 40 through the coil of the contacts *c* and *d*, the coil of the line 44, to the coil of the magnetic operating mechanism for the outlet valve 14 and the return line 41. The circuit through the contacts *c* and *d* will remain closed while a pipe is passing under the lever 22 of the switch E, but as soon as the pipe passes from under the lever 22, switch E will close again, energizing the coil *e* and making the circuit to the coil of the magnetically controlled inlet valve 13.

The magnetic inlet valve 13 and outlet valve 14 are adapted to be normally seated or closed, and to open only when their respective coils are energized.

The operation of the apparatus is as follows—

Pipe being conveyed along the trough A toward the sizing rolls B will strike the lever 22 of the switch E, breaking the contact of the sleeve 29 and fingers 31, thereby deenergizing the coil *e* and releasing the contactor Y, separating the contacts *a* and *b*, thereby breaking the circuit to the coil of the magnetically controlled inlet valve 13, allowing it to close by gravity, and closing contacts *c* and *d*, thereby making the circuit to the magnetically controlled outlet valve 14, energizing its solenoid coil, and opening the valve to exhaust the fluid from the cylinder 12. As the fluid is exhausted, the cover 6 of the dump trough C will be lowered by gravity to receive the pipe, and will remain in its lowered position until the pipe passes from under the lever 22 of switch E. As the pipe passes from under the lever 22, the switch E will return to its normal position, closing the contact between the sleeve 29 and the fingers 31, thereby making the circuit through the coil *e* which becomes energized and closes the contacts *a* and *b* to again make the circuit to the coil of the magnetically operated inlet valve 13, opening the same. As the contacts *a* and *b* are closed, contacts *c* and *d* are opened, thereby breaking the circuit to the solenoid coil for operating the outlet valve 14 and allowing it to close by gravity.

The effect of the above described operations is to normally hold the cover 6 of the dump through C in raised or open position, and to automatically close or lower the cover when the forward or front end of a pipe passes under the lever 22 of switch E, the cover being automatically opened or raised again as soon as the rear end of each pipe passes from under the lever 22. The pipes travel very fast in the passage thereof through the rolls B and therefore, the time required for the rear end of the pipe to pass into the dumping trough C after passing from under the lever 22 of the switch E is less than the time necessary for the operation of the valve 13 and cylinder 12.

It will be understood that while sizing rolls are shown delivering the pipe to the dumping trough, such rolls may be omitted and the pipe run directly from a stand of cross rolls, or similar apparatus, to the dumping trough, or the cross rolls may be placed in front of the sizing rolls if desired, without departing from my invention. It also will be understood that materials other than pipe may be handled with apparatus embodying my invention, as defined in the appended claims.

I claim:—

1. The combination with a dumping trough of a pipe handling apparatus having a hinged cover, and a pneumatic cylinder for raising and lowering said cover, of an electrical control apparatus for operating said pneumatic cylinder, said electrical control apparatus being operated by the pipe prior to its entry into said dumping trough.

2. The combination with a pipe handling apparatus comprising an ingoing trough, a dump trough having a hinged cover, and a pneumatic cylinder for raising and lowering said cover, having magnetically operated inlet and outlet valves, of an electrical control apparatus adapted to control the circuit to said magnetically operated valves.

3. The combination with a pipe handling apparatus comprising an in-going trough, a dump trough having a hinged cover, and

a pneumatic cylinder for raising and lowering said cover, having magnetically operated inlet and outlet valves, of an electrical control apparatus adapted to control the circuit to said magnetically operated valves, said apparatus being actuated to make and break the circuits by the pipe passing through said in-going trough prior to passing of the rearward end of the pipe into said dump trough.

4. The combination with a pipe handling apparatus comprising an in-going trough, sizing rolls, a dump trough having a hinged cover, and a pneumatic cylinder for raising and lowering said cover, having magnetically operated inlet and outlet valves, of an electrical control apparatus adapted to control the circuit to said magnetically operated valves, said apparatus comprising a main control switch mounted over said ingoing trough and having a trip lever extending into said trough into the path of travel of the pipe, and a magnetically operated contactor adapted to make the circuits to said inlet and outlet valves, said control switch being adapted to control the circuit energizing said magnetically operated contactor.

In testimony whereof, I have hereunto set my hand.

EDWIN L. UPP.