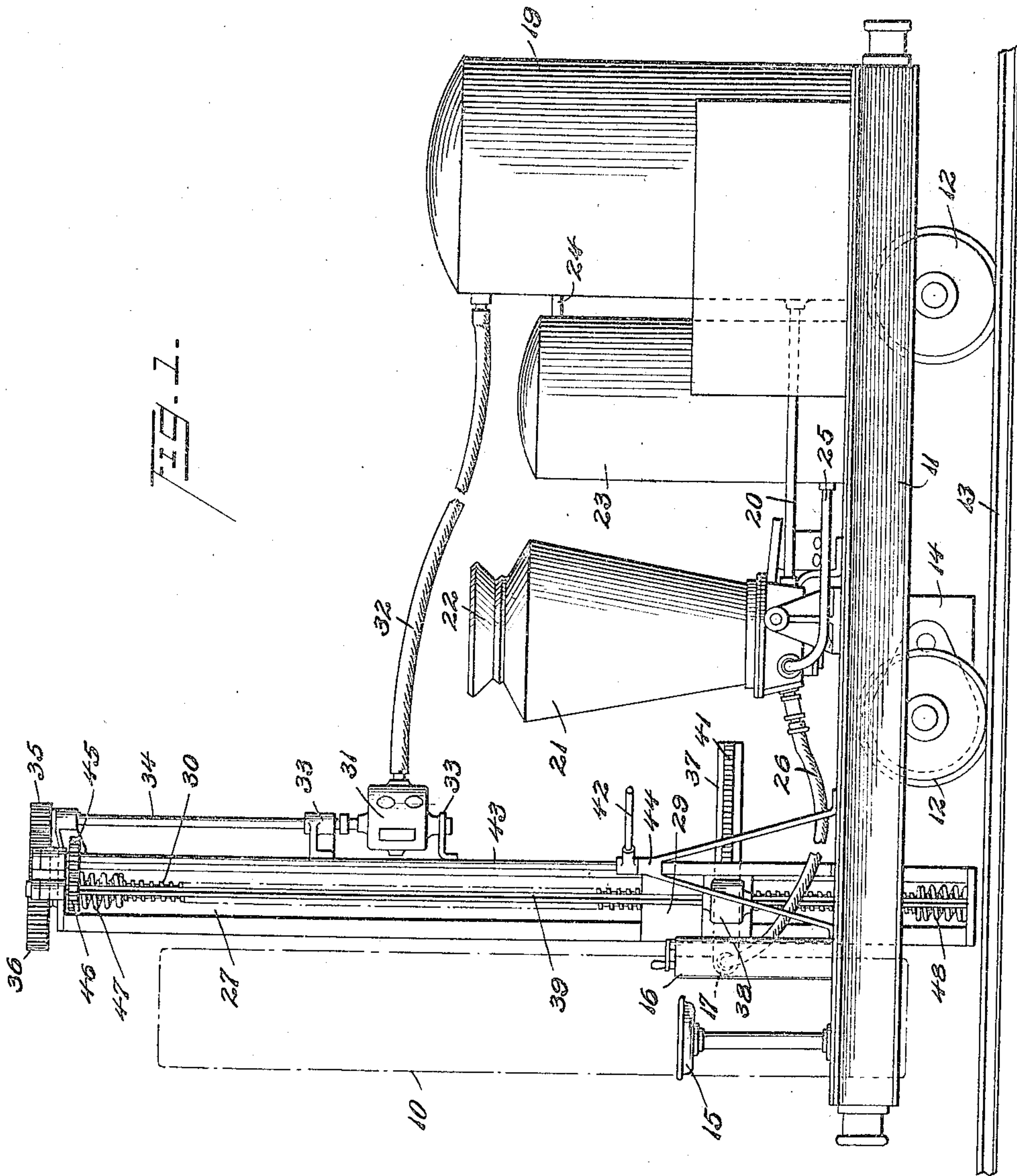


Jan. 2, 1923.

C. E. UNDERWOOD.  
APPARATUS FOR SEALING OPENINGS.  
FILED OCT. 6, 1920.

1,440,424

3 SHEETS-SHEET 1



Inventor

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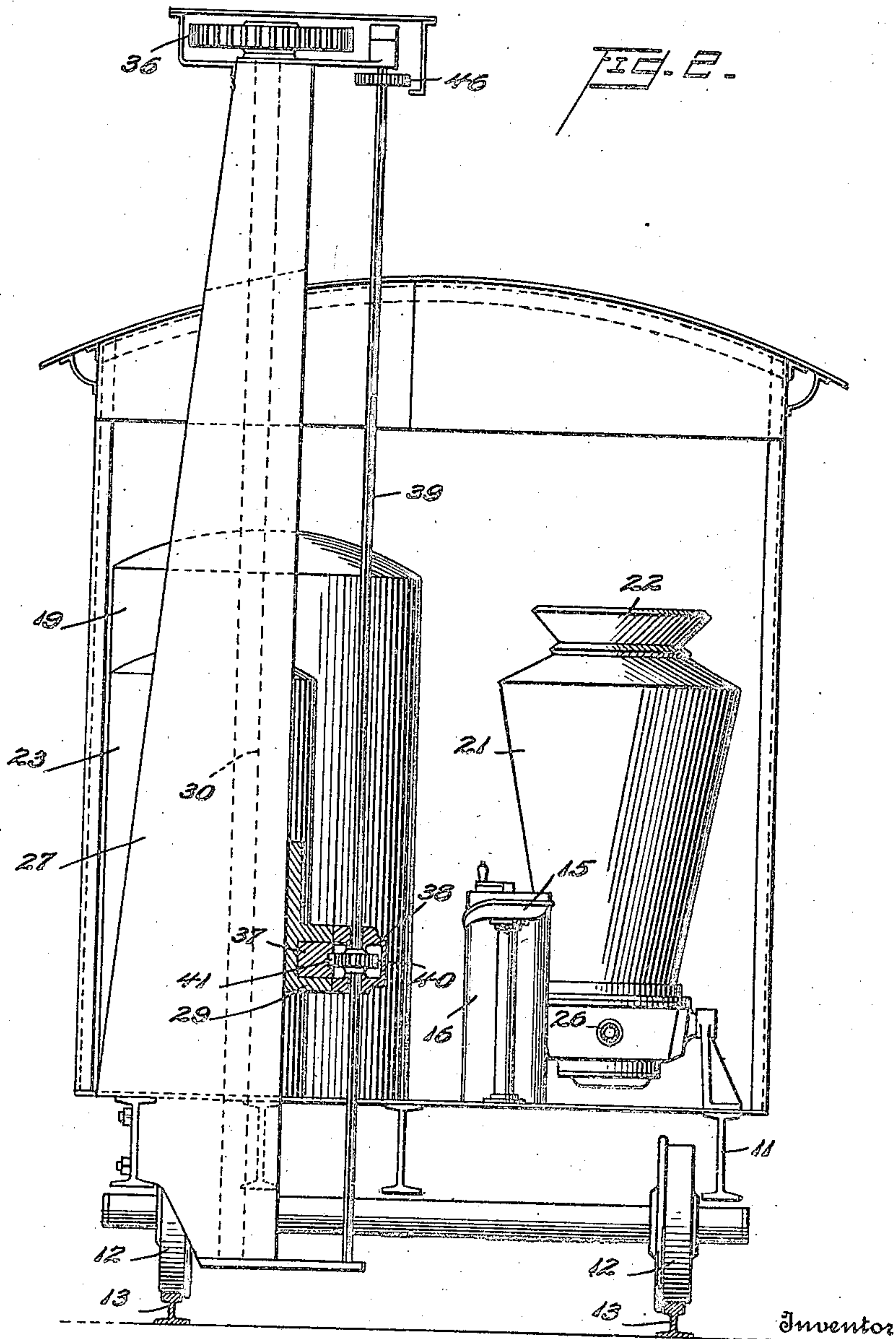
By Watson, Cox, Morse & Grindle,  
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3 SHEETS-SHEET 2



Inventor

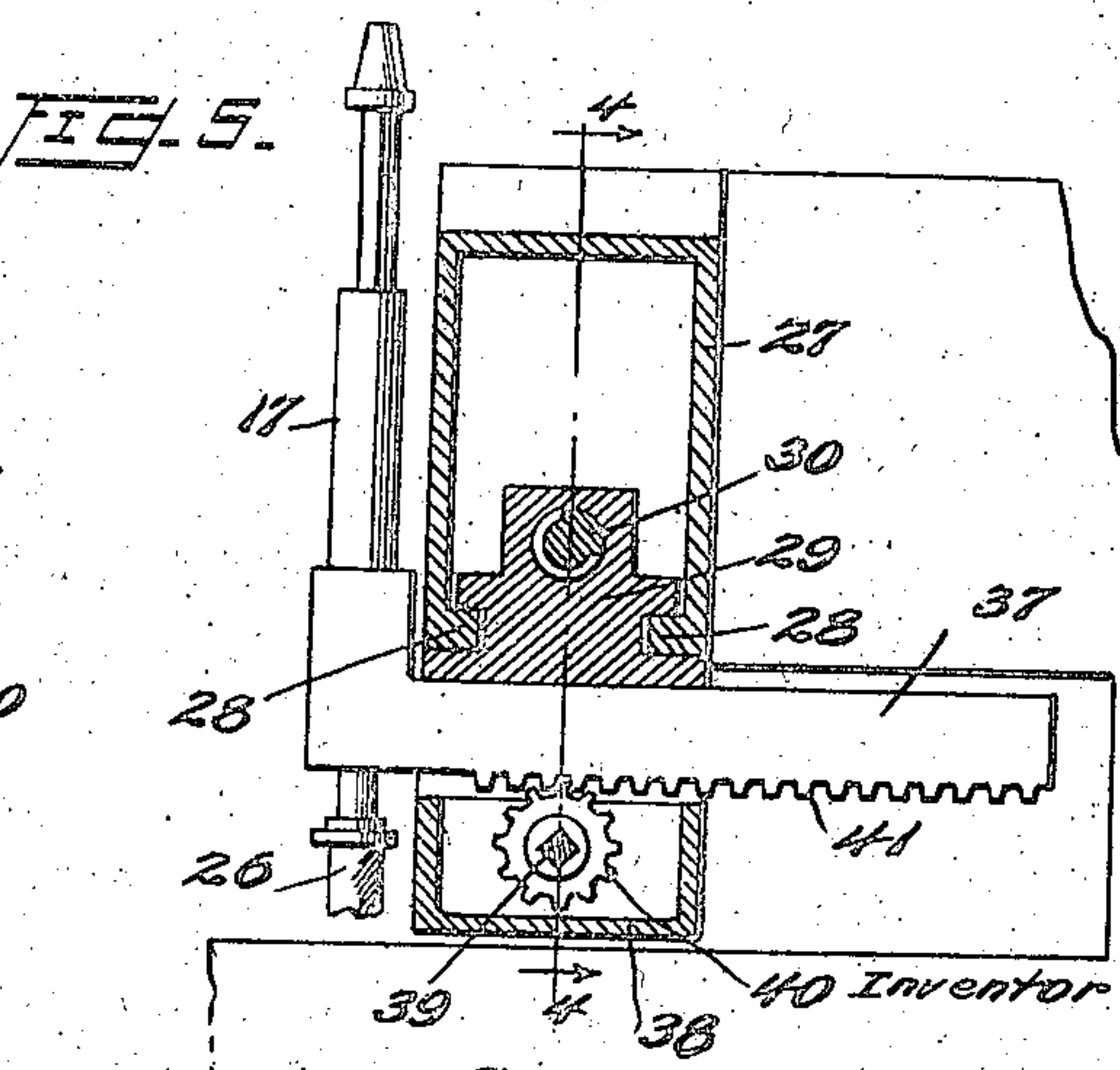
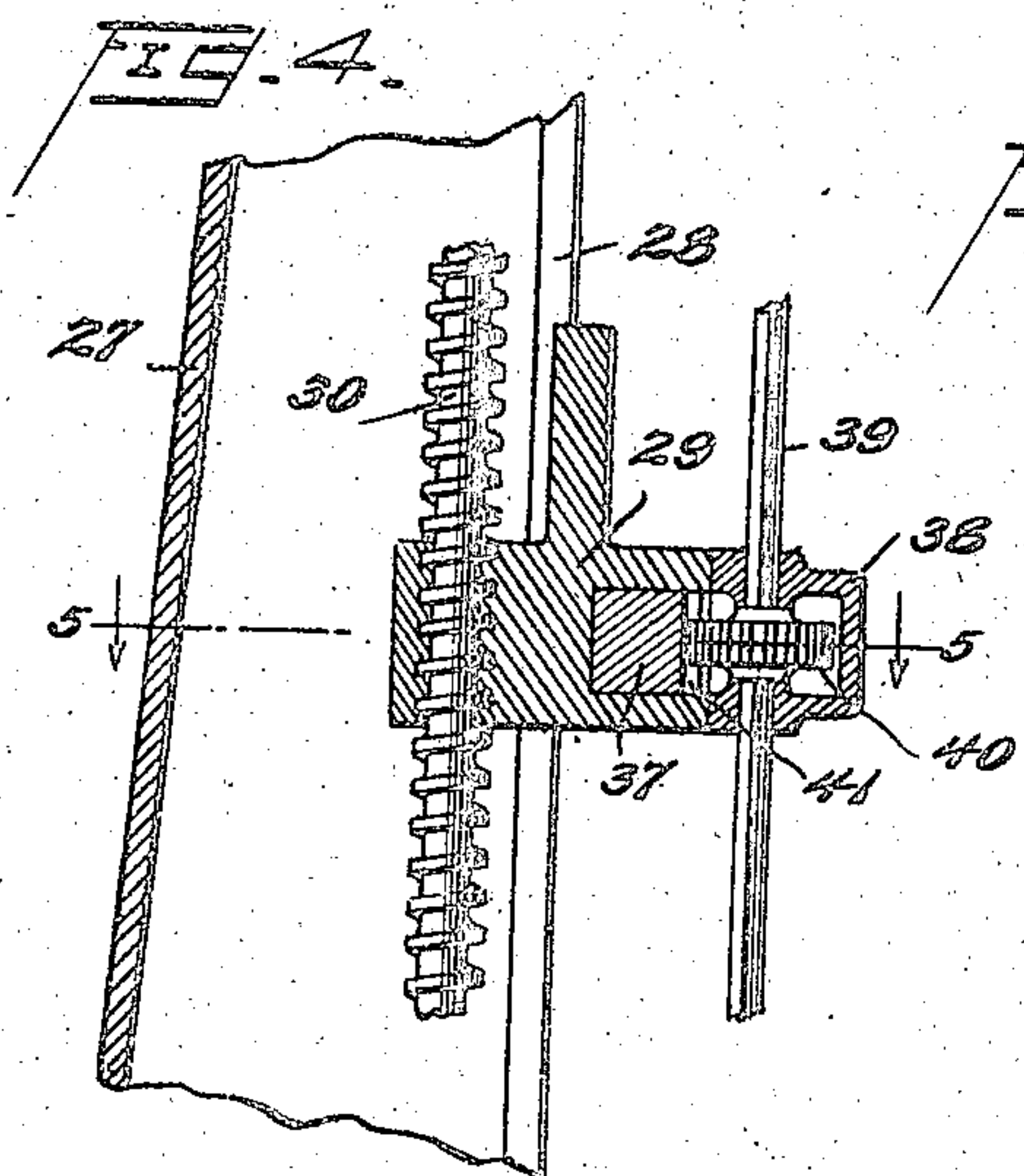
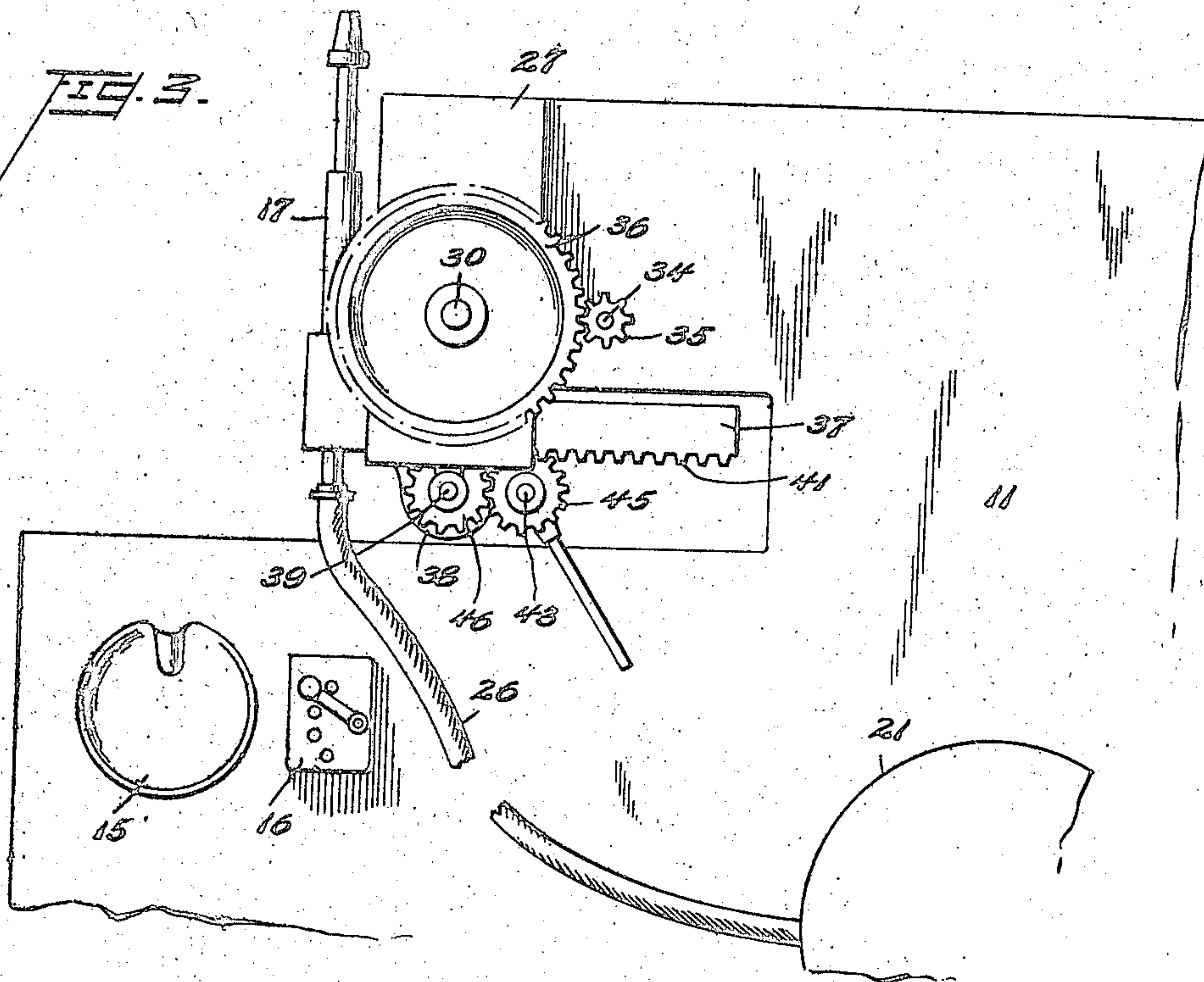
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1,440,424

3 SHEETS-SHEET 3



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# UNITED STATES PATENT OFFICE.

CHARLES E. UNDERWOOD, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO BETHLEHEM STEEL COMPANY, OF BETHLEHEM, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## APPARATUS FOR SEALING OPENINGS.

Application filed October 3, 1920. Serial No. 415,205.

*To all whom it may concern:*

Be it known that I, CHARLES E. UNDERWOOD, a citizen of the United States, and residing at Bethlehem, Northampton County, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Sealing Openings, of which the following is a specification.

The present invention relates to apparatus for sealing the cracks or joints around openings such as coke oven doors.

Heretofore the cracks or joints around coke oven doors and the like have been sealed by hand. It is the principal aim of the present invention to provide a machine for accomplishing this result. To this end the invention consists in the provision of means for delivering sealing material around the edges of the door. In one form of the invention a gun like the common cement gun is provided and this supplies the sealing material to a nozzle, which is adjusted to cause the jet of sealing material to travel around the edges of the door.

The objects and features of novelty will be apparent from the description taken in connection with the drawings, in which—

Fig. 1 is a side elevation of one form of apparatus constructed in accordance with the present invention and mounted on a car or truck adapted to travel along in front of a battery of ovens, the housing being removed;

Fig. 2 is an end view of the apparatus;

Fig. 3 is a partial plan view of the apparatus;

Fig. 4 is a sectional elevation taken through the upright or guide substantially on the line 4—4 of Figure 5; and

Fig. 5 is a sectional plan view taken substantially on the line 5—5 of Figure 4.

Referring to the drawings and more particularly to Figure 1, the reference numeral 10 indicates the outline of one of the oven openings or doors, the same being indicated by dotted lines. It is to be understood that there are a series of these openings. It is the main object of the present invention to provide means for sealing cracks around the edges of the oven doors. In the form of

the invention illustrated, the apparatus is mounted on a car or truck 11 having wheels 12 running on a track 13 disposed along in front of the oven doors. The car is equipped with a motor 14, under the control of an operator on a seat 15 near one end of the car, a suitable motor controller 16 adjacent the seat being provided for starting and stopping the motor. Of course suitable means (not shown) is provided for conveying electric current to the motor.

In the form of the invention shown the sealing material is discharged around the edges of the door from a nozzle 17. This nozzle is supplied with sealing material under pressure in any suitable manner. Thus an apparatus such as used in connection with cement guns may be employed. This apparatus may comprise an air compressor 18 operated by a suitable motor (not shown) supplying compressed air to a reservoir 19. A conduit 20 connects the compressed air reservoir and the cement gun 21 having a hopper 22 at its upper end through which the gun is supplied with suitable material such as clay. A water tank 23 is provided and the water therein is put under pressure by placing the tank in communication with the compressed air reservoir through the conduit 24. Thus water is forced to the gun through the conduit 25. From the gun a suitable conduit 26, such as a hose, leads to the nozzle 17.

According to the present invention the nozzle is mounted so that it may be adjusted to cause the jet of sealing material issuing therefrom to travel around the edges of the door. As shown the nozzle is mounted for movement both vertically and horizontally so that it is adjusted to cause the jet to travel up one side of the door along the top down the other and then along the bottom. Although the nozzle is shown as mounted for movement both vertically and horizontally, it is to be understood that the nozzle might be mounted for adjustment in other ways so that the jet of sealing material would travel around the edges of the door.

As illustrated the car near the end having



ing the operator's seat is provided with a vertical standard 27 which extends slightly above the top of the door openings. This standard is provided with suitable guides 28 for a vertically adjustable carriage 29. Any suitable means may be provided for causing the carriage to travel vertically, a power driven screw 30 threaded through the carriage being shown for this purpose. Preferably the screw is actuated from an air motor 31, air being supplied thereto from the compressed air reservoir by a suitable conduit 32. The air motor 31 is disposed so that it may be controlled by the operator without moving from his seat. Thus it is carried by suitable brackets 33 secured to the upright or standard 27. The air motor is operatively connected to the power screw 30 through a shaft 34 extending from the motor to a point adjacent the top of the standard, where it has secured thereto a pinion 35 in mesh with a gear 36 secured to the power shaft 30. In this manner when the motor is operated the power screw will be rotated and the carriage 29 raised or lowered in accordance with the direction of rotation, it being understood that the motor 31 is a reversible motor.

The nozzle 17 is carried by a ram 37 horizontally adjustable in the carriage 29. Any suitable device may be provided for effecting horizontal movement of the ram. As shown the casing 38 is secured to the carriage and has a vertically disposed square or splined shaft 39 extending therethrough. A pinion 40 within the casing is slidably mounted on the shaft for rotation therewith and meshes with the rack teeth 41 carried by the ram 37. In the form of the invention shown the shaft 39 is turned and thereby the nozzle adjusted horizontally by means of a lever or arm 42 disposed adjacent the operator's seat. This arm is secured to a vertical shaft 43, which at its lower end is rotatively mounted in the bracket 44 and at its upper end carries a pinion 45 for rotation therewith. This pinion meshes with a similar pinion 46 secured to the splined shaft 39. Thus when the arm 42 is rocked, the nozzle 17 will be reciprocated in a horizontal direction. In order to prevent injury to the apparatus, suitable springs 47 and 48 are provided at the top and bottom of the screw shaft 30, so that, in case the air motor is not stopped at the proper time, the springs will yieldingly stop the travel of the carriage.

In the operation of the device it will be understood that the sealing material is supplied to the nozzle 17 by the air pressure and the motor 31 is set in operation to cause the nozzle to travel up or down one side of the door. Then arm 42 is turned by the operator and the nozzle travels along either the top or bottom of the door. Thereafter the motor 31 is again set in operation and the

nozzle travels along the other side of the door. Finally the arm 42 is again operated and the sealing of the door is completed.

Although a specific form of the invention has been described in detail, it is to be understood that it is not thus limited, but includes modifications and changes which come within the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for luting coke oven doors and the like, comprising a truck having a standard thereon, a carriage slidable on said standard, power means to traverse said carriage, a ram slidable on said carriage, a cement gun on said truck, a nozzle on said ram, and a conduit from said gun to said nozzle.

2. Apparatus for luting coke oven doors and the like, comprising a car, a standard thereon, a cement gun thereon, a carriage slidable up and down on said standard, means to traverse said carriage, a manually operated ram slidable on said carriage at an angle to the traverse of said carriage, a nozzle carried by said ram, a connection between said gun and said nozzle, and means to stop the travel of said carriage.

3. Apparatus for luting coke oven doors and the like, comprising a car adapted to move in front of a battery of ovens, a cement gun on the car, a nozzle connected to said gun, means to feed said nozzle vertically along the entire length of the sides of the door, and means to move it horizontally across the top and bottom thereof.

4. Apparatus for luting coke oven doors and the like, comprising a frame, a carriage slidable thereon in one direction, a ram slidable on said carriage in another direction, a cement gun nozzle carried by said ram, and means on the frame to supply sealing material to said nozzle.

5. Apparatus for luting coke oven doors and the like, comprising the combination with a car adapted to travel in front of a battery of ovens and having vertical guides thereon, of a carriage slidable on said guides, a power driven means for traversing said carriage in said guides, means to cushion said carriage at the upper and lower limits of its travel, a ram slidable horizontally on said carriage, a nozzle carried by said ram, means on said car to supply said nozzle, and means to slide said ram horizontally.

6. Apparatus for luting oven doors and the like, comprising the combination with a cement gun and nozzle, power means to traverse said nozzle in one direction, and means to traverse it in another direction.

7. Apparatus for luting coke oven doors and the like, comprising the combination of a car containing a cement gun, an air compressor and a water tank, and having a ver-



tical standard thereon, of a carriage slidable vertically on said standard, a nozzle on said carriage, connections between said tank, compressor, gun and nozzle, a screw to traverse said carriage on said standard, an air motor for driving said screw, connections between said compressor and motor, means to cushion said carriage at the ends of its travel, and means to move said nozzle horizontally on said carriage.

8. Apparatus for luting coke oven doors and the like, comprising the combination with a truck having a cement gun plant including a nozzle, means to feed said nozzle vertically in either direction on said truck, and means to shift said nozzle horizontally.

9. Apparatus for luting coke oven doors and the like, comprising a standard, a carriage slidable up and down thereon, power means for reciprocating said carriage, a ram horizontally slidable on said carriage and having rack teeth thereon, a shaft carrying a pinion in mesh with said rack, a parallel shaft provided with a hand operating lever, gears connecting said shafts, a nozzle carried by said ram, and means to supply sealing material under pressure to said nozzle.

10. Apparatus for luting coke oven doors and the like, comprising a nozzle and means to supply material under pressure thereto, means to feed said nozzle vertically up and down the sides of a door, and manual means to feed it horizontally along the top and bottom of the door.

11. Apparatus for sealing the cracks around an oven door, including in combination, a nozzle, means to supply said nozzle with sealing material, and means to adjust said nozzle to cause the jet of sealing material issuing therefrom to travel around the edges of said door.

12. Apparatus for sealing the cracks around an oven door, including in combination, a nozzle, means to supply said nozzle with sealing material, means to raise and lower said nozzle to seal the side edges of the door, and means to adjust said nozzle to cause the jet of sealing material issuing therefrom to travel horizontally to seal the top and bottom edges of the door.

13. Apparatus for sealing the cracks around an oven door, including in combination, a nozzle, means to adjust the nozzle to cause the jet of sealing material issuing therefrom to travel vertically to seal the side edges of the door, and means to move the nozzle horizontally to seal the top and bottom edges.

14. Apparatus for luting coke oven doors and the like including in combination, a car traveling in front of the oven door, a nozzle for discharging sealing material, a support for said nozzle carried by the car, means on the car to feed said support in either of two directions at an angle to each other and

means on the car to supply said nozzle with sealing material.

15. Apparatus for sealing the cracks around an oven door including in combination a car, means carried by said car to discharge a jet of sealing material, and means to move the jet to cause it to travel around the outer edges of said door.

16. Apparatus for sealing the cracks around an oven door including in combination a car, and means carried by said car to discharge a jet of sealing material around the edges of the door.

17. Apparatus of the character described including in combination, a nozzle adapted to discharge a mixture of water and clay, and means to move said nozzle in a closed rectangular path.

18. Apparatus of the character described including in combination, a nozzle adapted to discharge a mixture of water and clay, and means to move said nozzle in a path forming a closed figure.

19. Apparatus for sealing the cracks around an oven door including in combination, a nozzle adapted to discharge a stream of sealing material and means to move the nozzle to cause the stream to travel along the outer edges of said door.

20. Apparatus for sealing the cracks around an oven door including in combination, means to discharge a jet of sealing material and means to cause the jet to travel around the outer edges of said door.

21. Apparatus for luting coke oven doors including in combination, a car, means carried by the car to discharge a jet of sealing material, and means including a motor to move said jet in a path to seal the cracks around a door.

22. Apparatus for luting coke oven doors including in combination, a car, means carried by the car to discharge a jet of sealing material, means including a motor to move said jet in a path to seal the cracks around a door and means to supply power to said motor from a source on the car.

23. Apparatus for luting coke oven doors including in combination, a car, means carried by the car to discharge a jet of sealing material, and means including an air motor to move said jet in a path to seal the cracks around a door.

24. Apparatus for luting coke oven doors including in combination, a car, means, including a supply of compressed air carried by the car, to discharge a jet of sealing material, means including an air motor, to move said jet in a path to seal the cracks around a door, and means to furnish said motor compressed air from said supply.

25. Apparatus for luting coke oven doors including in combination, a car, a cement gun including a nozzle, means including a supply of fluid under pressure to discharge



sealing material from said nozzle, means to move said nozzle in a path to seal the cracks around a door, said last mentioned means including a fluid operated motor, and means  
5 to furnish said motor with fluid under pressure from said supply.

26. Apparatus for luting coke oven doors including in combination, a car, means car-

ried by the car to discharge a jet of sealing material and means to move said jet in a path to seal the cracks around a door including a motor to traverse the jet in a vertical direction.

In testimony whereof I affix my signature.

CHARLES E. UNDERWOOD.