

No. 752,726.

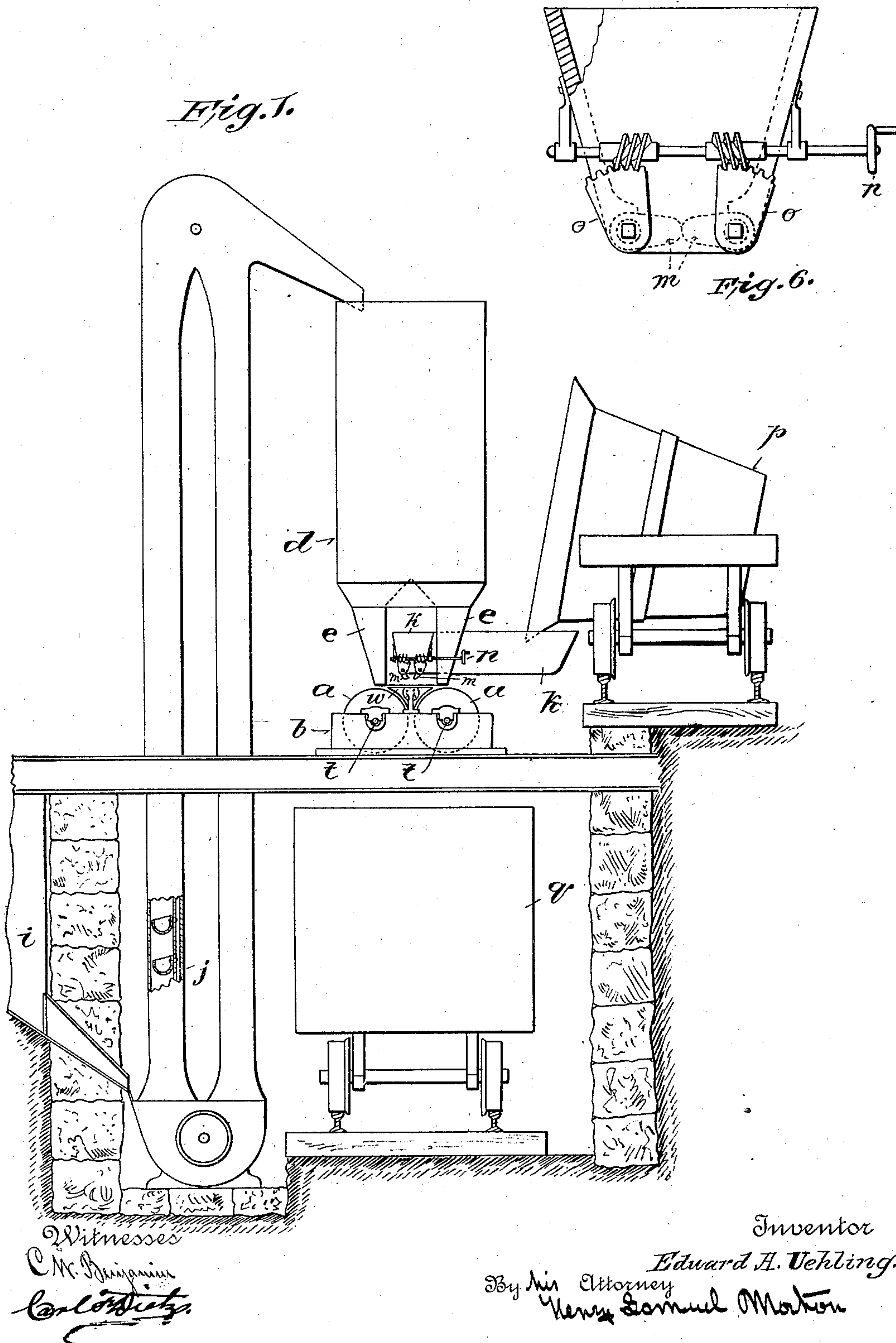
PATENTED FEB. 23, 1904.

E. A. UEHLING.  
ORE AGGLUTINIZING APPARATUS.

APPLICATION FILED JUNE 10, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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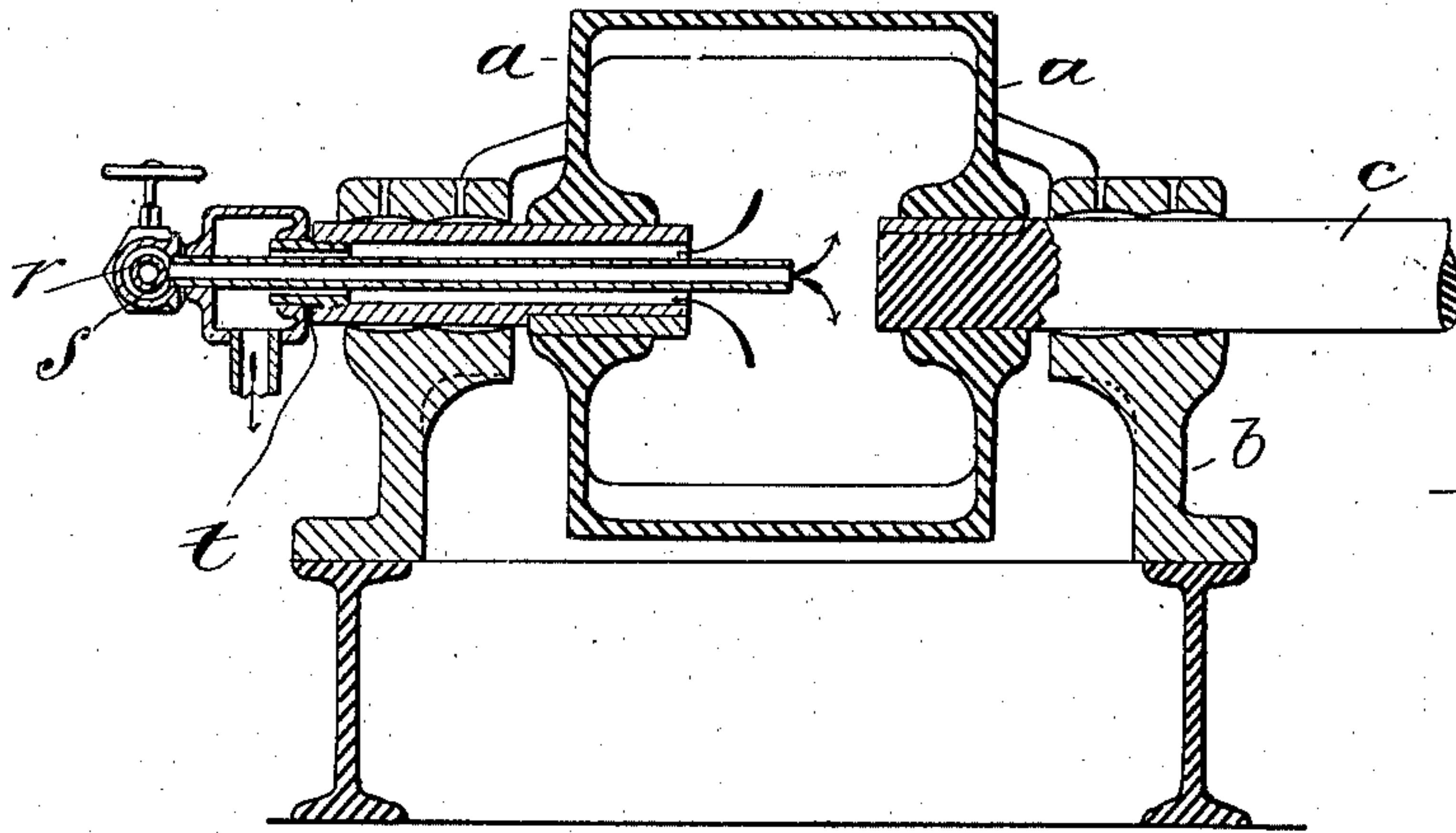


Fig. 2.

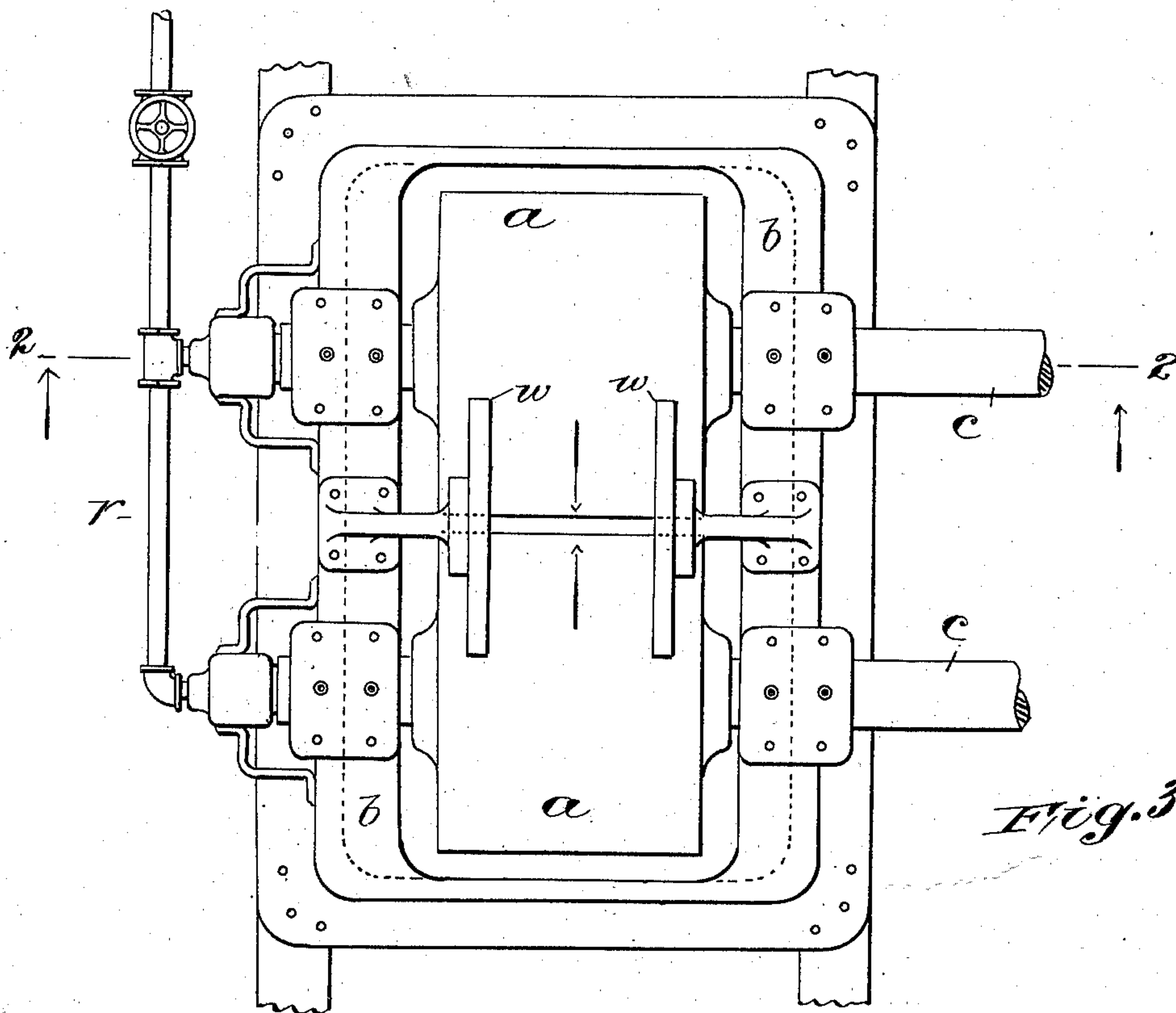


Fig. 3.

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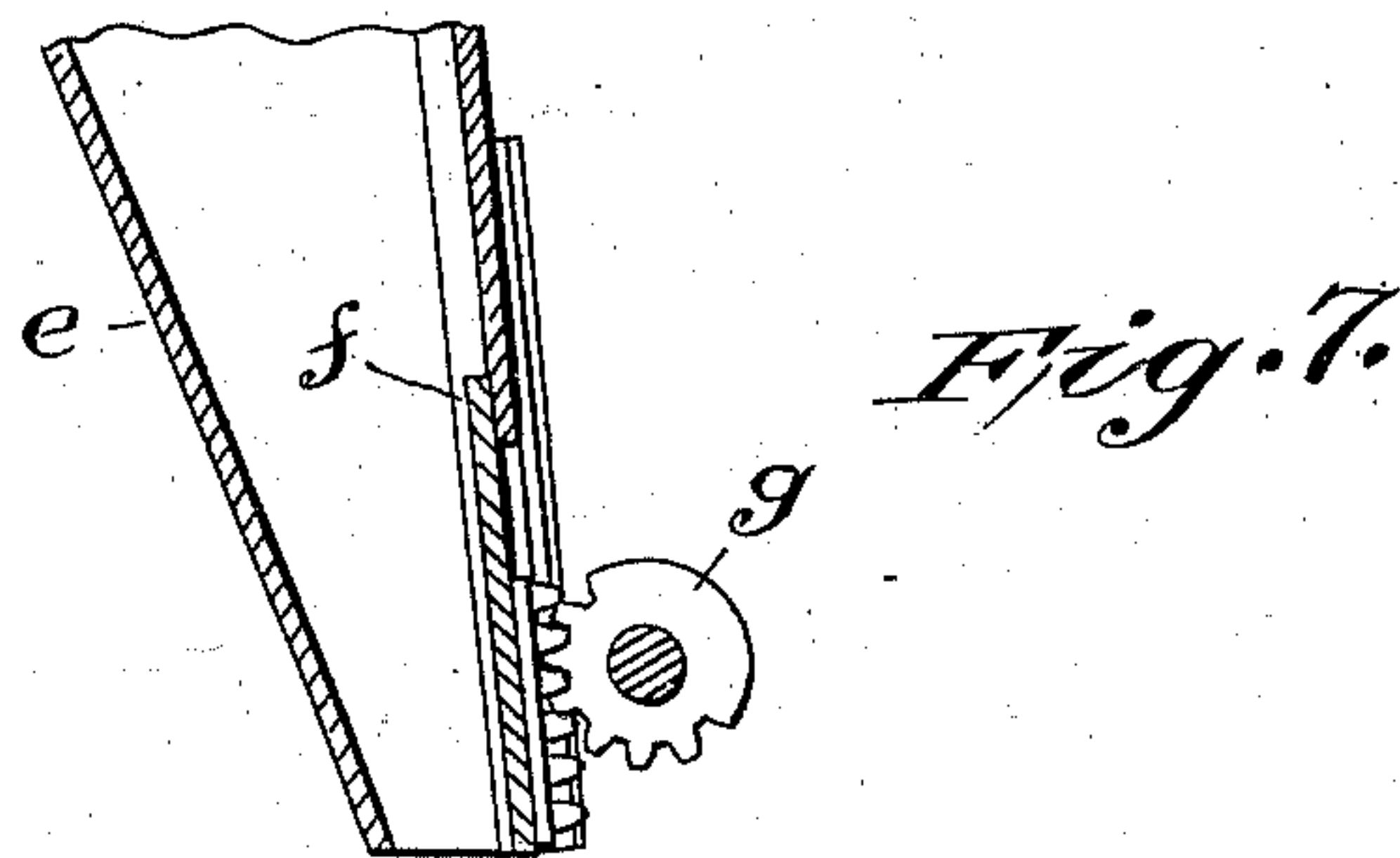
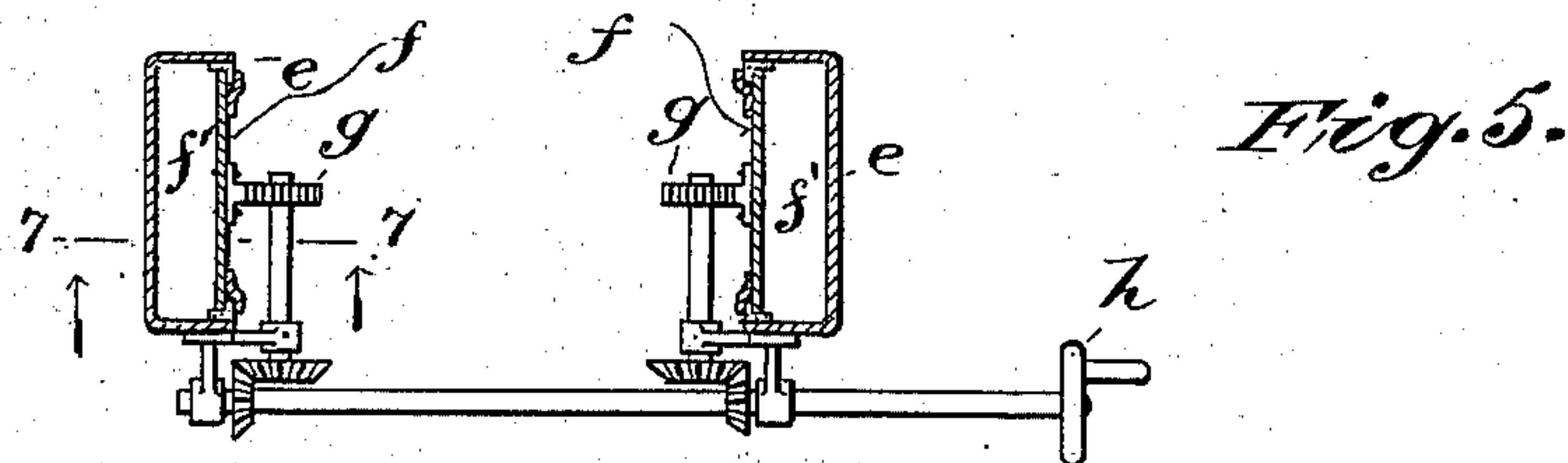
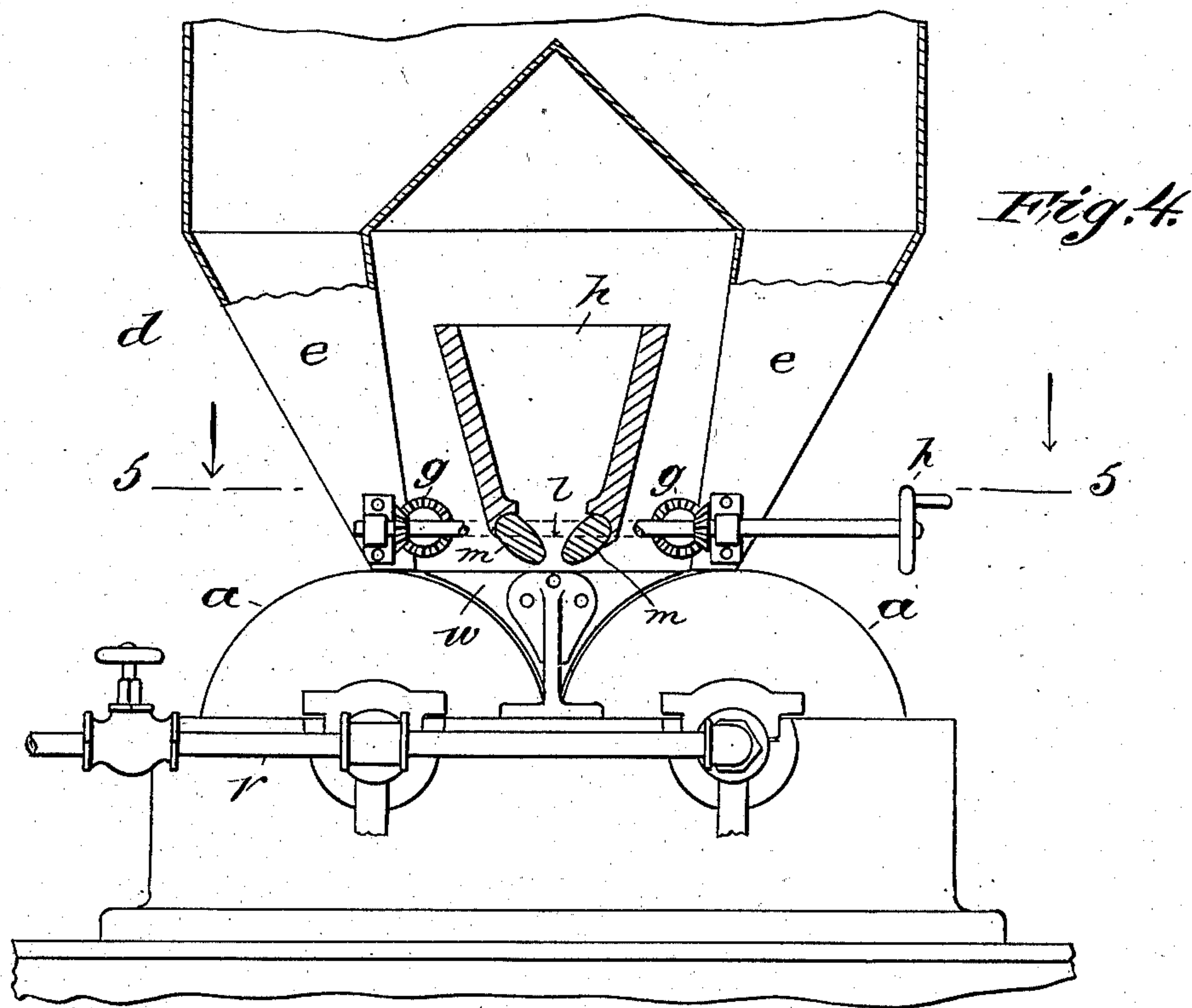
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3 SHEETS—SHEET 3.



Witnesses  
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# UNITED STATES PATENT OFFICE.

EDWARD A. UEHLING, OF PASSAIC, NEW JERSEY.

## ORE-AGGLUTINIZING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 752,726, dated February 23, 1904.

Application filed June 10, 1903. Serial No. 160,949. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD A. UEHLING, mechanical engineer, a citizen of the United States, and a resident of Passaic, Passaic county, New Jersey, have invented certain new and useful Improvements in Ore-Agglutinating Apparatus, of which the following is a specification, illustrated by the accompanying drawings.

This invention relates to the use of ore in blast-furnaces, and in particular to the use of ore in a finely-divided pulverized state, such as is found in many of the richest ore deposits. To use the ore in this pulverulent condition, it is necessary to run grave risks, due to the material in the furnace "hanging" and "slipping," as when after the furnace "hangs," which is due to the choking action of the fine ore, the slipping, which is bound to follow the hanging, frequently produces explosions, which are liable to cause grave loss of life and property. Many attempts have been made to overcome this difficulty, the most successful of which is the process termed "briquetting;" but owing to the expense involved and the only partial success attendant upon its use this method has not proved an unqualified success. In United States Patent No. 513,744 of January 30, 1894, and in my application, Serial No. 160,948, filed of even date with this, there are described two methods of treating this fine pulverulent ore, by which means the above-enumerated and other difficulties are overcome. The subject-matter of this application discloses another method by which these fine ores may be safely and economically used.

The object of this invention is to devise an apparatus whereby this fine ore may be mixed or agglutinated with the cinder or slag from the blast-furnaces, whereby the ore and slag may be mechanically mixed, so as to render the ore fit for smelting in a blast-furnace and temporarily utilize a portion of the slag, which otherwise would be entirely wasted.

In the drawings, Figure 1 is an elevation, partly in section, of the apparatus. Fig. 2 is a vertical cross-section through the center of one of the rolls, showing the device for cooling the rolls. Fig. 3 is a plan view of the apparatus on

the plane 22 of Fig. 3. Fig. 4 is a detail of the ore-hopper and cinder-spout, showing these details in section and the rolls in full. Fig. 5 is a cross-section on the plane 55 of Fig. 4. Fig. 6 is a detail view showing the mechanism for regulating the flow of cinder or slag. Fig. 7 is a cross-section on the plane 77 of Fig. 5.

This apparatus to render efficient service should be located as near the blast-furnace as possible in order that the slag may be used in a fluid state before it begins to cool and harden. Located upon an open framework of I-beams are the two rolls *a a*, the shafts *c c* of which are mounted in the frame *b* and may be rotated by means of a dynamo and reducing-gears or in any manner most convenient. Situate above the rolls is the ore-hopper *d*, which terminates in the two legs *e e*, the bottoms of which are open and located so as just to clear the rolls. These legs are constructed in the manner of rectangular tapering chutes and on their inner surfaces have the movable sliding plates *f*, which are adapted to move vertically along the inner surfaces of the legs. The plates *f* are provided with racks which cooperate with the gears *g*. The gears *g* by means of a system of bevel-gears (shown in Fig. 5) are connected with the hand-wheel *h*. It will be seen that when the plates *f* are in the position shown in Fig. 7 substantially no material can pass between the upper surface of the rolls and from within the sides of the legs *e*; but when the hand-wheel *h* is rotated and the plates *f* lifted a certain amount of material will pass out from the legs and fall upon and pass between the rolls.

In Fig. 1 is shown the ore-hopper *i* and a cup-shaped ore-conveyer *j*, which are adapted to convey and discharge the ore into the hopper *d*. This arrangement is simply shown as a preferred form for use in conjunction with this apparatus, the invention not being limited to this particular construction of conveying device. At one side of the hopper *d* and having an L-shaped extension bringing it forward between the legs *e* is the cinder-trough *k*. This trough has at its end between the legs an opening *l*, situate in the bottom of the trough. The flow of material out from this



opening is controlled by the jaws *m*, which are adjusted by means of the right and left worms on the sectors *O*, which are in turn controlled by the hand-wheel *n*, by which means the flow of material may be readily adjusted.

The operation of this device is as follows: The molten slag being drawn from the blast-furnace into the ladle *p*, which may be carried upon a truck running on rails, as shown in Fig. 1, is brought before the cinder-trough *k*, into which its contents are poured. In the meanwhile the conveyer *j* has been discharging the fine ore or flue-dust into the hopper *d*, and the slides *f* being properly adjusted to allow the ore falling upon the rolls *a* the rolls are started revolving toward each other, the hand-wheel *n* is turned, and the molten cinder-slag flows downward between the jaws *m* and meeting with the ore which is falling over the surfaces of the rolls the ore and slag are forced together, making an intimate mixture, the ore becoming agglutinated during the process and falling into the car *q* or any other convenient receptacle by which it may be transferred to the furnace and charged therein, due account being taken of the proportion of ore to that of slag used.

In order to prevent the rolls *a a* from becoming overheated by reason of their contact with the molten cinder or slag, the rolls are constructed in a hollow form, as shown in Fig. 2, and are mounted upon the hollow axles *s* and *t*, which are directly connected with the interior opening within the rolls. The axle *s* is connected, by means of the pipes *r*, with a suitable water-supply, and in this manner a current of cooling-water is maintained in the direction of the arrows shown in Fig. 2.

In order to prevent the ore-dust and cinder-slag from overflowing and dropping into the car beneath the rolls in an unglutinated form, the plates *w* are inserted above the rolls converging downward toward the meeting-point of the rolls.

Manifestly some features of this device may be omitted and others substituted in their place without departing from the idea of this invention; but,

Without enumerating the many modifications of construction of which this device is capable, I claim the following as the essential and characteristic features of this invention:

1. In an ore-agglutinizing apparatus, the combination of two coöperating rolls, means for rotating said rolls, means for feeding ore to said rolls and means for feeding slag to said rolls, together with means for regulating the supply of said ore and said slag, substantially as set forth.

2. In combination, two coöperating rolls, means for actuating said rolls in opposite directions one from the other, a receptacle situate above said rolls and adapted to feed ore to the surfaces of said rolls, means for feeding slag between the surfaces of said rolls, separate and independently manually actuated means for regulating the supply of said ore and said slag, substantially as described and set forth.

3. In combination in an apparatus adapted to agglutinate ore, two coöperating rolls, rotating toward one another, a hopper situate above said rolls manually-controlled means for discharging the contents of the said hopper on the upper surface of each of the said rolls, a trough situate above said rolls, and manually-controlled means for regulating the discharge of the contents of said trough between the said rolls, substantially as set forth.

4. In combination in an apparatus adapted to agglutinate ore, two coöperating water-cooled rolls, rotating toward one another, a hopper situate above said rolls, manually-controlled means for discharging the contents of the said hopper on the upper surface of each of the said rolls, a trough situate above said rolls, and manually-controlled means for regulating the discharge of the contents of said trough between the said rolls, substantially as set forth.

Signed this 9th day of June, 1903, at New York, N. Y.

ED. A. UEHLING.

Witnesses:

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CARL F. DIETZ.