

(No Model.)

3 Sheets—Sheet 1.

C. E. WOLLÉ.  
COAL HANDLING MACHINERY.

No. 533,767.

Patented Feb. 5, 1895.

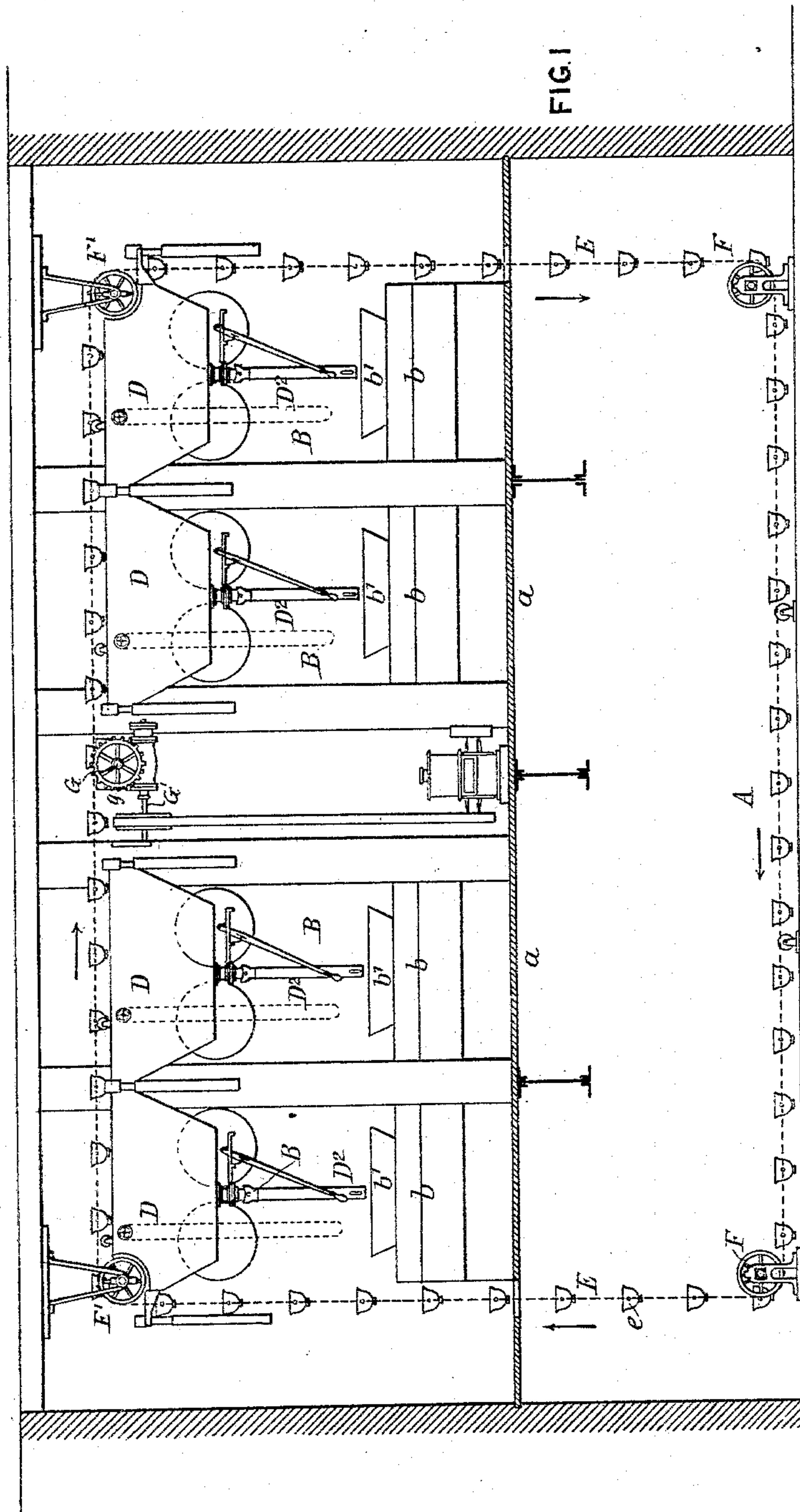


FIG. 1

FIG. 8

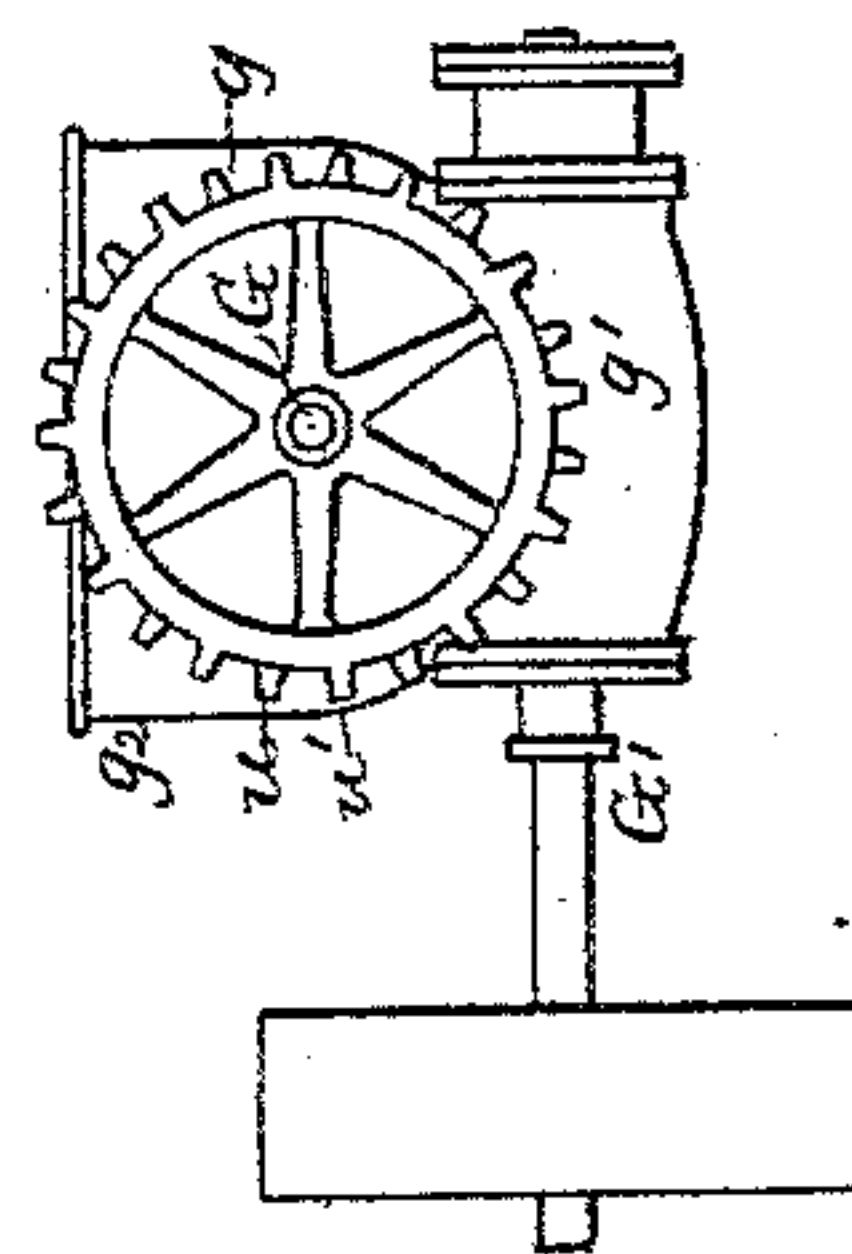


FIG. 9

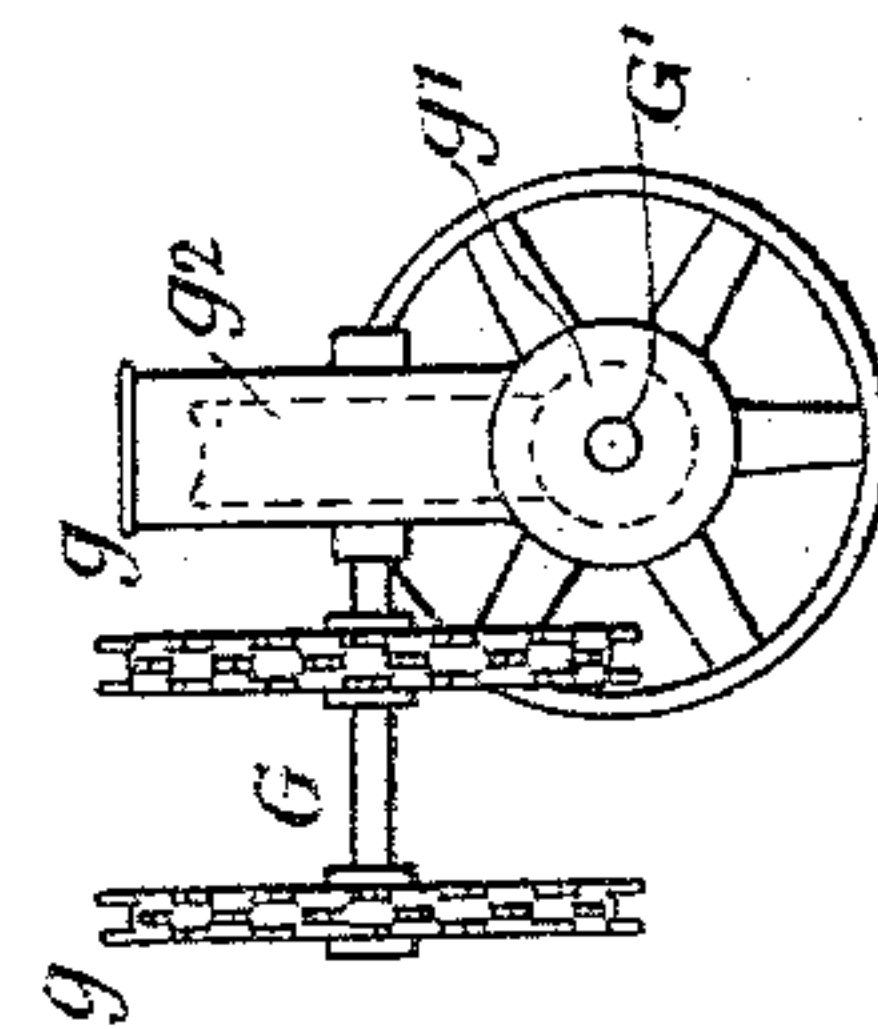
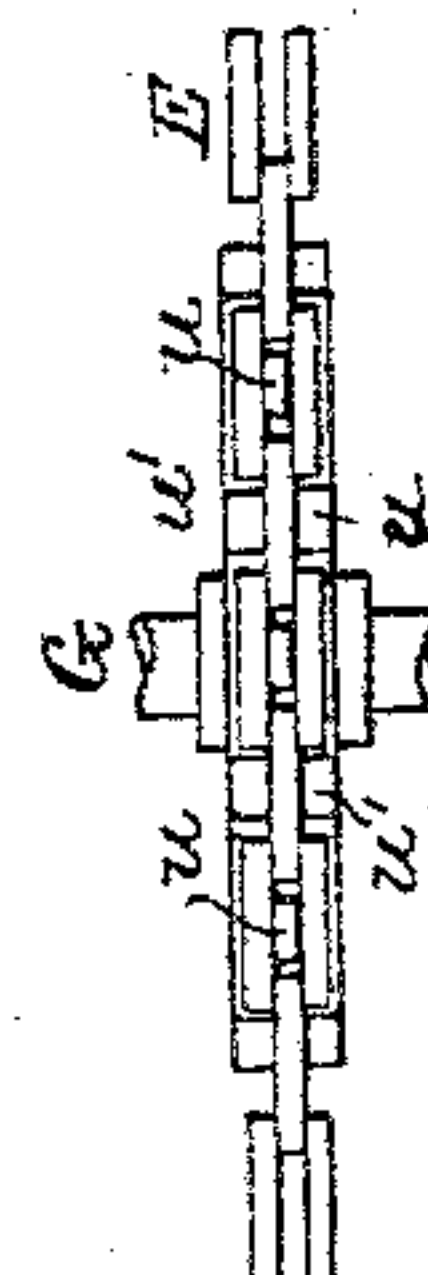


FIG. 10



WITNESSES

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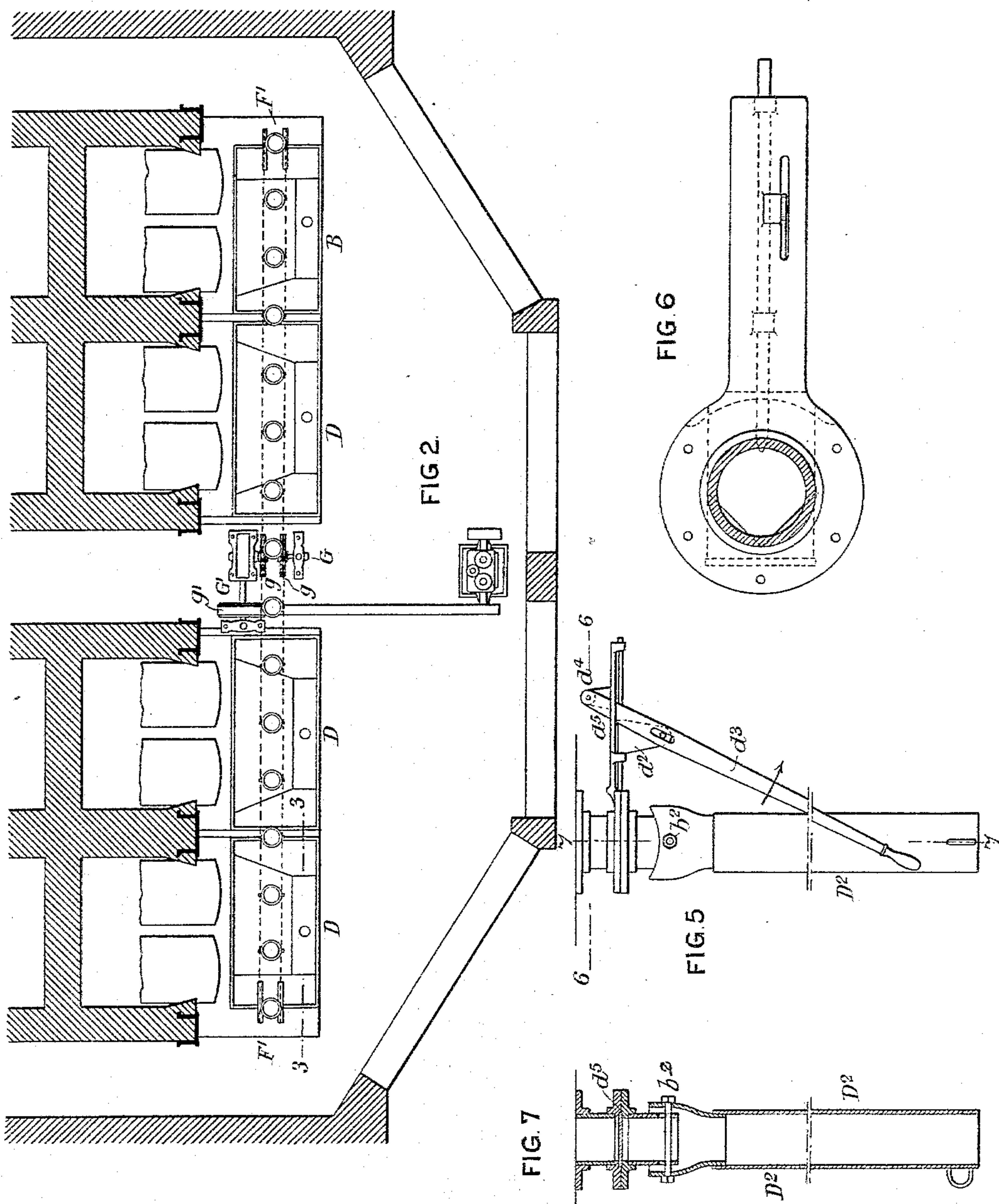
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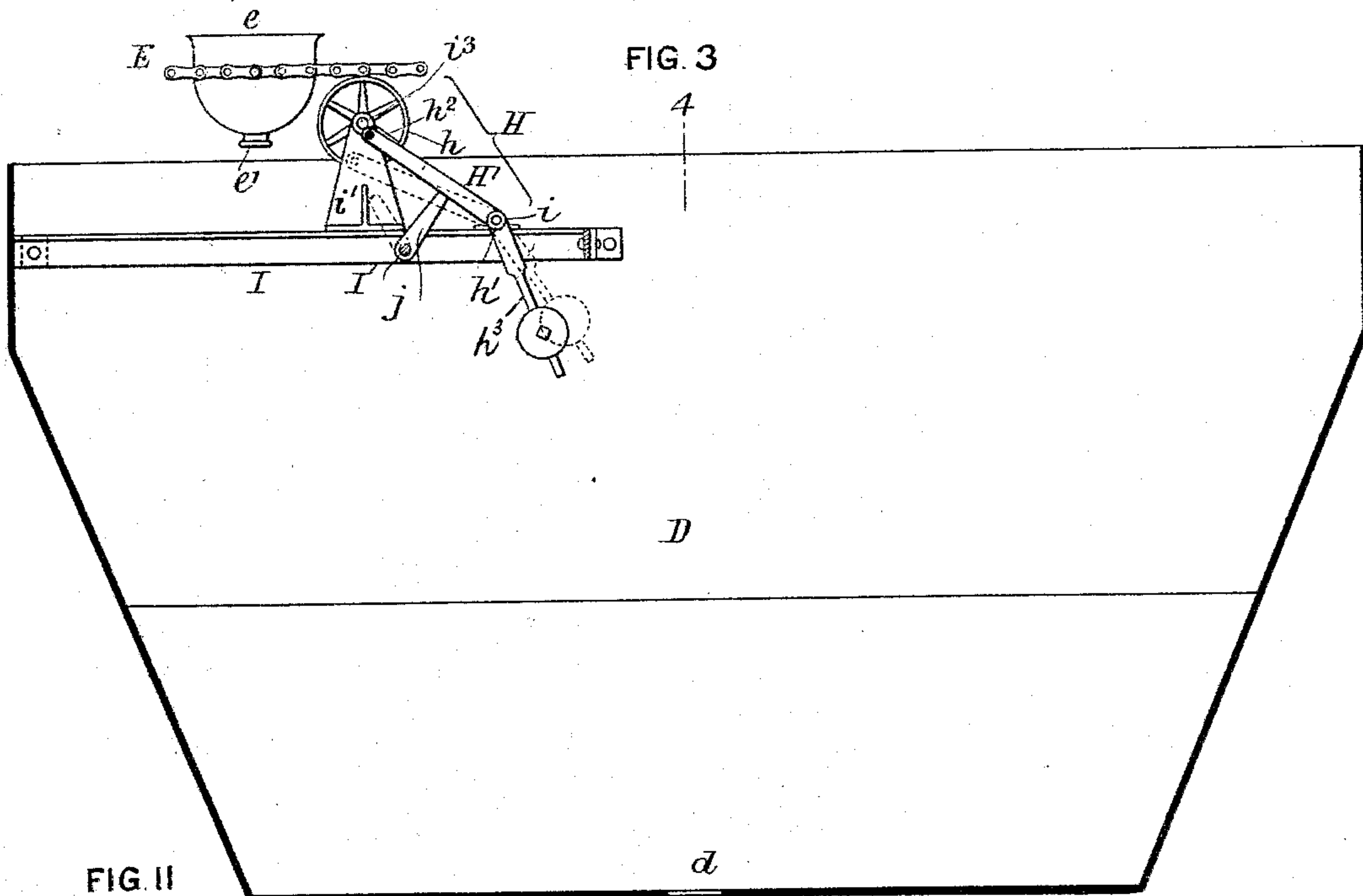


FIG. II

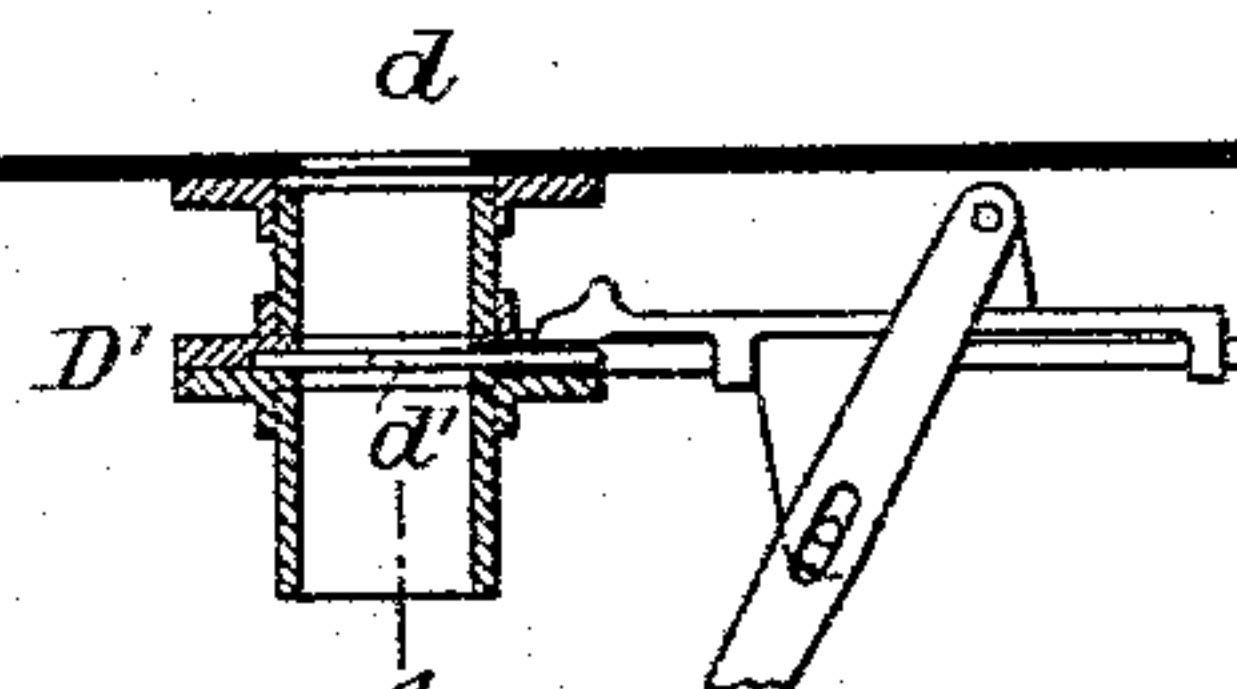
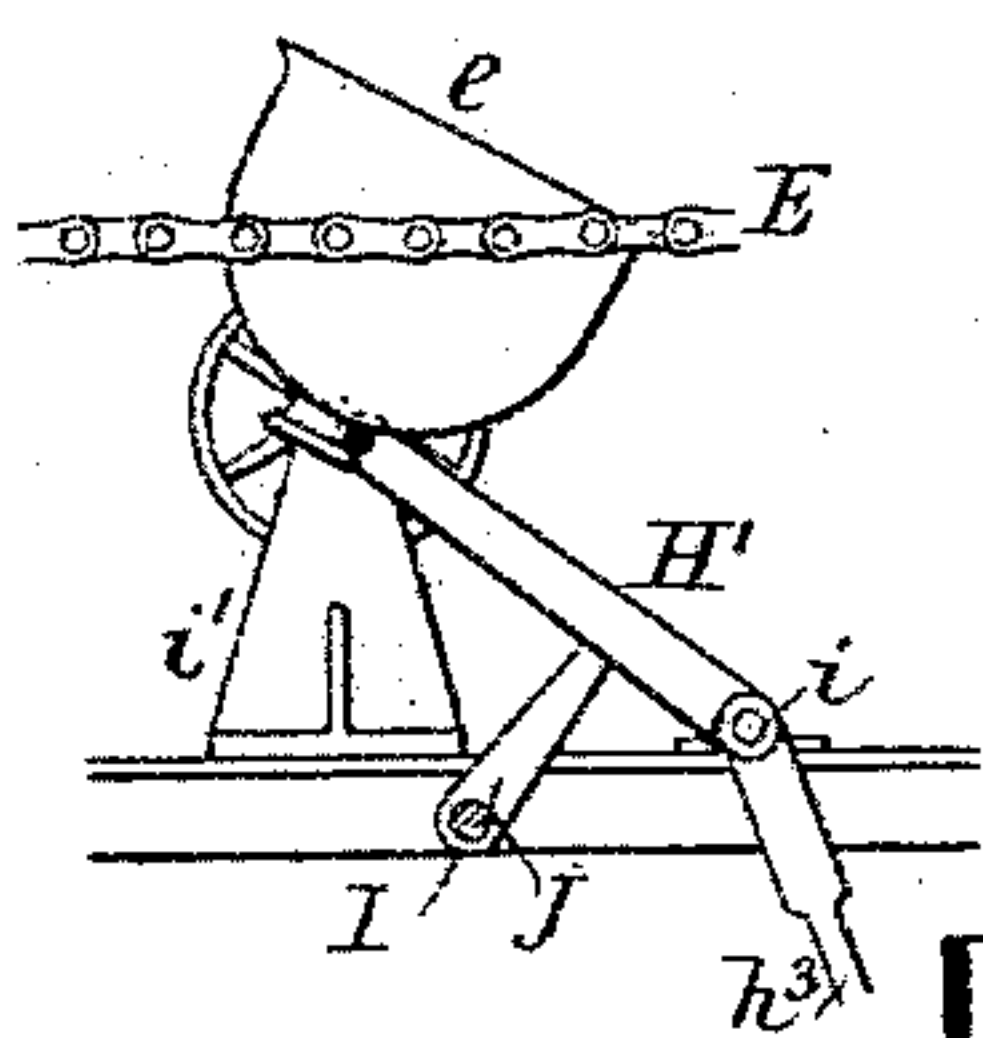


FIG. 4

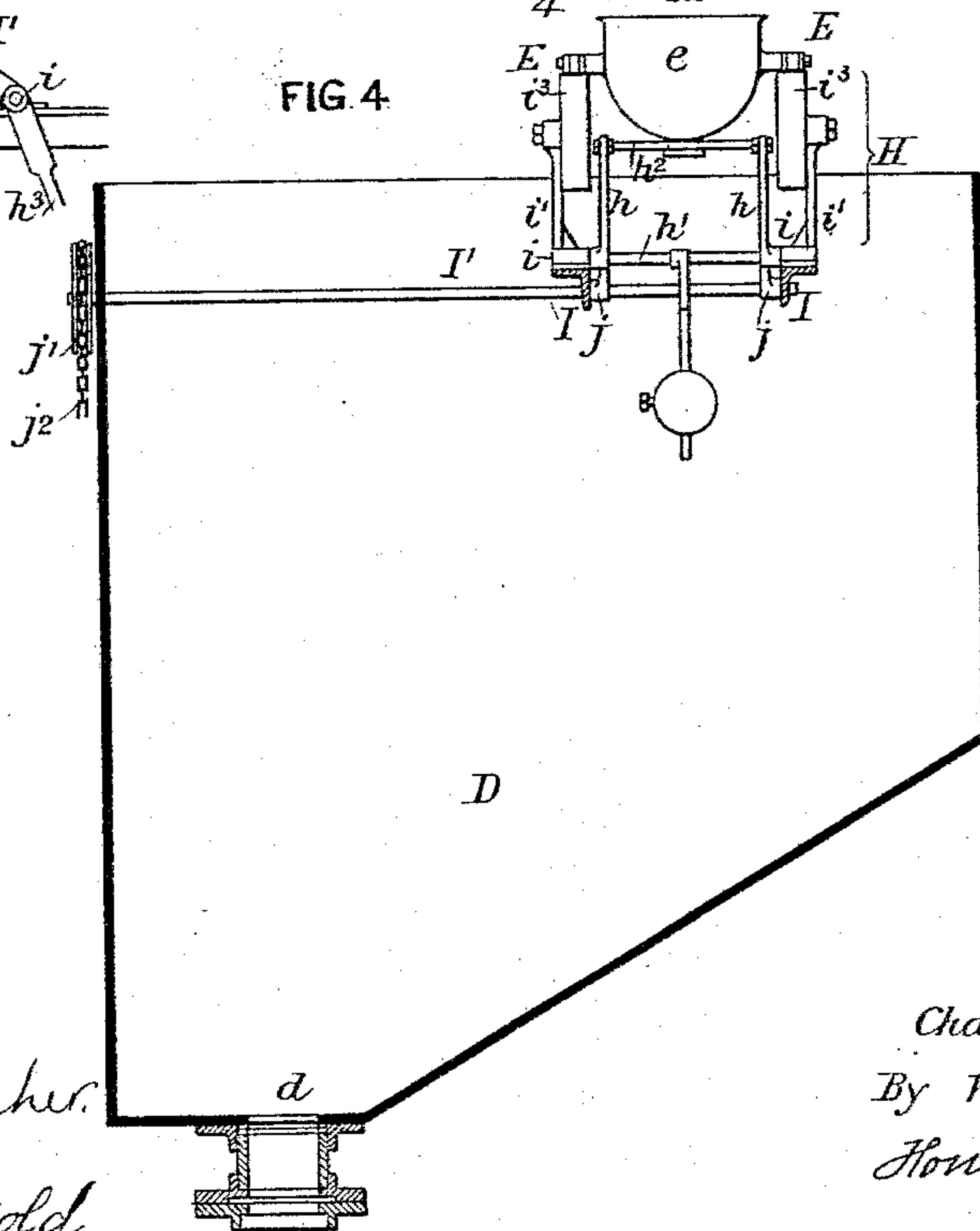
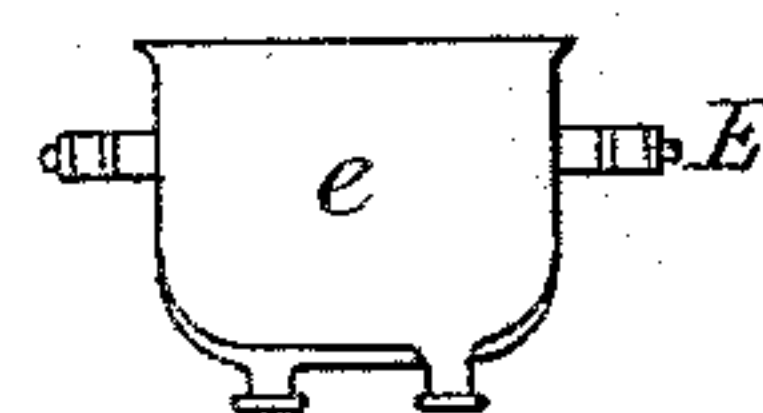


FIG. 12.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES E. WOLLÉ, OF PHILADELPHIA, PENNSYLVANIA.

## COAL-HANDLING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 533,767, dated February 5, 1895.

Application filed February 16, 1894. Serial No. 500,382. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. WOLLÉ, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain  
5 Improvements in Coal-Handling Machinery, of which the following is a specification.

The object of my invention is to so construct coal handling machinery that coal can be delivered from storage bins to hoppers in  
10 front of steam boiler furnaces.

While my invention relates particularly to the carrying of coal from storage bins below the boiler floor to a point above the hopper for feeding automatic stokers, still it can be  
15 used for other purposes such, for instance, as carrying coal to heating furnaces or carrying material other than coal.

In the accompanying drawings:—Figure 1, is a front elevation of my improved coal handling machinery, with the building shown in  
20 section. Fig. 2, is a sectional plan view. Fig. 3, is an enlarged section on the line 3—3, Fig. 2. Fig. 4, is a transverse section on the line 4—4, Fig. 3. Fig. 5, is a side view showing  
25 the valve and conducting tube. Fig. 6 is a sectional plan on the line 6—6, Fig. 5. Fig. 7, is a section on the line 7—7, Fig. 5. Fig. 8, is a side view of the driving mechanism. Fig. 9, is an end view of the driving mechanism.  
30 Fig. 10, is a plan view slightly enlarged showing the engagement of the driving wheel with the chain. Fig. 11, is a diagram illustrating the action of the tripping device; and Fig. 12 is a view of a modification of the bucket.

35 In the present construction of steam power plants it has been customary to mount the boilers on the floor above the ground level so as to insure the proper foundation for engines and dynamos and so that coal can be stored  
40 in bins below the level of the floor. Consequently it is desirable to convey by machinery the coal from the storage bin to the hoppers in front of the furnaces so as to save as much labor as possible in the handling of coal.

45 Referring to the drawings, A is the storage bin for the coal.  $\alpha$  is the floor upon which is built a series of steam boiler furnaces B each having automatic stoking apparatus  $b$  provided with hoppers  $b'$  for coal. As this auto-  
50 matic stoking apparatus forms no part of my invention I have not shown it in detail.

Mounted above the hoppers  $b'$  and in front

of the boiler furnaces are large hoppers D of the construction shown in Figs. 3 and 4. The bottom of each hopper is inclined as shown  
55 to an outlet  $d$  having a nozzle  $D'$  in which is a slide valve  $d'$  by which the supply of coal from the hopper is cut off. This valve, as shown in Figs. 5 and 6, has a lug  $d^2$  pivoted to an operating lever  $d^3$  hung at  $d^4$  to the  
60 frame  $d^5$ , so that on moving the lever in the direction of its arrow, Fig. 5, the valve will be opened and when moved in the opposite direction the valve will be closed. The end  
65 of the valve, as shown in Fig. 6, is tapered on each side so that it will readily cut through the mass of coal.

Pivoted to the nozzle  $D'$  is a tube  $D^2$  which extends to a point above the hopper  $b'$  and is so hung on a pivot pin  $b^2$  that it can swing  
70 the entire length of the stoker hopper  $b'$  and thus supply coal to the hopper evenly throughout its length. The tube  $D^2$  also has a slight movement toward and from the furnace as the opening for the passage of the pivot bolt  
75  $b^2$  is slightly elongated as shown in Fig. 7.

E is an endless conveyer to the chain of which are pivoted buckets  $e$  shown in Figs 1 and 3. The conveyer chains pass around  
80 chain wheels F on the floor A and around chain wheels F' above the hoppers D so that the conveyer will carry the coal in the buckets from the storage bin A up through the floor  $\alpha$  to a point above the hoppers D into  
85 which the coal is discharged from the buckets, the chains being then directed down through the floor A to the storage bin in which the buckets are again filled. The buckets may be filled by shoveling or the coal may be fed to the buckets by gravity.  
90

The conveyer is driven by the mechanism shown in Figs. 8 and 9. The two chains at each side of the buckets are adapted to the sprocket wheels  $g$ ,  $g$  mounted on a shaft G which is driven from the driving shaft G'  
95 through the worm  $g$  and worm wheel  $g^2$ .

The sprocket teeth are not only adapted to the cavity between the links of the chain but are also adapted to the spaces at each side of the center link as shown in Fig. 10, there be-  
100 ing practically two sets of teeth  $u$   $u'$  one central set  $u$  acting as pins and the other set  $u'$  forming sockets thus insuring the proper engagement of the chain with the driving mech-



anism, but it will be understood that other driving mechanism may be employed without departing from my invention.

Within each hopper D is a balance lever mechanism forming the tripping device H, shown clearly in Figs. 3 and 4. By setting this tripping device the buckets can be discharged into the hopper.

Hung in suitable bearings *i* on a frame I is a lever H' consisting of the side arms *h*, *h*, shaft *h'*, cross bar *h*<sup>2</sup> and arm *h*<sup>3</sup> having a balance weight by which the arm may be accurately balanced on each side of the pivot. In the present instance this arm is secured to the shaft *h'* but in some instances may form part of one of the side arms.

On the bottom of each bucket is a depending button *e'* which comes in contact with the cross bar *h*<sup>2</sup> when the lever H' is moved from its normal position to the position shown in full lines in Fig. 3, and as the bucket travels it will carry the lever with it, as shown in Fig. 11, and the bucket will be turned sufficiently to discharge its contents into the hopper at the same time freeing itself from the bar which is returned by the balance weight to position and as the bottom of the bucket is heavier than the top it will assume the position shown clearly in Fig. 1.

In order to insure the proper engagement of the bucket with the tripping device I mount on uprights *i'*, supporting wheels *i*<sup>3</sup> for the chain E so that when the buckets come to the point of engagement with the tripping device they will be in line.

In order to throw the tripping device into and out of action a shaft I' is mounted in the frame I, and secured to the shaft are two arms *j* *j* which rest against the arms *h* of the tripping device and when the arms *j* *j* are moved to the position shown in Fig. 3 they raise the bar *h*<sup>2</sup>, so that it will be in the path of the buttons on the buckets, but when the arms are moved to the position shown by dotted lines in Fig. 3, they will allow the tripping device to fall to its normal position clear of the buckets. The shaft I' is extended through the hopper as shown in Fig. 4, and on this shaft is a chain wheel *j'* around which passes an operating chain extending down to a point within easy reach of the attendant so that on pulling on one run of the chain the tripping device can be thrown into action and by pulling on the opposite run the tripping device can be thrown out of action. By this construction only one hopper at a time can be charged.

In Fig. 12, I have shown the buttons arranged in different positions on the buckets. For instance, the button of one bucket may be placed at one side of the center and the button of the next bucket may be placed on the opposite side and the tripping mechanism of one hopper may strike all the buttons on one side while the tripping mechanism of the other hopper may strike the buttons on the

opposite side. Thus the buckets would be discharged alternately in different hoppers.

It will be seen by the above that coal can be readily carried from the bin to the hopper above the furnaces and discharged into any one or more of the hoppers D and the coal can be drawn from these hoppers by simply operating the valve in the neck D', and by moving the tube D<sup>2</sup> the coal can be spread evenly in the hopper *b'* of the stoking mechanism.

While I have particularly described my improvements in connection with automatic stokers for steam boilers and for handling coal it will be understood that the invention can be used for handling other material as well such for instance as sand, ore, stone, &c.

I claim as my invention—

1. The combination in conveying apparatus, of the continuous conveyer consisting of two chains, with a series of pivoted buckets between them, a hopper, and tripping mechanism for the buckets normally held out of line with the buckets, consisting of the balance lever mechanism with means for throwing the tripping mechanism in line so as to discharge the buckets into the hopper, substantially as described.

2. The combination of the endless conveyer consisting of two chains, pivoted buckets hung to the two chains, wheels around which the chains pass, driving mechanism for the conveyer, a series of hoppers, a tripping device consisting of the balance lever mechanism mounted above each hopper and set normally out of action, with a device for throwing each tripping device into and out of action so that the contents of the buckets may be discharged into one or other of the hoppers, substantially as described.

3. The combination of the conveyer, pivoted buckets thereon, a button projecting from each bucket below its center, a pivoted tripping lever, one arm of said lever adapted to be thrown into the path of a button on a bucket, a balance weight on the other arm of the lever, substantially as described.

4. The combination of the conveyer, pivoted buckets thereon, a button on each bucket, a pivoted lever forming a tripping device, said lever consisting of two arms *h* *h*, shafts *h'*, cross bar *h*<sup>2</sup> and weighted arm *h*<sup>3</sup>, substantially as described.

5. The combination of the conveyer chain, pivoted buckets thereon, the tripping lever H', the shaft I' having an arm adapted to engage with the lever and move it to dumping position, a chain wheel on the end of said shaft and an operating chain on the handling of which the tripping device can be thrown into and out of action while the machine is in motion, substantially as described.

6. The combination of the chain, the pivoted bucket conveyer thereon, a series of hoppers, a tripping device for each hopper, held normally out of action and means for throw-



ing the devices into and out of action, each bucket having a button thereon, said buttons being so arranged on the buckets that some will engage with one tripping device and discharge into one hopper and others will engage with other tripping devices and discharge into other hoppers, substantially as described.

7. The combination of the endless chain conveyer having pivoted buckets, a furnace, 10 hoppers for each furnace, a receiving hopper mounted above said furnace hopper, tripping device in each receiving hopper for discharging the buckets of the conveyer, a discharge pipe from the receiving hopper to the furnace hopper, a valve for said discharge pipe 15 and a swinging tube adapted to be moved across the furnace hopper, substantially as described.

8. The combination of an apparatus for 20 conveying coal to steam boiler furnaces, the same consisting of the endless conveyer comprising the two runs of the chain, pivoted

buckets mounted between the said chains, the storage bin for the coal from which the lower run of the conveyer is supplied, steam boiler 25 furnaces, stokers therefor, hoppers for said stokers mounted in front of each furnace, receiving hoppers mounted above the stoker hoppers and over which the endless conveyer passes, tripping devices for discharging the 30 buckets into any one of the receiving hoppers, a valve discharge pipe for discharging the coal from the receiving hopper by gravity and a movable tube through which the coal can be directed to the stoker hoppers with 35 mechanism for driving the conveyer, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. WOLLÉ.

Witnesses:

EDWIN C. FREEMAN,  
WILLIAM A. BARR.