

(No Model.)

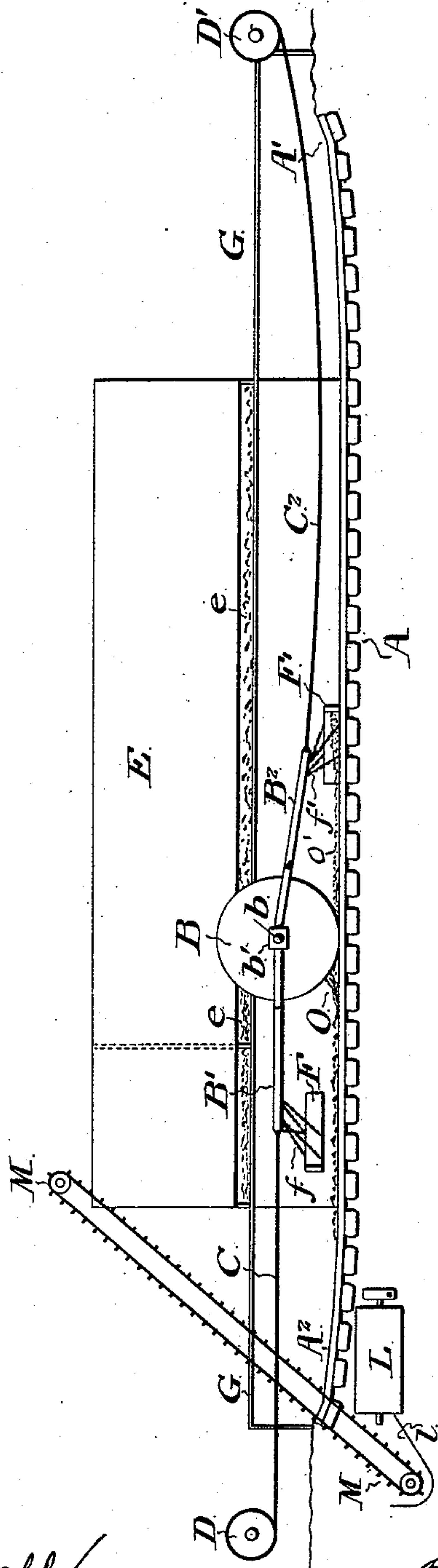
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ORE CRUSHER.

No. 541,632.

Patented June 25, 1895.

FIG. 1.



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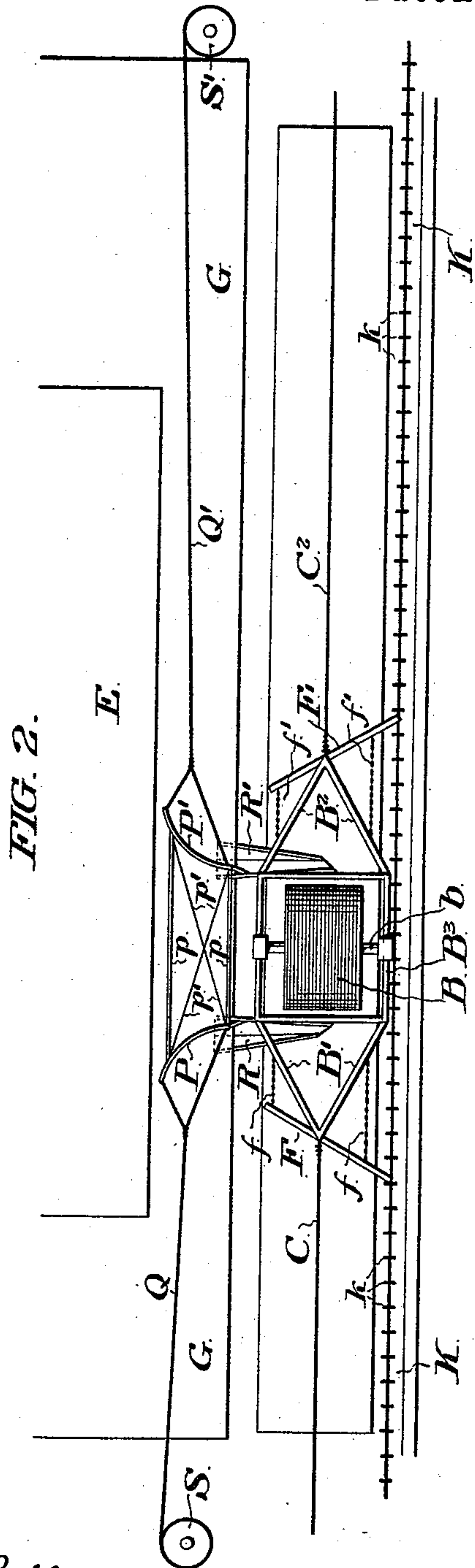
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Patented June 25, 1895.



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3 Sheets—Sheet 3.

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No. 541,632.

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FIG. 3.

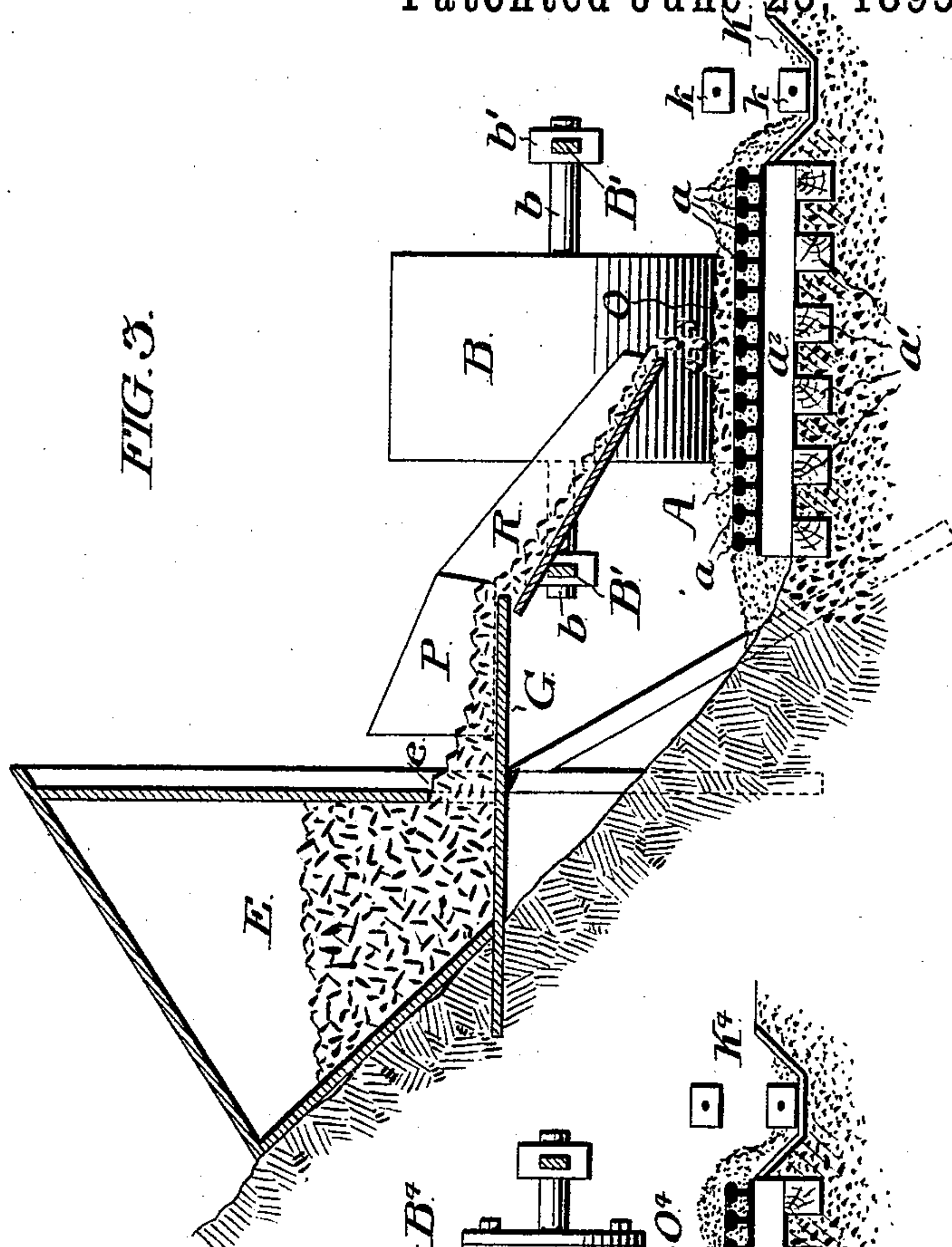
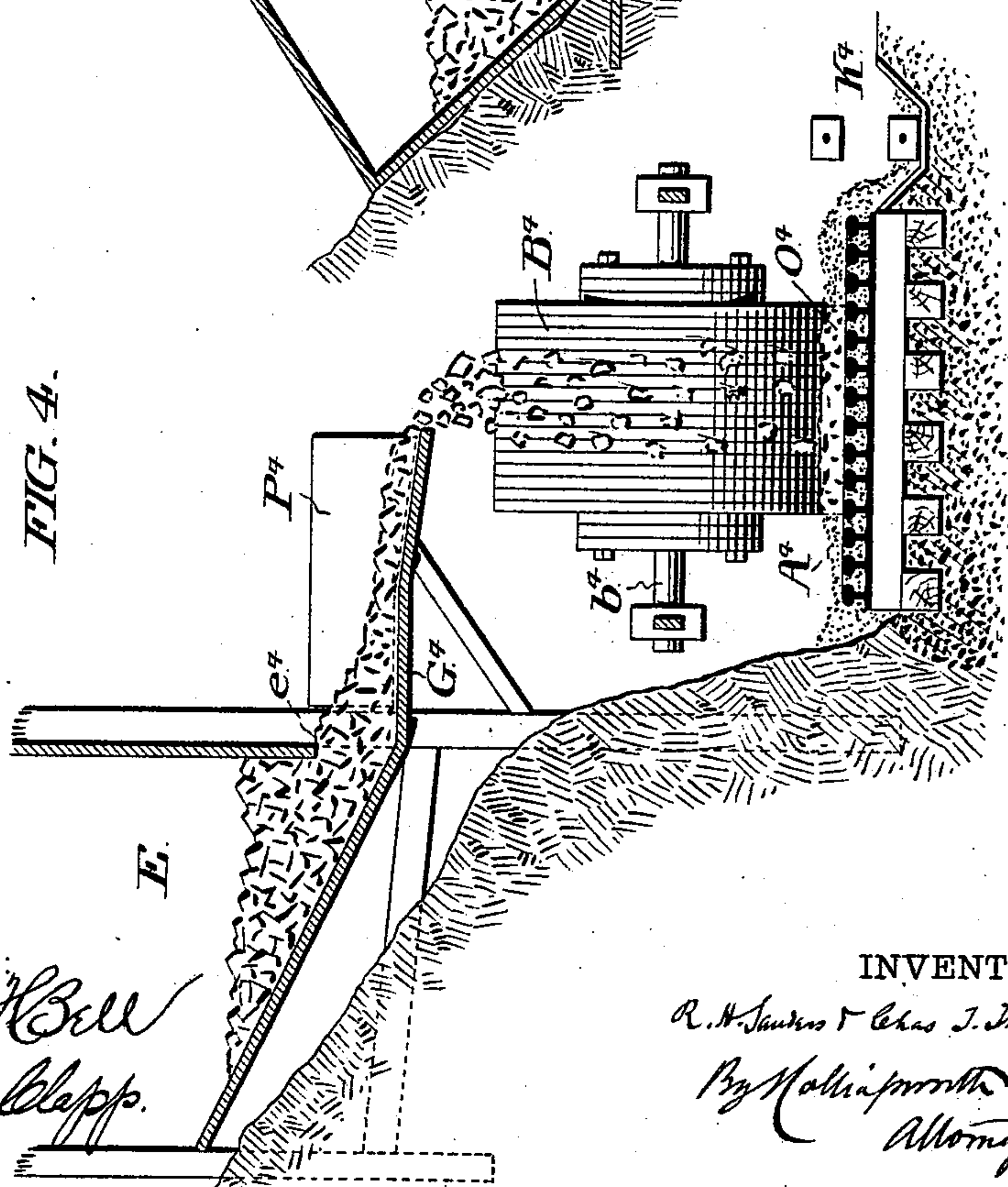


FIG. 4.



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UNITED STATES PATENT OFFICE.

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ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 541,632, dated June 25, 1895.

Application filed May 22, 1893. Serial No. 475,105. (No model.)

To all whom it may concern:

Be it known that we, RICHARD H. SANDERS and CHARLES T. THOMPSON, of Philadelphia, in the State of Pennsylvania, have invented
5 a certain new and useful Apparatus for Crushing Ore or other Material, whereof the following is a specification, reference being had to the accompanying drawings.

In said drawings Figure 1 represents a general side view of the apparatus, and Fig. 2 a
10 top or plan view thereof, the scale of these two views being such as not to permit elaborate illustrations of details. Fig. 3 is a vertical transverse section through the apparatus, on an enlarged scale, and showing some
15 of the details of construction. Fig. 4 is a similar section showing a modified arrangement for delivering the material to be crushed.

Broadly speaking, our invention consists in
20 combining with a substantially straight track, or hard flat surface of sufficient length, a hard roller provided with actuating mechanism whereby it may be drawn alternately in opposite directions along said track, and means
25 for feeding the material to be crushed in front of the roller as it advances in either direction, and for removing the crushed material after the action of the roller upon it.

Among the advantages which are attained
30 by our invention are great simplicity and cheapness in the construction of the working parts, a minimum of wear upon the roller and its journals and upon the track, owing to the fact that mere traction, without twisting
35 strain or positive grinding, is employed, and economy of power required for the actuating devices.

Referring to the drawings, A indicates a track which is preferably composed of a plurality of steel rails, a , laid longitudinally
40 close together upon ties, a^2 , which in turn are preferably supported upon longitudinal string pieces, a' . The track should be properly ballasted to insure its permanency under
45 the heavy pressure which it is to sustain, though of course, to a certain extent, the comminuted ore itself will enter between the rails, as well as into other interstices, and supply the upper stratum of ballast.

50 The track at each end is laid with a slight incline or up-grade, as indicated at A' , A^2 , re-

spectively, the purpose of said inclines being to arrest the forward motion of the roller when it approaches the end of the track and at the same time store up the power due to
55 its momentum, so that when the movement of the roller is to be reversed it can be easily started.

The roller itself is indicated at B, and preferably consists of a cylinder of cast iron
60 formed by bolting together a number of flat disks. It may, however, be constructed in any convenient manner, provided weight enough be embodied to crush the material upon which it is intended to be used. The
65 roller, B, is provided with laterally projecting axles or journals, b , which rotate in the journal boxes, b' , supported in a traction frame, which preferably is constructed as indicated in the plan view of Fig. 2, viz: a certain rect-
70 angular frame work, B^3 , terminating at each end in triangular frames, B' , B^2 , respectively, the apex of each triangle being opposite to the longitudinal center of the roller. The
75 two longitudinal halves of the traction frame, that is to say, those portions which are on opposite sides of the axle, are preferably inclined at a slight angle to each other, as indicated in the side view of Fig. 1, so that when one-
80 half, as for instance B' , is in a horizontal position the other half, B^2 , depends slightly downward.

A rope or chain, C, is attached to the apex of the frame B' , and a similar rope or chain, C^2 , is attached to the apex of the frame, B^2 ,
85 each of said ropes or chains being provided with a suitably driven drum or other actuating devices, as indicated at D, D' .

The traction frame carries at each end a discharging scraper, indicated at F and F' , re-
90 spectively, which scrapers are suspended and held in position by chains, f , f' , respectively, parallel to the surface of the track, but at an angle to the longitudinal axis thereof.

The length of the suspending chains is such
95 that when one end of the traction frame is in a horizontal position, owing to the pull of the actuating rope thereon, the scraper at that end will be lifted some distance above the plane of the track, while at the same time
100 the droop of the then rearward end of the traction frame (due to its being at an angle

to the forward part of said frame) will let the rearward scraper down upon the track and cause it to be drawn along the same in close contact with the surface thereof.

5 In Fig. 1 the apparatus is represented as moving toward the left, the pull being upon the rope, C, and the frame F is consequently lifted clear of the track, while the rope, C', being slack and the frame, B², drooping, the
10 scraper, F', is dragging upon the track in close contact. The action of these scrapers is, of course, alternately to collect and discharge laterally the crushed ore or other material, over which the roller has just passed,
15 each being alternatively operative for the purpose and each discharging at the same side of the track. The discharge takes place into a trough, K, running longitudinally with the track at the discharge side thereof, and
20 said trough is provided with a traveling conveyer of any well known construction whose blades are indicated at k, and which is adapted to deliver the ore to any point desired.

Extending along one side of the track is
25 the bin, E, in which the material to be crushed is stored and from which it is delivered. Said bin may be of any suitable construction for holding a large quantity of material. Along its front is an elongated opening, e,
30 through which the material falls, by gravity and pressure from above, on to the platform, G, which extends along one side of the track to the edge thereof and at a level somewhat above that of the roller axle. A pair of feed-
35 ing scrapers, P, P', respectively, is arranged to travel longitudinally along the surface of the platform, E, in conformity with the movements of the roller, a convenient form of actuating mechanism being ropes or chains, Q,
40 Q', attached respectively to the scrapers, P and P', and driven by drums or other actuating mechanism indicated at S and S'.

The feeding scrapers, P, P', are preferably curved as shown in Fig. 2, and are connected
45 to each other so as to form a single laterally inclosed frame by means of longitudinal side pieces, p, p', and cross-braces, p', p'. The scraper-frame also carries delivery chutes, R, R', arranged adjacent to the delivery ends of
50 the scrapers, P and P', respectively, and leading downward to points of discharge above the axis of the track and close to the opposite faces of the roller, B. Said feeding scrapers, P, P', are arranged to travel in conform-
55 ity with the movement of the roller and only that one of them is operative, for the time being, which is delivering ore in front of the roller, since the intermediate framing at p prevents the ore from getting in between the
60 two scrapers during their travel.

The operation of the device is as follows: The bin being filled with ore or other material to be crushed, and the latter being continually forced out on to the platform, G, the
65 feeding scrapers and the roller frame are caused to travel alternately in opposite directions, said feeding scrapers constantly de-

livering ore in front of the roller, as indicated at O. The roller in its travel crushes said material into a comminuted form and the
70 crushed material, indicated at O', is swept off in rear of the roller, by means of the discharging scraper, F', which for the time being is operative, and discharged into the trough K. It is thence continually removed
75 by the conveyer, and if sufficiently comminuted to need no further treatment may be delivered to the point where it is to be utilized. If, however, the ore is of irregular
80 comminution it may be delivered to a rotating screen, L, from the interior of which the coarser portions are discharged at l into the path of an elevating conveyer, M, which returns them to the bin in order to subject them to a second crushing operation.
85

An alternative form shown in Fig. 4, comprises a different arrangement of the delivery scrapers adapted to be used where it is convenient to have the platform on which said
90 scrapers act at a height sufficient to clear the roller in its passage. The arrangement of the other parts is precisely the same as that above described, except that the platform overhangs the track to a distance substantially in line with the axis thereof and the auxiliary dis-
95 charge chutes, R, R', are therefore dispensed with. It is not deemed necessary to repeat in connection with this figure the description of the other parts, which however are indicated by corresponding letters to those previously
100 used, but with the mark 4 affixed thereto.

Having thus described our invention, we claim—

1. The combination of a substantially straight track; a roller adapted to run there-
105 on; actuating mechanism for drawing said roller alternately in opposite directions along said track; feeding devices for delivering material in front in each of its two directions of travel; discharging scrapers arranged in the
110 described relation to the roller and adapted to discharge the crushed material at one side of the track; a trough arranged along said side of the track; and a conveyer arranged in said trough, substantially as set forth.
115

2. An ore crusher comprising a bed, a crushing body upon said bed, means for reciprocating said body, a supply receptacle for the ore to be crushed, a plate resting upon the floor of said supply receptacle, discharge spouts
120 leading from the opposite sides of said plate to opposite sides of the crushing body, and means for reciprocating said plate in unison with the crushing body.

3. An ore crusher comprising a bed, a crush-
125 ing body reciprocating upon said bed, a cleaning mechanism carried by said crushing body, and means whereby said cleaning mechanism is caused to clean said bed after each passage of the crushing body; substantially as de-
130 scribed.

4. An ore crusher comprising a bed, a crushing body upon said bed, a frame upon said
crushing body, means for reciprocating said

frame, cleaners upon said frame and means
whereby, in the reciprocation of the crushing
body, the cleaner preceding said body is
thrown out of operative relation to the bed,
5 while the cleaner following the crushing body
is thrown into operative relation with the bed.

5. An ore crusher comprising a bed, a crush-
ing body upon said bed, a frame pivoted to
said crushing body, cleaners upon said frame,
10 and means for reciprocating said frame, the

parts being so arranged that in the movement
of the frame the advance end will be raised
while the rear end will be brought into oper-
ative relation with the bed for cleaning the
same.

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