

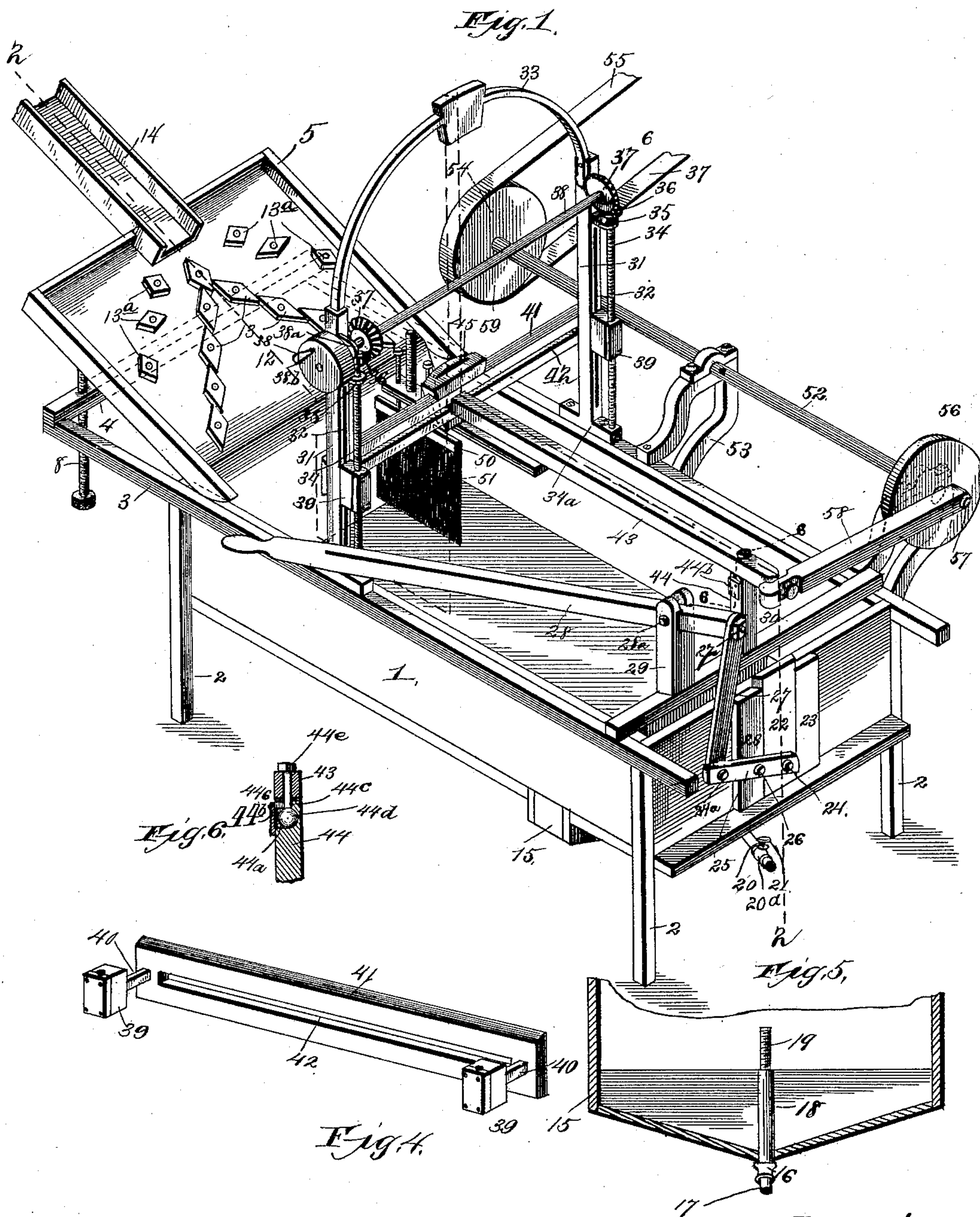
(No Model.)

2 Sheets—Sheet 1.

G. J. PARKER & C. B. WALKER.
ORE CONCENTRATOR.

No. 467,569.

Patented Jan. 26, 1892.



Witnesses,

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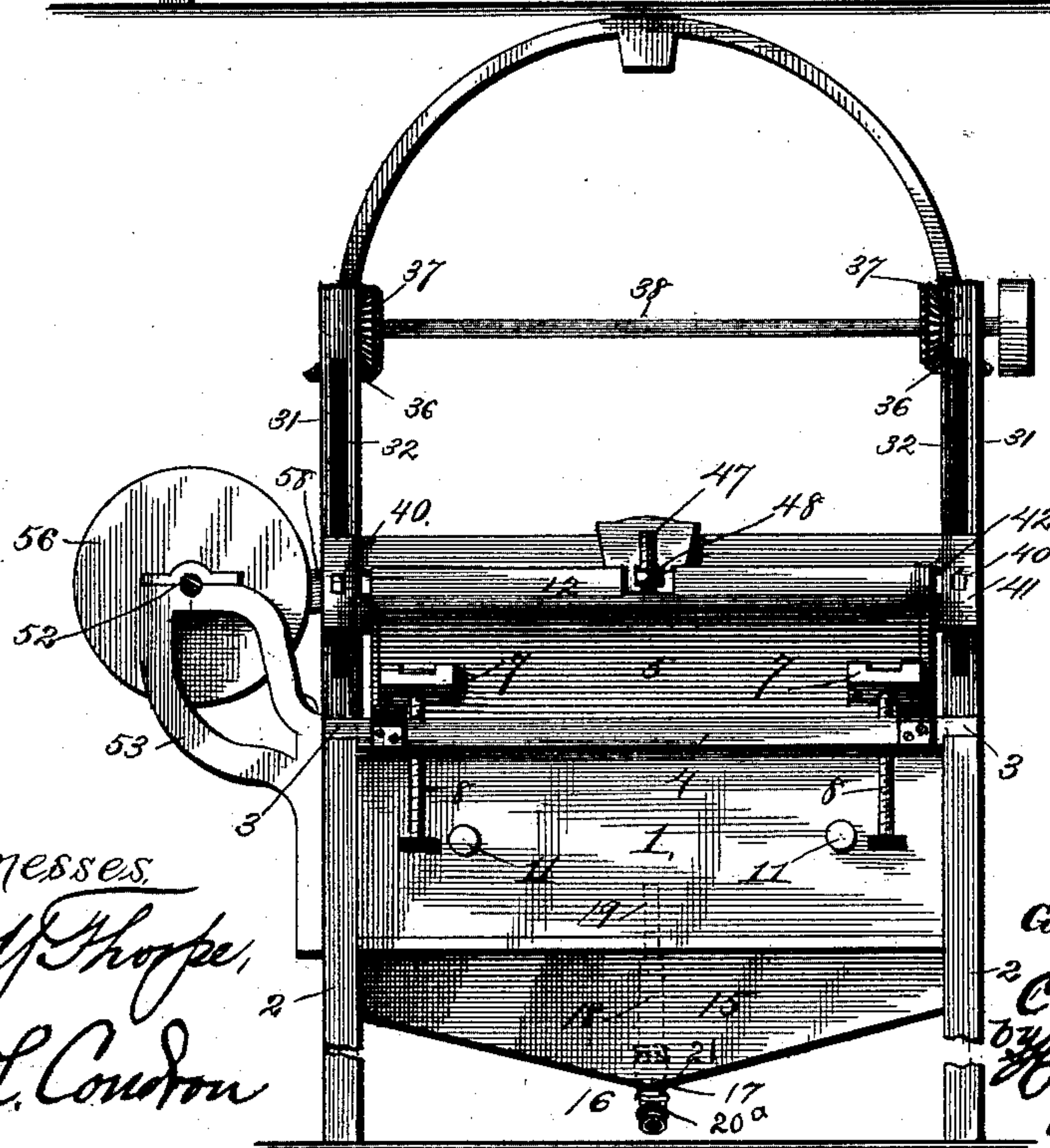
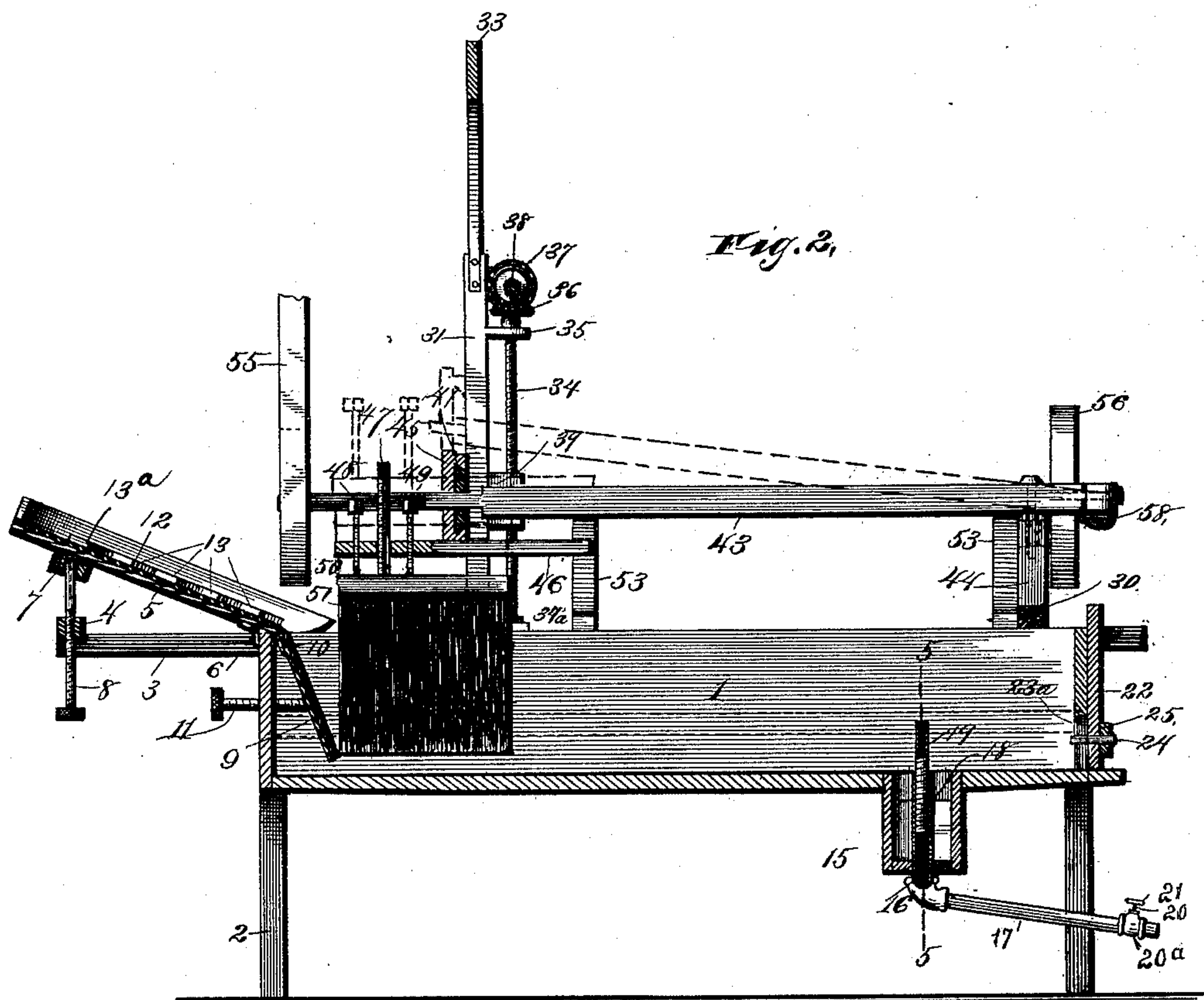
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2 Sheets—Sheet 2.

No. 467,569.

Patented Jan. 26, 1892.



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UNITED STATES PATENT OFFICE.

GEORGE J. PARKER AND CHARLEY B. WALKER, OF TRINIDAD, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 467,569, dated January 26, 1892.

Application filed August 24, 1891. Serial No. 403,591. (No model.)

To all whom it may concern:

Be it known that we, GEORGE J. PARKER and CHARLEY B. WALKER, of Trinidad, Las Animas county, Colorado, have invented certain new and useful Improvements in Ore-Concentrators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to machines for sorting ores according to their richness as evinced by their specific gravity, and more particularly to that class of such machines which operate by what is known as the "wet process;" and the objects of our invention are to produce an ore-concentrator which shall be simple, strong, and durable in construction and rapid and automatic in its action, and which furthermore shall effectively sort the different grades of ore without any waste of the same.

To the above purposes our invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

In order that our invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of an ore-concentrator embodying our invention. Fig. 2 is an irregular vertical longitudinal section of the same on the line 2 2 of Fig. 1. Fig. 3 is a front end elevation of the same. Fig. 4 is a detached perspective view of the guide for the agitator and the adjusting-blocks for said guide. Fig. 5 is a vertical longitudinal section of the mud-box on the line 5 5 of Fig. 2, showing its outlet-pipes. Fig. 6 is a vertical sectional view of a portion of the agitator-lever and its supporting-post on the line 6 6 of Fig. 1, showing the universal fulcrum or pivotal connection between the lever and its supporting-post.

In the said drawings, 1 designates the tank or receptacle of our improved concentrator, the said tank being preferably of the oblong rectangular form shown, and being also supported in horizontal position by four legs 2 at the ends of said receptacle. Two side pieces 3 at the front end of the receptacle 1 project horizontally outward from said end,

and their outer extremities are connected by a cross-bar 4.

5 designates the main distributing-board of the machine, the said board being preferably of rectangular form, as shown, and connected to the front end of the receptacle 1 by any number of hinges 6. Two or more bearing-pieces 7 are secured to the under side of this main distributing-board, and extend transversely of said board and within each of these bearing-pieces 7 is inserted the upper end of an adjusting-screw 8, said screws working vertically through the cross-bar 4, above described.

9 designates the auxiliary distributing-board, which is connected at its upper edge to the front end of the receptacle 1 by any desired number of hinges 10, and which is thus pendent across the front end of said receptacle and within the same. This auxiliary distributing-board 9 is adjusted forwardly and rearwardly by two or more adjusting-screws 11, which work horizontally through the front end of the receptacle 1. The upper surface of the main distributing-board 5 and the inner surface of the auxiliary distributing-board 9 are covered by a piece of rubber cloth or fabric 12, which is secured to the said boards in any suitable manner, and which is of coarser or finer texture, according to the nature of the ores to be treated by the machine.

13 designates a number of projections, also of rubber cloth or fabric and of diamond or lozenge shape, which are secured to the upper surface of that part of the cloth 12 which covers the main distributing-board 5 and which are arranged in a V-formed series, the angle of the V being toward the outer end of said board 5. A number of additional projections 13^a, also of rubber and preferably of square form, are secured to the upper surface of the cloth 12, and said projections are disposed in two sets of three or more in a set, each set of said projections 13^a being at one side of the angle of the V. Upon the upper edge of the distributing-board 5 rests and is suitably-secured one end of a chute or trough 14, which conducts the wet ore from a crusher and which delivers said ore upon the main distributing-board 5. It will thus be seen that as the wet ore flows downward over the

surface of the rubber cloth 12 the projections 13 and 13^a serve to distribute it evenly over the board, and thus cause it to enter the interior of the tank or receptacle in a broad stream or current.

At the opposite or rear end of the bottom of the receptacle or tank 1 is located a mud box or trough 15, which is of V form in longitudinal section, and which extends transversely of the receptacle. From the middle or lowest point of this mud-box leads outwardly a bent pipe or tube 16, to the lower or outer end of which is connected a discharge-pipe 17, while to the upper end of said bend is secured a short vertical internally-screw-threaded pipe 18. Into the upper end of this pipe 18 is screwed a second short externally-screw-threaded pipe 19, and the arrangement is such that by turning the pipe 19 in one or the opposite direction the upper end of the pipe can be raised or lowered, and thus the level of the fluid mass in the receptacle 1 can be regulated as desired. A valve 20^a of any suitable or preferred type is set into the outer end of the discharge-pipe 17, and to the stem 20 of this valve is connected a hand-wheel 21 or an equivalent device for enabling the rod to be turned. Thus it will be seen that by adjusting the pipe 19 and opening the valve 20^a the liquid in the receptacle can be drawn off as required, leaving only the slush in said receptacle. Through the rear end of the receptacle 1 is formed an opening 23^a, which is closed normally by a gate 22, which gate slides vertically between two guides 23, secured to the outside of said rear end of the receptacle 1.

25 designates a short lever, which is pivoted, as at 26, about midway of its length to one of the guides 23, and which is pivoted also at one end, as at 24, to the outer surface of the gate 22. The opposite end of the lever 25 is pivoted, as at 24^a, to the lower end of a link 27, the upper end of which is bolted, as at 27^a, to the rear end of a long lever 28, said lever being pivoted, as at 28^a, upon the upper end of a standard 29, which rises from a cross-bar 30 at the rear end of the receptacle 1. This arrangement is such that when it is desired to empty the ore from the receptacle 1 the front end of the lever 28 is raised, thus raising the gate 22 and permitting the ore to be removed through said opening 23^a.

From opposite sides of the receptacle 1 rise two vertical standards 31, each of which is formed with a longitudinal slot 32, and the upper ends of which are connected by a cross-brace 33, preferably of arch form, as shown.

34 designates two screw-rods, the lower end of each of which is stepped into the base 34^a of one of the standards 31, and the upper part of each of which is journaled in a bracket 35, projecting rearwardly from the upper part of the corresponding standard or pillar. At its upper end each of these screw-rods 34 carries a beveled gear-pinion 36, which pinions mesh with companion beveled gear-pinions 37 upon

the end portions of a transverse horizontal counter-shaft 38. This shaft 38 is journaled in bracket-bearings 38^a, projecting from the upper parts of the pillars or standards 31, and at one end said shaft carries a belt-pulley 38^b, over which is designed to be led a belt from a suitable motor or from a line-shafting.

39 designates two screw-boxes, through each of which passes one of the screw-rods 34, and each of these boxes is provided with a short arm 40, projecting from its front side and extending through one of the slots 32 of the pillars 31. The front ends of these arms 40 are connected to the ends of a horizontal guide-bar 41, which is provided with a longitudinal slot 42, and which extends transversely of the receptacle 1 from one pillar 31 to the other. It will thus be seen that as the shaft 38 is revolved in one or the opposite direction the screw-rods will also be revolved, and the guide-bar will thus be caused to rise or fall, according to the direction in which the shaft 38 is being revolved. The purpose of these movements of the guide 40 will be presently explained.

43 designates the agitator-bar of the machine, the rear portion of which rests upon a vertical standard 44, which rises from the cross-bar 30, above described, and the front end of which extends through the longitudinal slot 42 of the horizontal guide-bar 41. This bar is connected to the upper end of said standard 44 by a bolt 44^c, which extends downwardly through the bar, and the lower end of which is provided with a ball 44^d, which rests in a socket 44^a in the upper end of the standard, one side of the socket being closed by a removable face-plate 44^b, and the upper end of the bolt 44^c being secured by a nut 44^e. By virtue of this connection the bar 43 is permitted to vibrate laterally in a horizontal plane, and also to rise and fall at its front and rear ends to accord with the vertical movements of the guide-bar 41, above described. The front end of the bar 43 is connected to a cross-head or slide 45, the upper and lower parts of which embrace the upper and lower sides of the guide-bar 41. To the lower side of this slide or cross-head is connected a horizontal bar 46, through the front end of which extends a vertical screw-bar 47, the lower end of which is inserted into the top bar 50 of an agitator 51 in such manner as to support said top bar and to turn therein. Two screws 48 and 49 also work through said bar 46, and their lower ends impinge upon the upper side of the top bar 50, the arrangement being such that by turning the screw 47 the top bar 50 can be raised and lowered relatively to the bar 46, while by turning the screws 48 and 49 the top bar 50 can be leveled. The agitator 51 is composed of pendant sticks, coarse straw, fagots, or similar material.

To the rear extremity of the bar 43 is pivotally connected the inner end of a connecting-rod 58, the outer end of which is connected

eccentrically by a wrist-pin 57 to a disk 56, which is mounted upon the rear end of a counter-shaft 52. This shaft 52 is journaled horizontally at one side of the receptacle 1 in brackets 53, extending outwardly from the side of the receptacle, and said shaft carries at its front end a belt-pulley 54, over which passes a suitable belt 55, leading from a suitable motor or from a line-shafting.

From the above description it will be seen that as the wet and crushed ore flows into the receptacle 1 it is agitated by the lateral movement of the agitator 51, and that this action of the agitator insures the settling of the heavier ore at the front portion of the receptacle, the successively finer and lighter slush being deposited toward the rear end of the receptacle, and the mud or slush only entering the box or trough 15. Thus a complete and successive grading of the ore is accomplished and all of the ore is saved. As the ore accumulates in the receptacle 1, the agitator is gradually elevated by the action of the screw-rods 34, the ball-and-socket joint in the upper end of the standard 44 permitting this movement as well as the required horizontal vibratory movements produced by the disk 56 and the connecting-rod 58, and at the completion of each run of the machine the agitator is lowered by reversing the rotation of the shaft 38 and screws 34. It will further be seen that the machine is simple, strong, and durable in its construction, and rapid and effective in its operation.

The pulley 38^b is preferably provided with a handle 38^c, so that the guide-bar 40 can be raised and lowered by hand, if desired.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. An improved ore-concentrator comprising a suitable receptacle for wet ore, a distributing-board hinged to one end of the receptacle and provided with a covering of rubber fabric, and a number of adjusting-screws for moving the free end of said board, vertically supported at the front end of the receptacle, substantially as set forth.

2. An improved ore-concentrator comprising a suitable receptacle for the ore, a vertically-adjustable hinged distributor-board located at the front end of the machine, a covering of rubber fabric applied to the board, and a number of projections, also of rubber, secured upon the upper surface of said covering, substantially as set forth.

3. An improved ore-concentrator comprising a suitable receptacle for ore, a main vertically-adjustable distributing-board hinged to one end of the receptacle, a pendent auxiliary distributing-board hinged within said end of the receptacle, adjusting-screws for said boards, supported at said end of the receptacle, a cover of rubber fabric overlying said boards, and a number of projections, also

of rubber and secured to the outer surface of said covering, substantially as set forth.

4. An improved ore-concentrator comprising a suitable receptacle for ore, a mud box or trough located at the rear end of the bottom of said receptacle, a valved outlet-piping leading from the bottom of said mud box or trough, and an auxiliary outlet-pipe connected to the upper end of said outlet-piping and vertically adjustable therein and also located within the mud box or trough, substantially as set forth.

5. An improved ore-concentrator comprising a suitable receptacle for ore, a gate covering an outlet-opening at the rear end of the receptacle, a pivoted lever connected to the gate, a lever pivoted upon the rear end of the receptacle and extending forwardly therefrom, and a link connecting the rear end of said lever with the outer end of the first-named lever, substantially as set forth.

6. An improved ore-concentrator comprising a laterally-vibrating agitator, a slide or cross-head to which said agitator is attached, a horizontal transverse guide for said slide, a pair of vertical slotted standards or pillars located upon the sides of the machine, a pair of vertical screw-rods mounted upon the pillars and having beveled gears at their upper ends, a pair of screw-blocks embracing the said rods and vertically movable in said pillars, and a horizontal revoluble shaft journaled upon the pillars and having beveled gear-pinions meshing with the pinions of the screw-rods, substantially as set forth.

7. An improved ore-concentrator comprising a receptacle for the ore and an agitator movable laterally and vertically in said receptacle, a bar or lever carrying the said agitator at one end and pivoted near its opposite end upon the receptacle, a power-shaft journaled at one side of the receptacle and carrying a disk, and a connecting-rod connected at one end to an eccentric wrist-pin on the disk and at its opposite end to the adjacent end of the agitator-bar, substantially as set forth.

8. An improved ore-concentrator comprising a receptacle and an agitator consisting of a top bar, a carrying-bar, a screw connected to the top bar and working through the carrying-bar, a pair of adjusting-screws working through the carrying-bar at opposite sides of the first-named screw and impinging upon the upper side of the top bar, and a number of sticks forming a broom and pendent from the top bar, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE J. PARKER.
CHARLEY B. WALKER.

Witnesses:

R. G. COON,
C. L. HUNGERFORD.