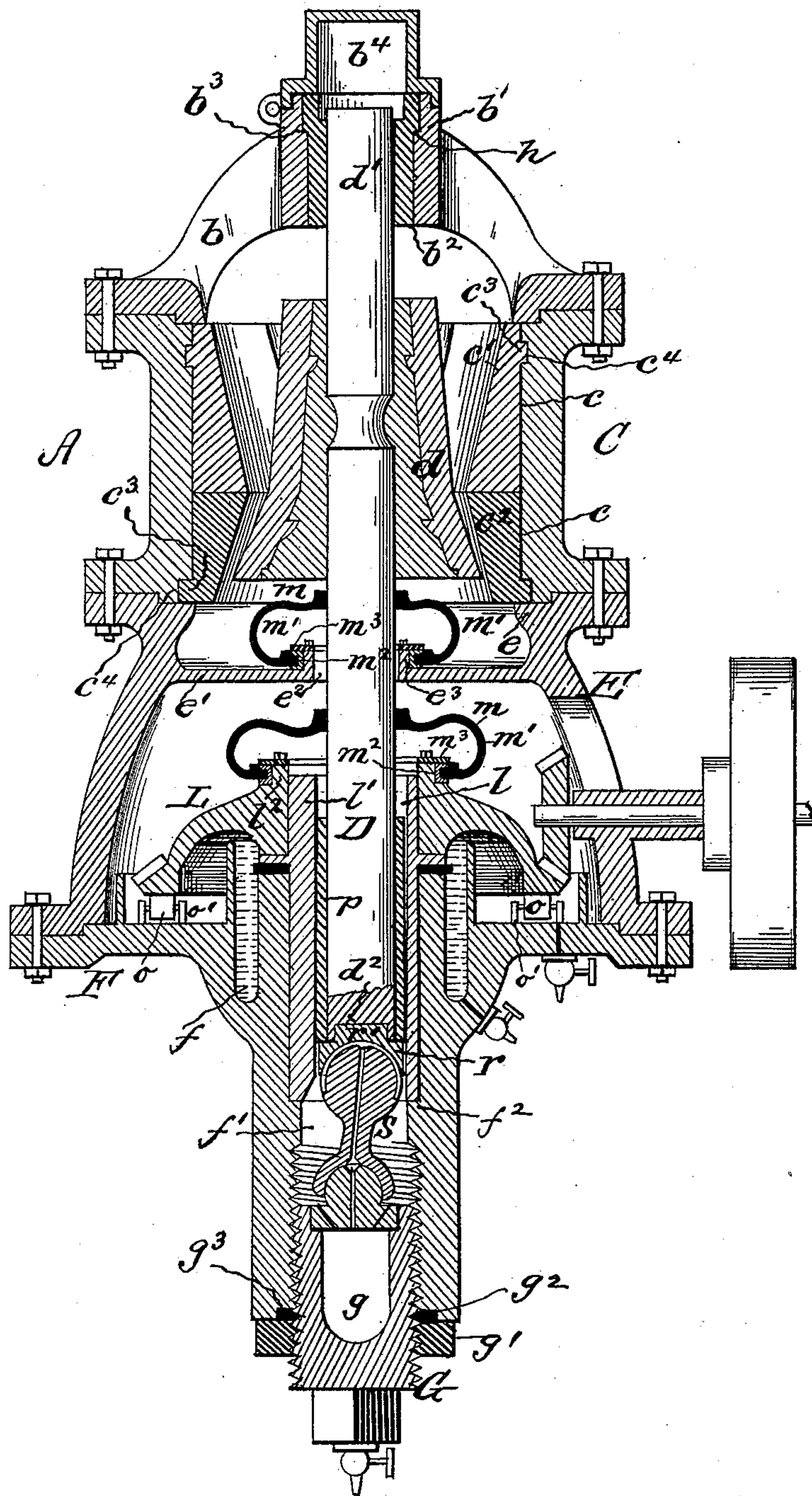


(No Model.)

R. McCULLY.
CRUSHING AND PULVERIZING MACHINE.

No. 464,463.

Patented Dec. 1, 1891.



WITNESSES:

Wm. H. H. H. H.
R. A. Smith

INVENTOR

Robert McCully
By S. J. Van Stavern
ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT McCULLY, OF PHILADELPHIA, PENNSYLVANIA.

CRUSHING AND PULVERIZING MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,463, dated December 1, 1891.

Application filed December 1, 1886. Serial No. 220,330. (No model.)

To all whom it may concern:

Be it known that I, ROBERT McCULLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Crushing and Pulverizing Machines, of which the following is a specification, reference being had therein to the accompanying drawing, which is a vertical section of an ore-crushing machine embodying my improvements.

My invention has relation to crushing-machines having gyratory crusher-heads; and it consists of the novel combination, construction, and arrangement of parts, as hereinafter described and claimed.

In the drawing, A represents the frame of a crushing-machine composed of a top plate B, having side feed-openings b and a central elongated hub b' , having a bore b^2 , of a crushing-chamber C, having working faces c' and c^2 , of a gyratory shaft D, having a crusher-head d , of a chute or exit chamber E, having ledge e and bottom or floor e' , provided with a central shaft-opening e^2 , having an upwardly-projecting flange e^3 , and of a bottom plate F, having oil-well f and shaft-opening f' , provided with an adjustable or screw bottom G, having a tubular bore or sediment-chamber g , all of which, except as hereinafter noted, are constructed substantially as shown, described, and claimed in another pending application filed by me of an even date herewith, Serial No. 220,329. The working faces c' and c^2 for the crushing-chamber are in two parts or sets and have reversed tapers, as shown. The upper part c' is composed of staves, segments, or sections, which rest upon the other or lower part c^2 , composed of an annular ring in one piece, and which rests upon the ledge e of the chute-chamber E. Both sets of these working faces have straight backs or outer sides c , which rest against correspondingly-shaped walls of the frame of the machine inclosing the crushing-chamber C, and, if desired, the outer sides c are provided with lugs or flanges c^3 , which enter recesses c^4 in said walls or frames, as shown, to assist in holding the working faces c' and c^2 in position and in relieving the top plate B of the full force of the crushing strains exerted upon said faces. The straight outer sides of the faces c' and c^2

admit of easy insertion of the faces in the crushing-chamber and their removal therefrom for replacement or repairs. The bore or opening b^2 in top-plate hub b' is, near its top, provided with a shoulder or enlarged bore b^3 . In opening b^2 is inserted a tubular sleeve H, extending down to or near the bottom of said opening, which has near its upper end, on its outside, a shoulder h , fitting and resting upon the shoulder b^3 of opening b^2 , whereby said sleeve is supported within opening b^2 .

The bore of sleeve H tapers or decreases in diameter from above downward, as illustrated, and in this bore is inserted the upper end of d' of shaft D, so that the sleeve H forms a bearing for the upper end of shaft D. Its said end is made cylindrical or of an even diameter throughout, so that it can be raised or lowered in said sleeve to admit of adjusting the crusher-head d to vary the degree of fineness of the crushing. The taper of the bore of sleeve H corresponds to the inclination given to the shaft D by the eccentric bore or opening l of its driving-wheel L, so that as the shaft is gyrated only one side of its upper end d' impinges or rolls around upon its bearing or sleeve H, and there is but little friction between said parts; and as the upper end of the shaft is straight or cylindrical and the sleeve H is open at both ends and extends down to the bottom of the hub b' the shaft and its upper end bearing are economically constructed, the bearing does not move with the shaft when it is adjusted, and the shaft never comes in contact with the inner lower edge of the bore of hub b' to wear it away.

As the bore of sleeve H is tapering, the end d' of shaft D in gyrating around the same exerts a downward pressure to keep the sleeve in position and prevent it rising; but I prefer to hinge a cap b^4 to the top of hub b' , so that its lower end will abut against the top of sleeve H to keep it down in the hub-opening b^2 , said cap being suitably fastened, as desired.

To prevent access of dust or dirt to the opening e^2 in chute-chamber floor e' , I employ a rubber or other elastic or flexible dust-shield m , which is made in the form of a disk, having a central opening to spring it upon shaft D and a turned-in or U-shaped rim m' , to which is

secured a metal ring m^2 , the latter being suitably grooved, as shown, to receive the edge of rim m' . The ring m^2 fits the outside of flange e^3 of opening e^2 and is loosely held in position or swiveled thereto to admit of its rotating by a plate m^3 , screwed or fastened to the top of flange e^3 . This shield therefore yields laterally to the gyratory motion of shaft D, and its rim has a gyratory motion around the opening e^2 . To prevent dust gaining access to the eccentric bore l of wheel L, its top is provided with a similar shield m , a suitable shoulder l^2 being formed on the top of wheel L to receive the ring m^2 of the dust-shield.

The hub l' of wheel L or an extension of said hub is elongated and extends into the shaft and oil-well or opening f' , and its lower edge rests upon a shoulder f^2 in said opening. To avoid lateral friction on the wheel-hub, the rim of the wheel is supported by anti-friction rollers o , having suitable bearings in standards o' on the top of plate F.

Between the shaft D and the eccentric bore l of wheel L is a sleeve or bushing p , which is preferably used to avoid wear of the eccentric bore l . The wear of said parts falls on bushing p , and when worn out it is easily and economically replaced by a new one, this replacement being far cheaper and more desirable than that of renewing the hub of wheel L when its eccentric bore is worn out, as has heretofore been required in the kind of mills in which the shaft impinged directly against the walls of said eccentric bore. The bushing p is retained in position by a loose block r at the lower end of the shaft, which block is of a larger diameter than that of the shaft to extend beyond the periphery of the latter and form a support for said bushing, as shown. To prevent lateral movement of loose block r , it has an upwardly-projecting stud r' , fitting a socket or recess d^2 in the lower end of shaft D. This block may rest directly upon the step-bearing for the shaft, or between the block and step-bearing may be inserted a toggle or link S, as shown, in which case the under side of the block has a hemispherical cavity or bearing for the ball end of toggle S.

The adjustable or screw bottom G has a jam-nut g' to retain it in its adjusted position, and this nut impinges against a packing g^2 , inserted in a recess or groove g^3 in the lower edge of well or opening f' to serve as a stuffing-box for preventing escape of oil from well f' , through the joint or joints of the adjustable bottom G.

I do not herein claim the gyratory shaft having cylindrical upper end and bearings for so supporting it that it can be adjusted vertically without altering its angle of inclination, as the same is broadly claimed in another pending application filed of an even date herewith, Serial No. 220,329.

I do not herein broadly claim the combination of a gyratory shaft D, adjustable bottom G, and a knuckle or toggle between said shaft and bottom, as the same forms the subject-matter of another pending application filed September 17, 1886, Serial No. 213,795; neither do I herein claim said shaft and toggle combined with a tubular adjustable bottom G, as the same forms the subject-matter of still another pending application filed September 17, 1886, Serial No. 213,797. Again, I do not claim said shaft and toggle combined with a tubular screw-bottom, as the same forms the subject-matter of another pending application of even date herewith, Serial No. 220,329.

What I claim is—

1. In a crushing-machine, the combination of a gyratory shaft having a straight or cylindrical upper end, in combination with top plate B, having central hub-opening b^2 , with shoulder b^3 at or near its top, and fixed sleeve H, having a tapering bore corresponding to the angle or pitch of the shaft and at or near its top an outside flange h , fitting shoulder b^3 , substantially as set forth.

2. In a crushing-machine, the combination of a gyratory shaft, bottom plate F, having shaft opening or well f' , driving-wheel I, having an eccentric bore, a tubular bushing between the shaft and eccentric bore, a loose step-block r' for said shaft, having a shoulder for supporting said bushing, a toggle or knuckle S, and adjustable bottom G for said well-opening f' , substantially as set forth.

3. In a crushing-machine, the combination of a gyrating shaft, frame-plate F, having shaft-opening f' , having shoulder f^2 , driving-wheel L, having a hub with an eccentric bore, loose tubular bushing p , step-block r' , supporting said bushing, toggle or knuckle S, and adjustable bottom G for shaft-opening f' , substantially as set forth.

4. In a crushing-machine, a gyratory shaft, in combination with a bottom plate F, having shaft-opening f' , removable bottom G, having sediment-chamber g , means whereby said shaft is supported from said bottom G, a jam-nut, and a stuffing-box, substantially as set forth.

5. In a crushing-machine, a gyratory shaft, in combination with a bottom plate F, having shaft-opening f' , an annular recess g^3 , provided with packing g^2 at the bottom of opening, a removable screw-bottom G, having sediment-chamber g , a jam-nut g' , and means whereby said shaft is supported from said bottom G, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT McCULLY.

Witnesses:

S. J. VAN STAVOREN,
CHAS. F. VAN HORN.