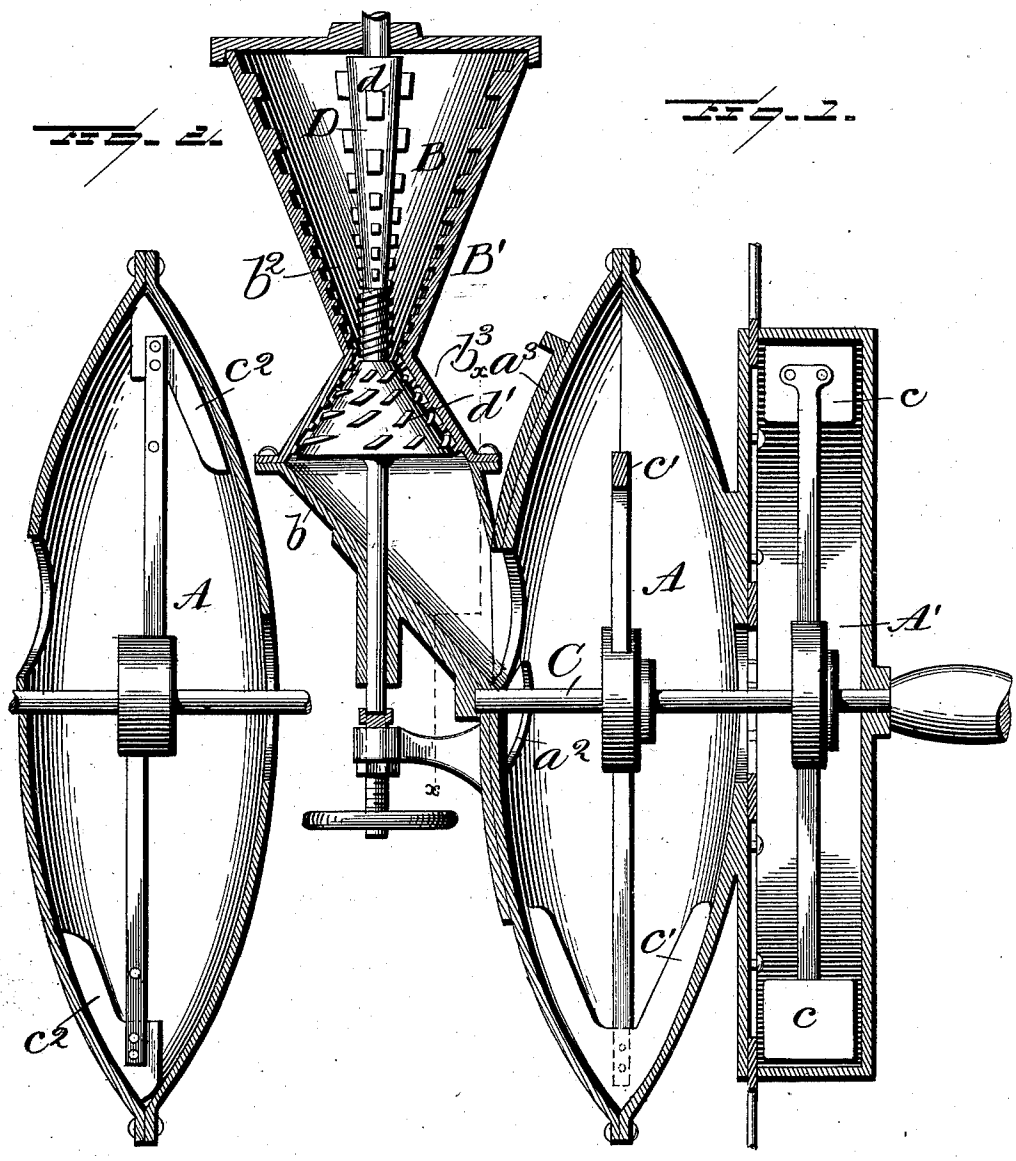
No. 669,897. Patented Mar. 12, 1901.

A. A. DAY.

APPARATUS FOR PREPARING AND FEEDING FUEL

(Application filed July 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.



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Fig. 3.

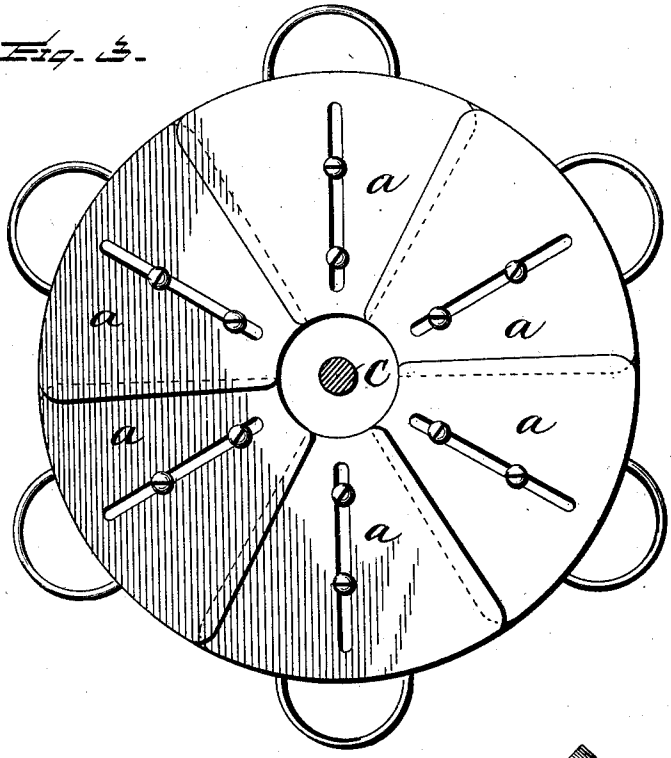
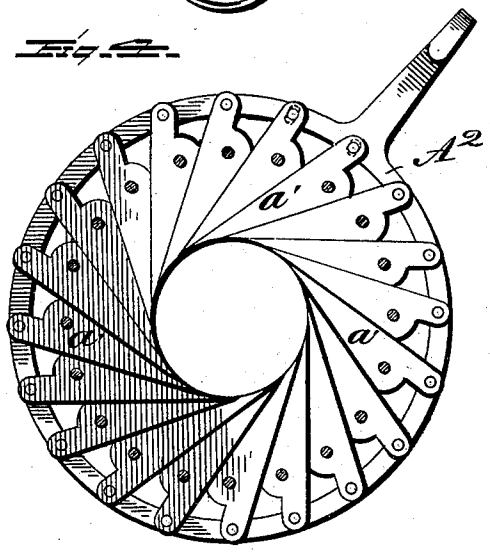


Fig. 4.



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Fig. 6.

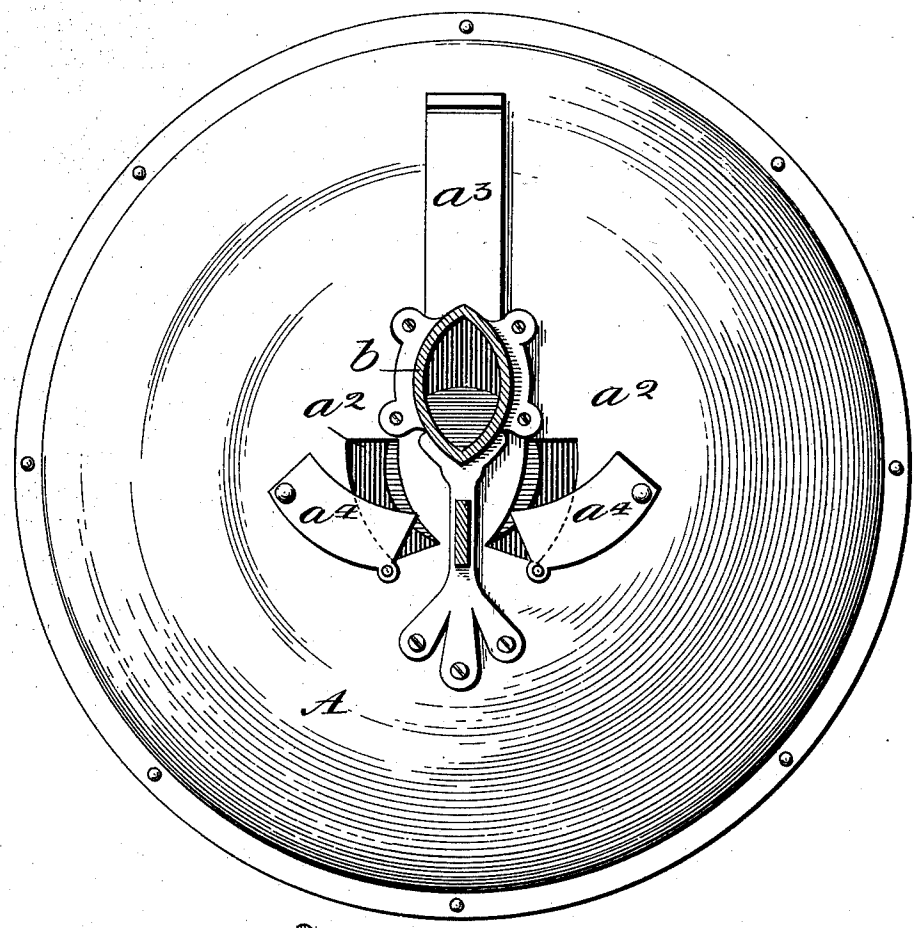
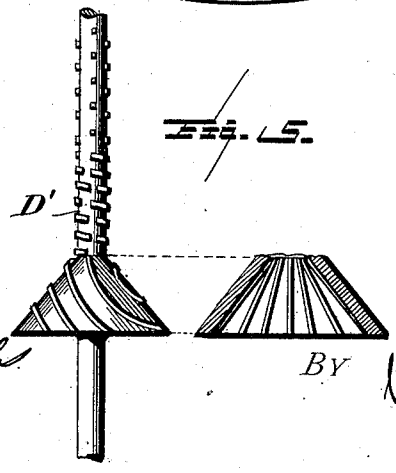


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PREPARING AND FEEDING FUEL.

SPECIFICATION forming part of Letters Patent No. 669,897, dated March 12, 1901.

Application filed July 26, 1900. Serial No. 24,938. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. DAY, a citizen of the United States, residing at Brooklyn, in the city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for Preparing and Feeding Fuel; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to apparatus for preparing and feeding fuel in a finely-divided condition to furnaces; and it consists in an improved construction of pulverizer and breaker and grinder combined whereby new results are obtained and the device better adapted to a larger number of materials or a greater variety of materials than the devices heretofore employed for that purpose.

The best form in which I have contemplated embodying my said invention is illustrated in the accompanying drawings, and said invention is disclosed in the following description and claims.

In the drawings, Figure 1 is a vertical longitudinal section of my improved device. Fig. 2 shows a modified form of the blade arrangement in the pulverizer. Fig. 3 shows one form for regulating the size of the opening between the pulverizer and trough, and Fig. 4 is a view showing a different form of operating the opening. Fig. 5 shows a modified construction of the rotary part of the grinder. Fig. 6 is a section of the mechanism on line $x\,x$, Fig. 1.

In the drawings, A represents the pulverizing-chamber, the walls of which are in the form of two equal segments of a sphere having their edges meeting at a sharp angle, giving in cross-section the form of a pointed ellipse, as shown in Figs. 1 and 2. At one side of this chamber is located the ejector-chamber A′, provided with an annular trough, as usual in this class of devices, the pulverizing-chamber having a central aperture communicating with the ejector-chamber. A shaft C extends through these chambers and is provided within the trough A′ with fan-blades c, for blast purposes, as is usual in this class of devices. The shaft C is also provided within the pulverizer-chamber with blades c' conforming to the shape of the interior of the pulverizer, as shown in Fig. 1, or is provided with blades c^2 of substantially the form shown in Fig. 2 of the drawings, the working edge of said blades conforming to the shape of the wall of the chamber adjacent to said edge, but alternating in the manner indicated in said figure. At the top of the inlet b is located the grinder or breaker B, which consists of the casing B′, shown in Fig. 1, and the revolving grinder D, also shown in the same figure. The casing B′ is shown as being composed of the elongated chamber b^2, in the form of an inverted cone, provided with inwardly-extending breaking projections, as shown, and the shorter conical portion b^3, connected to the lower end of chamber b^2. This portion of the chamber is by preference provided with longer grinding-ribs extending in a general vertical direction, but which are of less height than those within the chamber b^2. The rotary grinder is composed of the upper portion d and the conical foot d'. The upper part of the portion d is provided with grinding or breaking projections in the manner shown, while the lower part is provided with a screw-thread which effects the finer breaking of the fuel and at the same time feeds the same forward to the lower part of the casing or the chamber b^3, in which the material is further reduced to the size desired for delivery to the pulverizing-chamber. The grinding projections of the part d are shown as being larger at the top and decreasing in size as they approach the foot.

The foot of the grinder may be provided with curved grinding projections rising but a short distance from its surface, as shown in Fig. 5, working against straight continuous projections on the inside of the chamber b^3, as shown in the same figure. These projections are preferably made larger at the top and gradually decrease in size toward the bottom or lower end of the foot. The grinding projections of the foot and of the chamber b^3 may also be made as shown in Fig. 1, in

which the curved or spiral projections are formed in interrupted or detached portions intermeshing with short grinding projections on the interior of the chamber b^3. These projections will preferably be made to decrease in size from the top to the bottom of the foot, while the space between the foot and the interior of the chamber b^3 will decrease in like manner.

The rotary breaker or grinder is so mounted that it can be raised or lowered to regulate the fineness to which the material is to be reduced and also to regulate the feeding of the material to the pulverizing-chamber A.

In Fig. 5 I have shown at D' a slight modification of this feature of my construction, in which the spiral grinding projections of the rotary grinder D do not form a continuous thread, but are formed as elongated projections arranged in a spiral manner around the cylindrical portion of the grinder D, near the foot d', so as to effect the downward movement or feeding of the partially-broken material.

In Figs. 3 and 4 I have shown two different means for regulating the size of the opening between the pulverizer A and the trough A'. In Fig. 3, C represents the shaft viewed from the side adjacent to the pulverizer. $a\ a$ are plates of segmental form having inwardly-curved edges adjacent to the opening between the two chambers. These plates overlap, as shown, and are provided with slots and guiding pins or screws to maintain them in their proper positions in relation to each other. By forcing such plates inwardly the area of the opening is contracted and by moving them outwardly the opening is increased in size. In Fig. 4 I have shown another method of constructing a means for accomplishing this end. $a'\ a'$ are blades arranged around the aperture, as shown. These blades are pivoted and overlap each other and are controlled by an annular ring having slots, as shown. By turning this annulus A^2 in one direction or the other the opening can be increased or decreased in area, as desired. The air-inlet of the pulverizer is located by preference as near the center of the pulverizer-chamber as the proper supporting of the shaft C in respect to the other parts will permit. In this case I have shown two openings $a^2\ a^2$, one on each side of the support for the shaft C. $a^4\ a^4$ are pivoted closing-plates for the inlets $a^2\ a^2$, which can be manipulated so as to reduce the influx of air to the point desired. The inlets $a^2\ a^2$ will be made large enough to admit the maximum amount of air that can be utilized in the operation of the device, and the amount will be decreased by the operator by moving the closing-plates to reduce the same when it shall be deemed necessary to do this. a^3 is a slide which can be manipulated to wholly arrest the feed of the ground material to the pulverizer when it is found desirable to do this.

What I claim, and desire to secure by Letters Patent, is—

1. In apparatus for preparing and feeding fuel to furnaces, the combination with the pulverizing-chamber, having its walls in the form of two segments of spheres having their edges meeting at a sharp angle, of an ejector-chamber arranged at one side of said pulverizing-chamber and communicating therewith by a central aperture, a series of rotary pulverizing-blades mounted in said pulverizing-chamber, each having a lateral edge, conforming to and closely adjacent to one of the spherical walls of said chamber, ejecting mechanism in said ejector-chamber, and a fuel-feed connection with said pulverizing-chamber, substantially as described.

2. In apparatus for preparing and feeding fuel to furnaces, the combination with the pulverizing-chamber, having its walls in the form of two segments of spheres having their edges meeting at a sharp angle, of an ejector-chamber arranged at one side of said pulverizing-chamber and communicating therewith by a central aperture, a series of rotary pulverizing-blades mounted in said pulverizing-chamber, each having its lateral edges conforming to and closely adjacent to the opposite spherical walls of the said chamber, a series of rotary ejecting-blades located in said ejector-chamber and a fuel-feed connected with said pulverizing-chamber, substantially as described.

3. In apparatus for preparing and feeding fuel to furnaces, the combination with the pulverizing-chamber having its walls in the form of two segments of spheres having their edges meeting at a sharp angle, of an ejector-chamber arranged at one side of said pulverizing-chamber and communicating therewith by a central aperture, a series of rotary pulverizing-blades mounted in said pulverizing-chamber, each having a lateral edge conforming to and closely adjacent to one of the spherical walls of said chamber, a positive fuel grinding and feeding apparatus having its discharge connected to said pulverizing-chamber substantially centrally thereof, an air-inlet located centrally of said chamber on the side opposite the aperture communicating with the ejector, regulating devices for said air-inlet and a series of ejector-blades in said ejector-casing, substantially as described.

4. In apparatus for preparing and feeding fuel to furnaces, the combination with the pulverizing-chamber, having its walls in the form of two segments of spheres having their edges meeting at a sharp angle, of an ejector-chamber, arranged at one side of said pulverizing-chamber and communicating therewith by a central aperture, a series of rotary pulverizing-blades mounted in said pulverizing-chamber, each having a lateral edge conforming to and closely adjacent to one of the spherical walls of said chamber, a positive fuel grinding and feeding apparatus having

its discharge connected to said pulverizing-chamber substantially centrally thereof, an air-inlet located centrally of said chamber on the side opposite the aperture communicating with the ejector, regulating devices for said air-inlet and a series of ejector-blades in said ejector-casing, and a regulating device for the communicating aperture between said pulverizing-chamber and said ejector-chamber, substantially as described.

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

ALBERT A. DAY.

Witnesses:
WM. J. SMITH,
WALTER H. PARRIS.