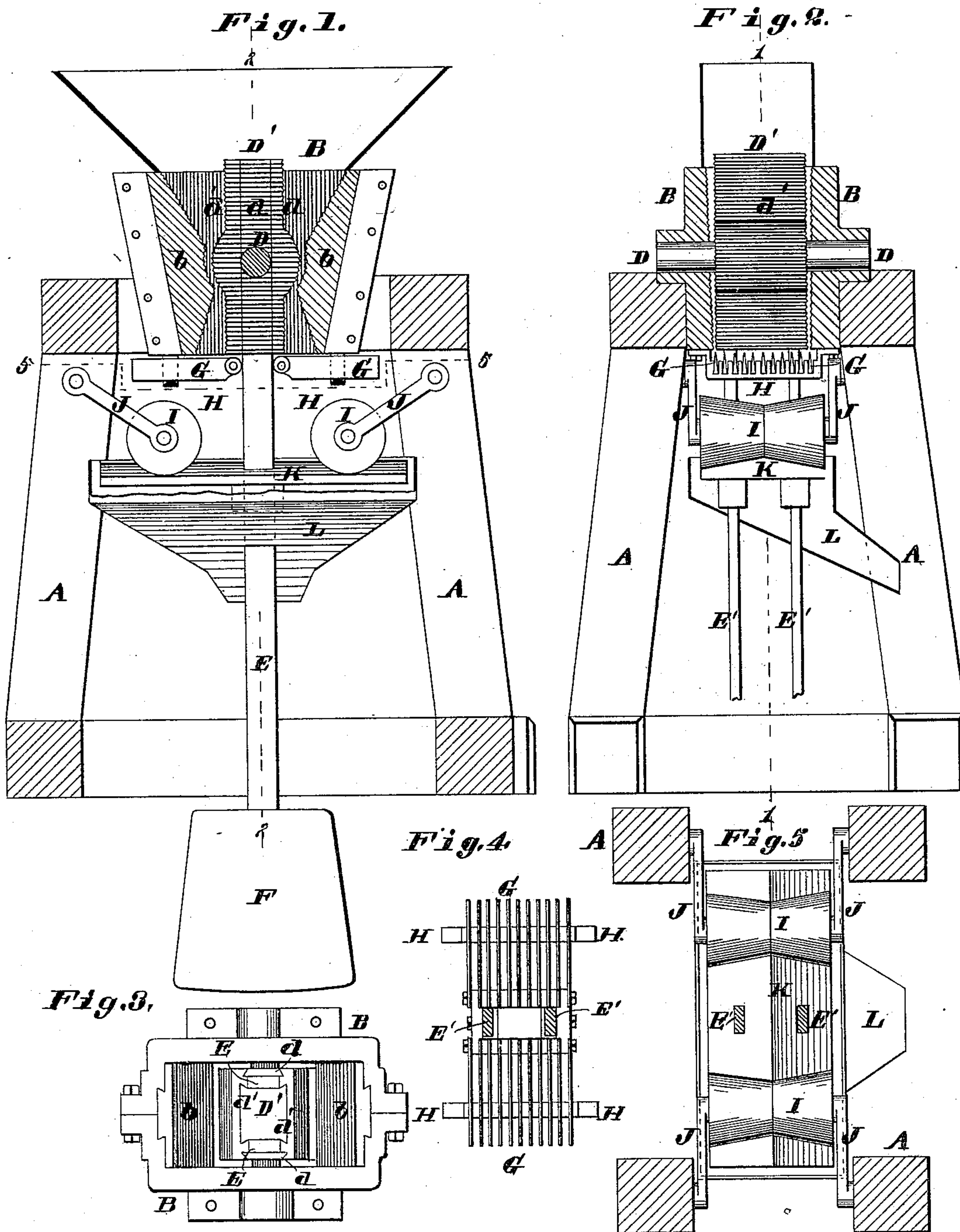


(No Model.)

M. A. SHEPARD.
CRUSHER AND PULVERIZER.

No. 277,071.

Patented May 8, 1883.



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MORRILL A. SHEPARD, OF LEBANON, ILLINOIS.

CRUSHER AND PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 277,071, dated May 8, 1883.

Application filed July 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, MORRILL A. SHEPARD, of Lebanon, in the county of St. Clair and State of Illinois, have invented a certain new and useful Improvement in Crushers and Pulverizers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a vertical section taken on line 1 1, Fig. 2. Fig. 2 is a vertical section taken on line 2 2, Fig. 1. Fig. 3 is a top view of the grinding-box. Fig. 4 is a top view of the blades. Fig. 5 is a section on line 5 5, Fig. 1.

My invention relates to a device or apparatus for crushing and pulverizing ores and hard substances in general; and my invention consists in certain points of novelty hereinafter fully described and claimed.

Referring to the drawings, A represents a suitable frame, in the upper end of which is the crushing-box B, having inclined and curved surfaces, as shown. D is a rod or axle supported in the frame and crossing the crushing-box, and upon it is hung a pendulum, E, which is swung or operated by any suitable motive power, and is preferably provided with a weight, F, on its lower end to increase its crushing-power. The upper end of the pendulum, above the rod D, is lettered D', and is formed with plane and curved surfaces, as represented. As this head D' of the pendulum is above the point of bearing on which the pendulum swings, and yet within the box B, a double crushing-chamber is formed, in which the substance is pulverized to different degrees of fineness.

The material to be reduced enters the upper portion of the crushing-box, which inclines downward, and is there broken by the upper end, D', of the pendulum, and then is further pulverized as it passes the curved plates around the axle D, and then, if not reduced to the desired degree of fineness, it is retained in the lower portion of the crushing-box by radial bars or blades G, secured to the pendulum and supported by stirrups H, depending from the frame, (see Figs. 1 and 4,) in which they work as the pendulum swings back and forth, and while thus retained it is pulverized by the portion of the pendulum immediately beneath the rod D. As soon as the material is pulverized to a certain degree of fineness in this chamber it falls through between the bars G onto a

table, K, secured to the pendulum above a suitable discharge-hopper, L, which is also secured to the pendulum. If the material is still too coarse when it falls upon the table K, it is further reduced by means of rollers I, resting upon the table and journaled by suitable gudgeons to the free ends of arms J, secured by their other ends to the frame A.

The rollers can be made of any desired shape, and either be smooth or corrugated.

The crushing-box can be made of wood, with chilled plates of steel or iron secured to its face and edge; or it can be made of iron with dovetailed grooves, as shown in Fig. 3, in which chilled crushing-plates *d d' d' b b* can drop and be held firmly in place.

The pendulum can be made out of substantial timber; or, to obviate the resistance of the air while in motion, two thin and wide iron bars, E' E', (see Figs. 2, 4, and 5,) can be secured to the crushing-head D' and to the weight F.

Another advantage of my improved crusher and pulverizer is the effective manner in which power can be attached without the use of wheels, cranks, &c. The pendulum can be secured to a rod with a knuckle-joint direct to the piston-rod of a steam-engine; or, if the machine is located on the sea-shore, the action of the waves can be utilized to give it motion.

I claim as my invention—

1. In combination with a suitable frame, A, provided with a crushing-box, B, having inclined and curved surfaces, the pendulum E, having a crushing-head with plane and curved surfaces, and a suitable rod or axle therefor, passing through the box B, thereby forming two crushing-chambers for pulverizing the substances to different degrees of fineness, substantially as set forth.

2. The combination of pendulum E, having head D', the frame A, box B, blades G, secured to the pendulum, and stirrups H, secured to the frame, all substantially as shown and described, for the purpose set forth.

3. In combination with the frame A, the pendulum E, table K, rollers I, and connecting-arms J, all made substantially as shown and described, for the purpose set forth.

MORRILL A. SHEPARD.

Witnesses:

J. A. SHEPARD,
W. B. ALDRIDGE.