

HALL & BENTLEY.
Machinery for Crushing Quartz.

No. 46,561.

Patented Feb. 28, 1865.

Fig. 1.

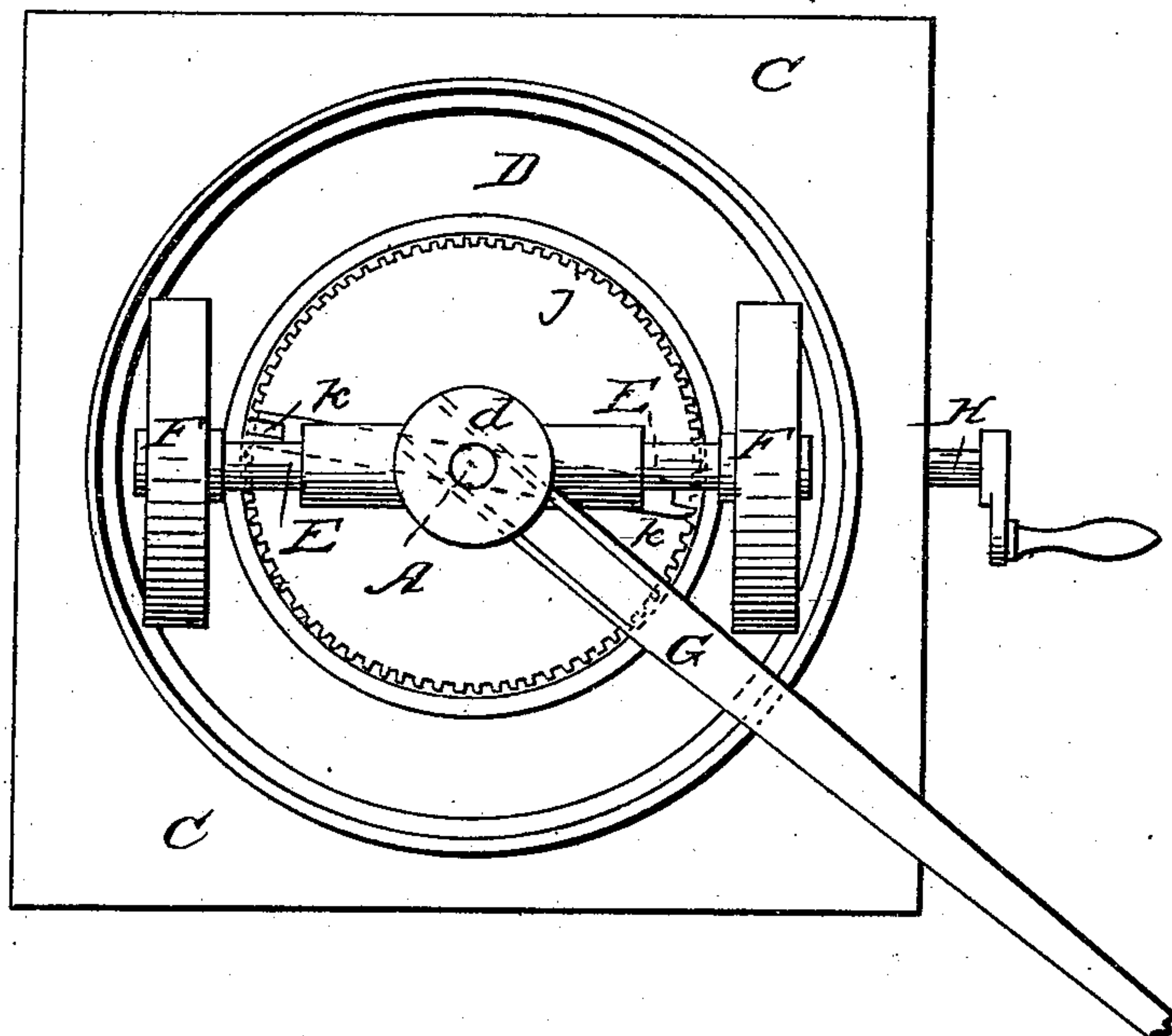
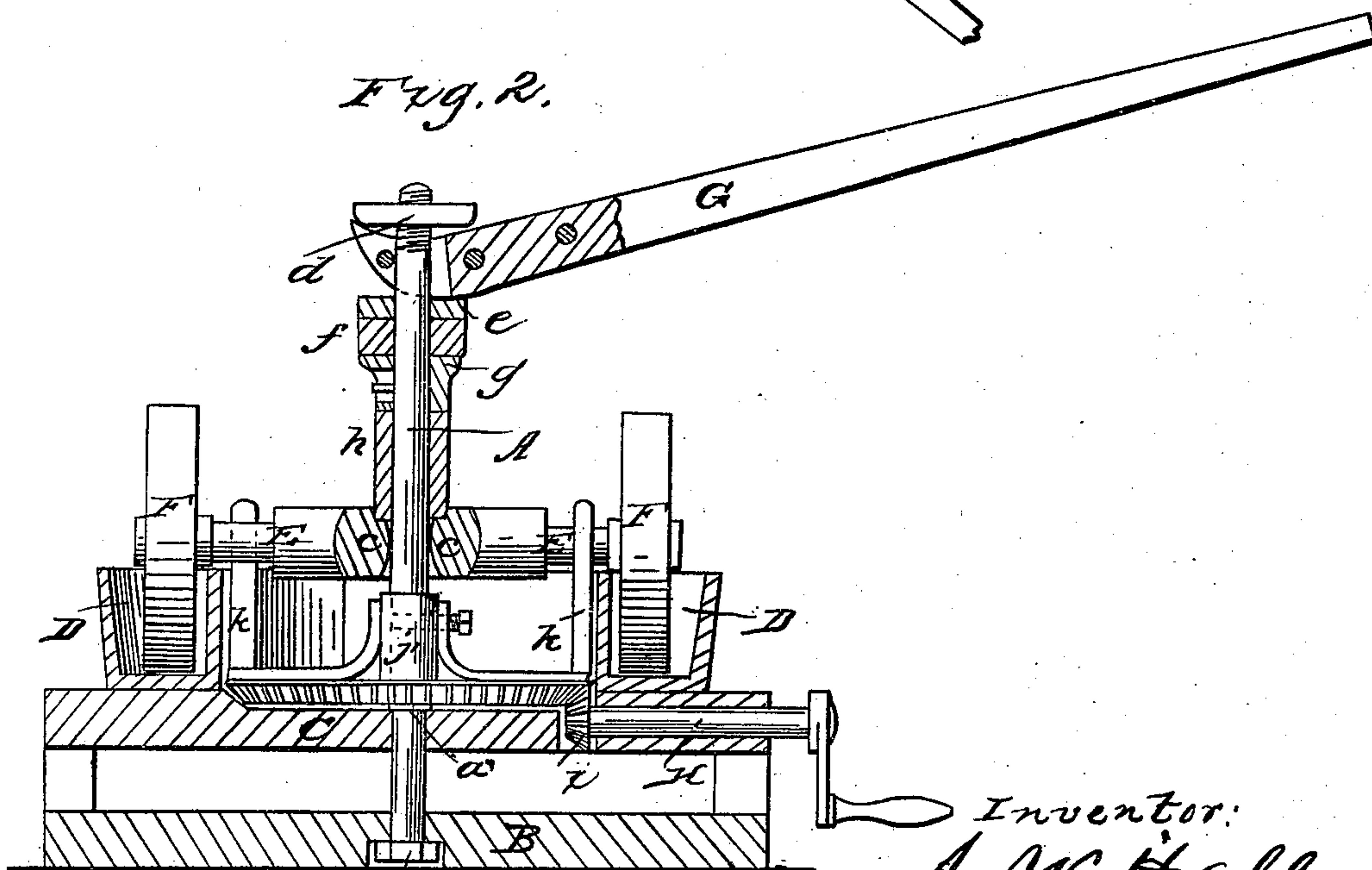


Fig. 2.



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IMPROVEMENT IN MACHINERY FOR CRUSHING QUARTZ.

Specification forming part of Letters Patent No. 46,561, dated February 23, 1865.

To all whom it may concern:

BE it known that we, ALEXANDER W. HALL and DANIEL BENTLEY, both of the city, county, and State of New York, have invented certain new and useful Improvements in Machinery for Crushing Quartz and other Substances; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of a machine with our improvements. Fig. 2 is a central vertical section of the same.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to that class of crushing machines in which the crushing devices consist of wheels or rollers running in an annular trough or basin around a common vertical axis.

It consists in a novel mode of applying the pressure of the rollers, whereby the machine is much simplified and its efficiency increased.

To enable others skilled in the art to construct crushing-machines according to our invention, we will proceed to describe it with reference to the drawings.

A represents the central shaft of the machine held firm and stationary in an upright position by being stepped into the bed or foundation B C, upon which the annular trough or pan D and all the other parts are supported. This bed may be of timber, cast-iron, or other material, and is represented as composed of a lower part, B, and an upper part, C, at such a distance above it as to hold the shaft firmly in an upright position without the necessity for any framing above the pan and rollers. The shaft is represented as being furnished with a collar, *a*, which rests upon the upper part, C, of the bed and being secured by a nut, *b*, fitting a screw-thread on the lower part of the shaft, below the lower part, B, of the bed, but it may be secured in the bed in any other sufficiently firm manner.

E is the horizontal axle to which the crushing rollers F F are fitted in such manner as to rotate freely. This axle is made large enough at the middle of its length to permit it to be bored transversely and vertically to form a socket, *c*, which fits the central shaft, A, in such manner as to be permitted to turn

freely thereon; or the said axle may be otherwise provided with a socket midway between the two rollers to fit the said shaft. The bore of the socket *c* is tapered from the top and bottom, as shown in Fig. 2, so that it only fits the shaft at the middle of its depth, thereby enabling either end of the axle and the roller F, which is fitted thereto, to rise independently of the other end and roller for passing over any large lumps in the pan D.

On the upper part of the central shaft, A, there is a screw-thread, on which is screwed a nut, *d*, which forms a fulcrum or upward-bearing for the pressure which it may be necessary to apply to the crushing-rollers in addition to that produced by their own weight and the axle E. The device shown for producing such additional pressure consists of a lever, G, which is forked to apply the said pressure on opposite sides of the shaft A, and which rests on a loose collar, *e*, which is fitted to the said shaft. Below the said collar *e* there is placed around the shaft A a spring, *f*, of india-rubber or other material, under which there is fitted to the shaft a collar, *g*, which is free to slide up and down, but not to rotate, and under this collar *g* there is fitted to the shaft a deep washer, *h*, which bears directly upon the axle E or its central socket. The pressure, which is graduated by a weight suspended from the lever and movable toward or from the shaft, is transmitted through the collar *e*, spring *f*, collar *g*, and washer *h* to the shaft E and rollers, being divided or distributed equally between the rollers in consequence of its being applied at equal distances from the rollers, and the resistance to this pressure is obtained directly from the central shaft, A. The spring *f* makes the pressure sufficiently elastic or yielding to prevent any undue strain being suddenly brought upon the means of applying it by means of the rollers meeting with any large or very hard lumps in the pan, and thereby renders the machine more durable.

H is the driving-shaft of the machine, arranged horizontally in a suitable fixed bearing or bearings secured under the bottom of the pan D or upon the bed B C. On this shaft there is secured a bevel-pinion, *i*, which gears with a bevel-gear, *j*, the hub *j'* of which is fitted to the shaft A in such manner as to be capable of turning freely thereon, but not

of moving vertically. To this bevel-gear there are attached arms *k k*, which are arranged to press against the axle *E* near each of the wheels, but not connected with the said axle in such manner as to interfere with its rising and falling at either end as the rollers pass over lumps in the pan.

The additional pressure required upon the crushing-rollers beyond that produced by their own weight and that of the axle *E*, instead of being produced and graduated by a lever, *G*, and weight, may be produced by any other practicable means—as, for instance, by means of the nut *d*, or a nut similarly applied on the shaft *A* and pressing directly upon the collar *e*, or its equivalent, such nut being an equivalent of the lever *G*. When the said pressure is applied by means of a lever, a collar secured to the shaft *A* in any suitable manner may be substituted for the nut *d*.

It will be understood from the description that this machine is entirely without anything that can be considered strictly as a frame, all the parts being supported on or in the bed-plate or bed *B C*.

Although we consider it preferable, for greater simplicity of construction, to make the central shaft, *A*, stationary, it is not absolutely necessary that it should be stationary,

as the same result—viz., the dispensing with framing—may be obtained by fitting the said shaft to revolve in a suitable bearing or bearings below the pan *D*, provided the said shaft be extended downward a suitable depth below the pan and rollers.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The taper vertical socket *c c*, by which the axle or axles of the several rollers are attached to the central vertical shaft in such manner as to permit either roller to rise independently of the others, substantially as herein specified.

2. Applying pressure to the several crushing rollers by means of a lever, *e*, and nut, *d*, or their equivalent, applied directly to the central shaft and operating on all the rollers alike, substantially as herein specified.

3. The spring *f*, applied in combination with the collars *e g*, washer *h*, nut or bearing *d*, and central shaft, *A*, substantially as and for the purpose herein specified.

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