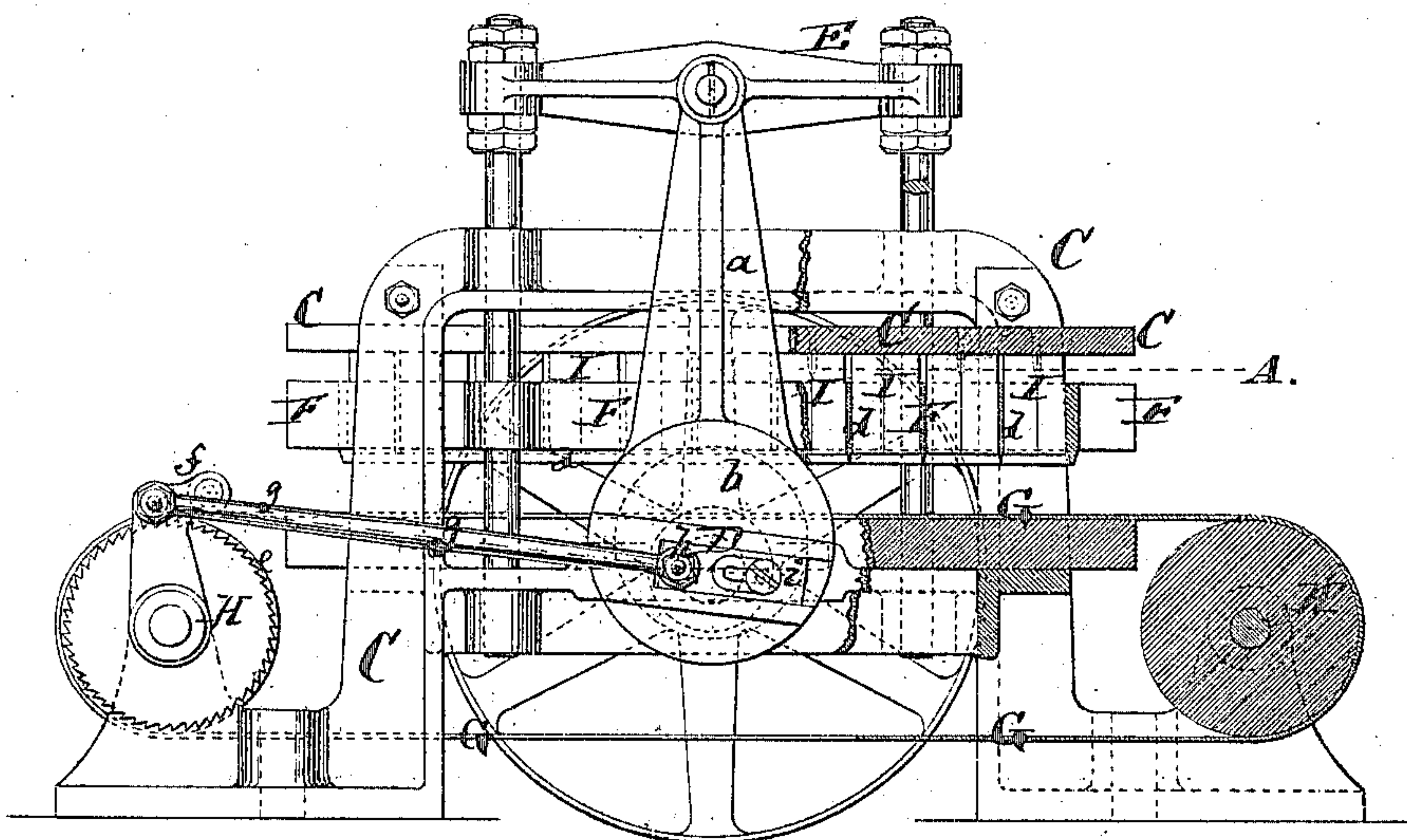


P. A. OLIVER.

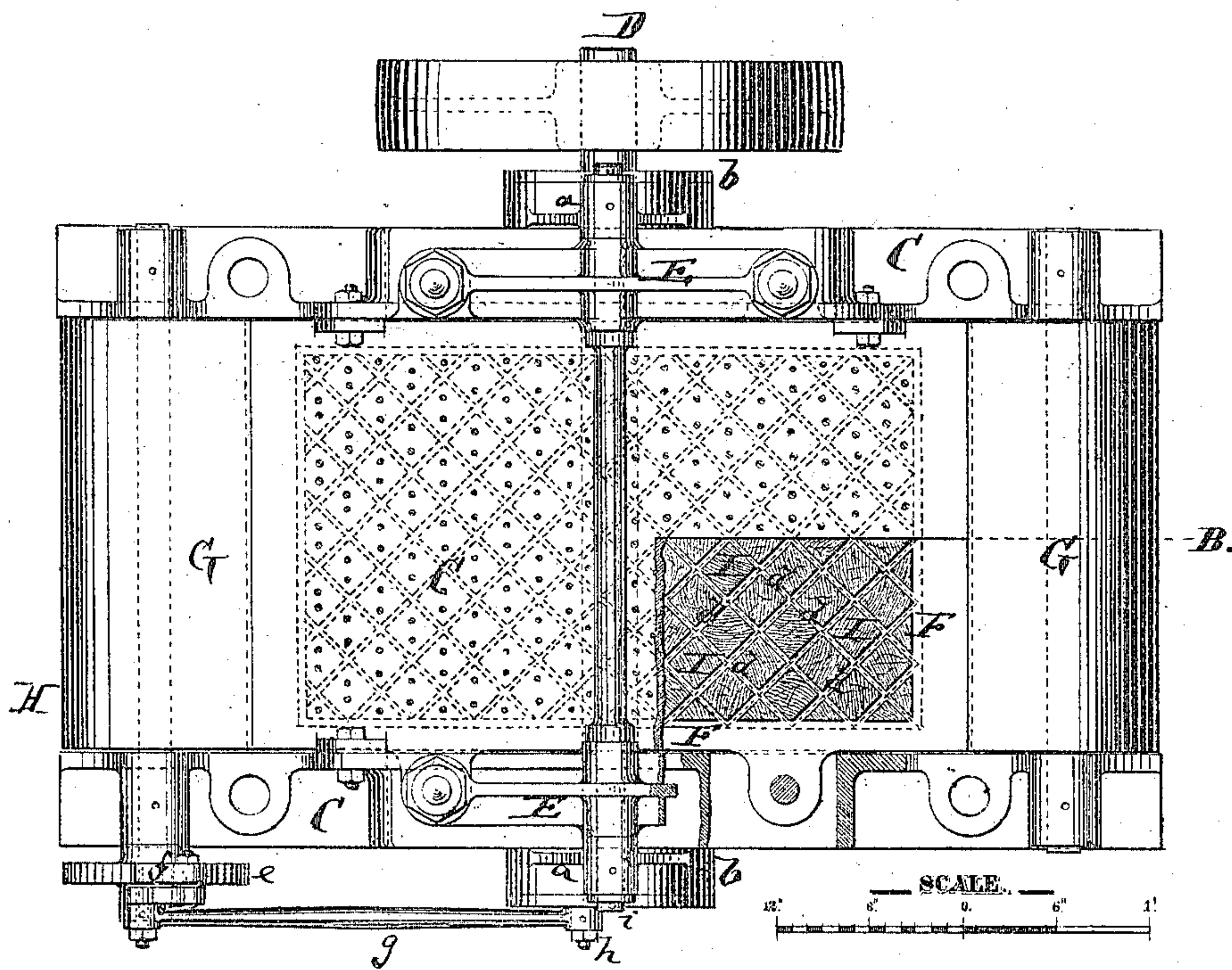
Apparatus for Graining Gunpowder.

No. 134,438.

Patented Dec. 31, 1872.



Figure, 1.



Figure, 2.

Witnesses:

A. A. Stearns.  
J. H. Bowden.

Inventor:

Paul A. Oliver



# UNITED STATES PATENT OFFICE.

PAUL A. OLIVER, OF WILKESBARRE, PENNSYLVANIA.

## IMPROVEMENT IN APPARATUS FOR GRAINING GUNPOWDER.

Specification forming part of Letters Patent No. 134,438, dated December 31, 1872.

*To all whom it may concern:*

Be it known that I, PAUL A. OLIVER, of Wilkesbarre, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Gun and Blasting Powder Graining-Machine, of which the following is a specification:

Figure 1 is a side view, partly in section, of my improved powder-graining machine, the line B, Fig. 2, indicating the plane of section. Fig. 2 is a top view, partly in section, thereof, the line A, Fig. 1, indicating the plane of section.

Similar letters of reference indicate corresponding parts.

This invention has for its object to facilitate the reduction of gun and blasting powder into grains of the requisite size and configuration; and consists principally in the use of a series of reciprocating knives, which cut the cakes of powder into pieces and gradually reduce the pieces until the desired degree of fineness has been obtained, all without creating waste in the form of dust to such an extent as the same is being created by the devices now in use. The invention also consists in the combination with said reciprocating cutters of adjustable feed devices for moving the powder to be cut, and of means for cleaning the knives of any powder that may adhere to them.

In the drawing, the letter C represents the frame of my improved powder-graining machine. This frame is made of metal, wood, or both, of the requisite size and shape to suit the requirements of the apparatus, and of the necessary strength. D is a shaft hung transversely in or near the middle of the frame C, and receiving rotary motion by suitable power, with which it is connected. E is a vertically-movable frame connected, by rods *a a*, with eccentrics *b b* that are mounted upon the ends of the shaft D. When the shaft is revolved the eccentrics will cause the frame E to be moved up and down. This frame E holds suspended a horizontal cutter-frame, F, which is in extent nearly equal to the horizontal area of the frame C. Series of knives *d d* are set into the frame F at suitable distances apart, and crossing each other at suitable angles. I prefer to place these knives in the positions indicated by dotted lines in Fig. 2, although they may be arranged in other suitable manner. The lower edges of the knives *d* are their cutting-edges.

G is an endless apron fitted over rollers H, so as to be just under the reciprocating cutter-frame F. This apron receives its rotary motion by connection with the shaft D, which connection may consist of a ratchet-wheel, *e*, on a drum, H, and of a pawl, *f*, and connecting-rod *g*, the latter being pivoted to a wrist-pin, *h*, of an adjustable crank, *i*, of the shaft D. The more the crank *i* is shortened the slower will be the motion imparted to the apron, while the further the wrist-pin is set from the center of the shaft D the faster will be the motion of the apron.

The powder, pressed in cakes as usual, is placed upon the apron, and thereon gradually moved along under the reciprocating knives. The latter descend and cut the cake into blocks and the blocks into pieces, reducing the pieces over and over again until the desired result is obtained.

An advantage of this method is that the powder may be cut in a moist state, and all danger of ignition and explosion is thereby avoided, and that the grains produced will be many sided, and therefore more advantageous than grains having a less number of sides.

The more the speed of the apron is increased the less will be the reduction in the size of grains.

Stationary pins I I, which are suspended above the frame F, enter between the knives *d* whenever the frame F is elevated, and clear the knives of adhering particles of powder.

It is evident that, in place of the apron, any other feed apparatus for the powder may be used.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The reciprocating frame F containing the knives *d d* and arranged on a gun and blasting powder graining-machine, substantially as herein shown and described.

2. The combination of the reciprocating cutter-frame F with the stationary clearing-pins I I, as set forth.

3. The feed-apron G arranged in combination with the reciprocating cutter-frame F and with the adjustable crank *i*, to operate substantially as specified.

PAUL A. OLIVER.

Witnesses:

S. AYRES, Jr.,  
E. B. STARK.