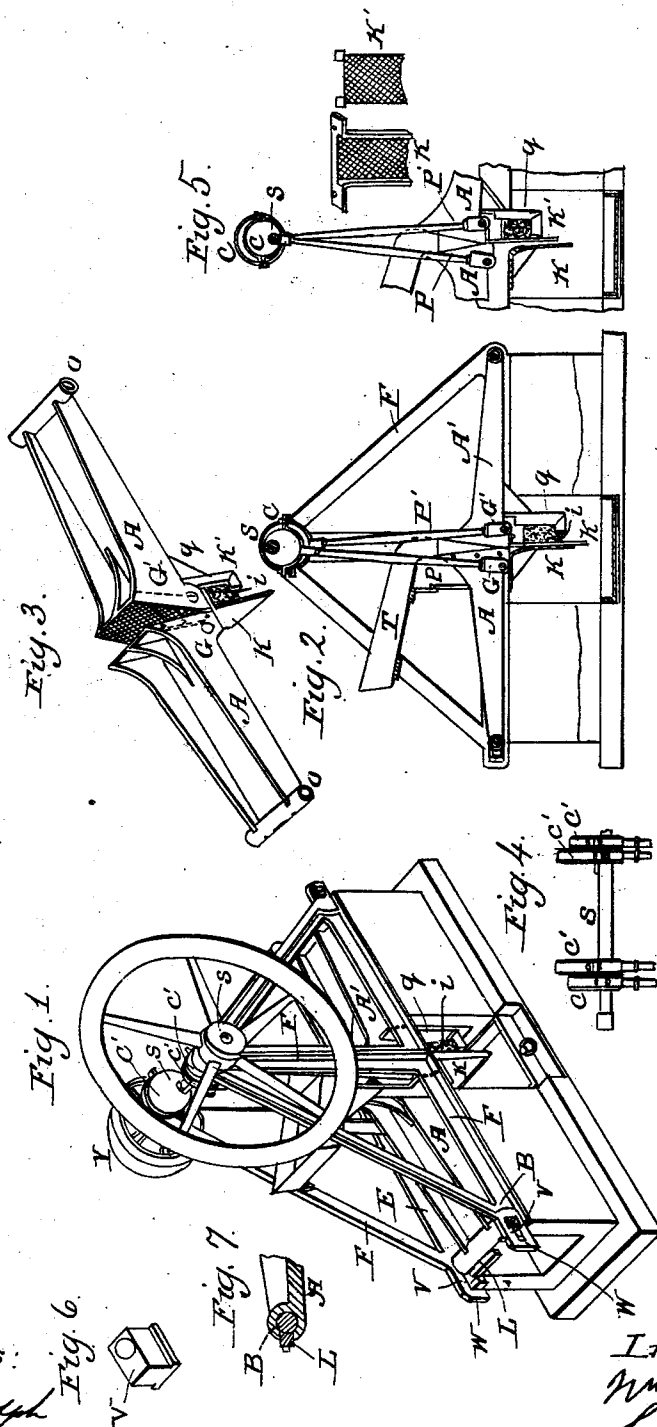


# GOODWIN & SQUIRE.

## Ore Crusher.

No. 69,656.

Patented Oct. 8, 1867.



Witnesses:  
*S. W. F. Randolph*  
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Inventors:  
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# UNITED STATES PATENT OFFICE.

WILLIAM F. GOODWIN, OF EAST NEW YORK, AND CHARLES R. SQUIRE, OF  
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## IMPROVED MACHINE FOR CRUSHING ROCKS, ORES, &c.

Specification forming part of Letters Patent No. 69,656, dated October 8, 1867.

*To all whom it may concern:*

Be it known that we, WILLIAM F. GOODWIN, of East New York, in the county of Kings and State of New York, and CHARLES R. SQUIRE, of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Crushing and Pulverizing Rocks, Ores, and other Hard Substances; and we declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 represents a perspective view of our machine when set up and ready for operation. Fig. 2 represents a side elevation of the same machine having one side of the frame and fly-wheel removed, showing the working apparatus. Fig. 3 is a detached view of the bars A and A' with rubbing-block K' and cheeks H attached. Fig. 4 is a detached view of the shaft S and eccentrics or cams C C and C' C'. Fig. 5 is a detached view of parts of the apparatus, showing the position of the ends of the bars A and A' and block K when drawn up in their elevated position. Fig. 6 represents a detached view of one of the adjustable blocks. Fig. 7 represents a section through the end of the bar A, bolt B, and tightening-block L.

Similar letters of reference indicate corresponding parts in the several figures.

Our improvement consists in the employment of two long bars, A and A', which work together, and two blocks, K and K', which also work together, for crushing and pulverizing rocks and ores, and also the general construction and arrangement of the frame and apparatus by which the bars and blocks are held in position and operated.

To enable others to understand and use our invention, we will now proceed to give a detailed description of the same, referring to the accompanying drawings.

F represents the frame, made in two pieces, formed as seen in Figs. 1 and 2, and may be of cast or wrought iron. The two side pieces are attached to each other by the wrought-iron bolts B B, one at each end of the frame, which bolts also serve as the means by which the bars A and A' are attached and pivoted to the frame, and on which they have their fulcrum

of motion. Other bolts may be employed to secure the frame, if necessary.

A and A' represent the bars, between the ends of which the hard substance is crushed and chewed. The bars or arms may be made of cast or wrought iron, formed as represented in Figs. 1, 2, and 3. The outer or small ends have holes O and O through which pass the bolts B and B, which serve as the means by which the bars are attached to the frame, and also the fulcrum on which they work. The inner ends of the bars or arms face each other, meeting together, or nearly so, at the center of the frame, and are squared and flattened, so as to present flat surfaces to each other, the lines of which form an acute angle, converging to a point near the bottom or under side, and diverging from each other to the top or upper sides, forming the angle of the letter V, leaving a space between the ends of the bars sufficient to admit pieces of rock or ore to be crushed. The inner ends of the bars are provided with lugs or wrists G, one on each side of each bar at a point near the bottom, and in a horizontal line with the bolts B and B. When the arms or inner ends of the bars have descended to their lowest point a line drawn through the centers of the bolts B and B will pass through the centers of the lugs G when the arms are depressed. The lugs G may be formed by passing wrought-iron bolts through holes O in the bars and allowing the ends to project on each side, or may be cast on the bars, as desired.

P and P' are pitmen or connecting-bars, through which motion is imparted from the shaft S to the bars A and A'. The lower ends of the pitmen P P are attached to the lugs G on the bars A, and, having their upper ends attached to the small cams C C on the shaft S, serve to operate the bar or arm A, and the pitmen P' P', having their lower ends attached in the same manner to the lugs G' G' on the bar A' and their top ends attached to the large cams C' C' on the shaft S, serve to operate the bar A', giving it a greater movement than the bar A by means of the larger cams.

S is a wrought-iron shaft, lying horizontally across the top of the frame, having its bearings in boxes, which are bolted to the top of the frame. On one projecting end of the shaft is mounted a fly-wheel and on the other is mount-

ed two pulleys, one for driving and the other loose.

C C and C' C' are cams placed on the shaft S, so as to move together. The cams C C are smaller in diameter than the cams C' C', and do not have so much throw as the large cams. The small cams C C are employed to operate one bar or arm, A, and the large cams C' C' are employed to operate the other bar or arm, A', thus varying the movements of the arms, causing them to produce a squeezing, rubbing, and grinding effect at the same time.

K and K' are blocks of metal, formed as represented in the drawings. The block K, being attached to the frame F, remains stationary, while the block K', being attached by a hinged joint to the bar A', moves up and down with the bar, rubbing against the stationary block K.

Q is a projection attached to and extending down from the bar A', and serves to hold the spring I, which bears against the block K', and holds it to and keeps it in contact with the stationary block K, thus causing the block K' to rub against the block K, which serves to pulverize the rock or ore, reducing it to a fine powder, after its having passed between the ends of the crushing-bars.

V V are adjustable-blocks, fitted into boxes or elongated holes in the end of the frame F. The ends of the bolt B are fitted and secured in the blocks V V. The keys W are driven behind the blocks, affording bearings and a means of adjustment for the bar A.

The machine is operated by a belt on the driving-pulley Y, which revolves the shaft S, operating the cams C C and C' C', and pitmen P P and P' P', which causes the swinging ends of the bars A and A' to vibrate up and down, which motion causes them to open and close like a toggle-joint, opening when ele-

vated out of line and closing when depressed into line with their fulcrum of motion, thus crushing the rock. One of the bars having more motion than the other causes a crushing, rubbing, and grinding effect at the same time. When the rock or ore is crushed and pulverized sufficiently fine to pass through between the ends of the bars it falls in between the blocks K and K', the block K' being attached to vibrate up and down with the bar A', rubbing against the stationary block K, thus pulverizing and reducing the substance to a finer powder.

The bars A and A' should be about six or eight feet long to gain power, the pulverizing of the ore being effected by the end of one of the bars moving faster and farther than the other in the same time. The ends of the bars, not being required to open but little, may be of any required length.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The long bars A and A' placed end to end in a horizontal line with each other in the frame F, and having their outer ends pivoted on the bolts B, one at each end of the frame F, and having their inner ends operated independently of each other by means of the cams C and C' and pitmen P and P', arranged to operate in the manner and for the purpose substantially as shown and described.

2. The blocks K and K' and spring I, arranged to operate together in the manner and for the purpose substantially as described.

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