

(No Model.)

P. H. SHARP.
Coal and Ore Breaker.

No. 239,626.

Patented April 5, 1881.

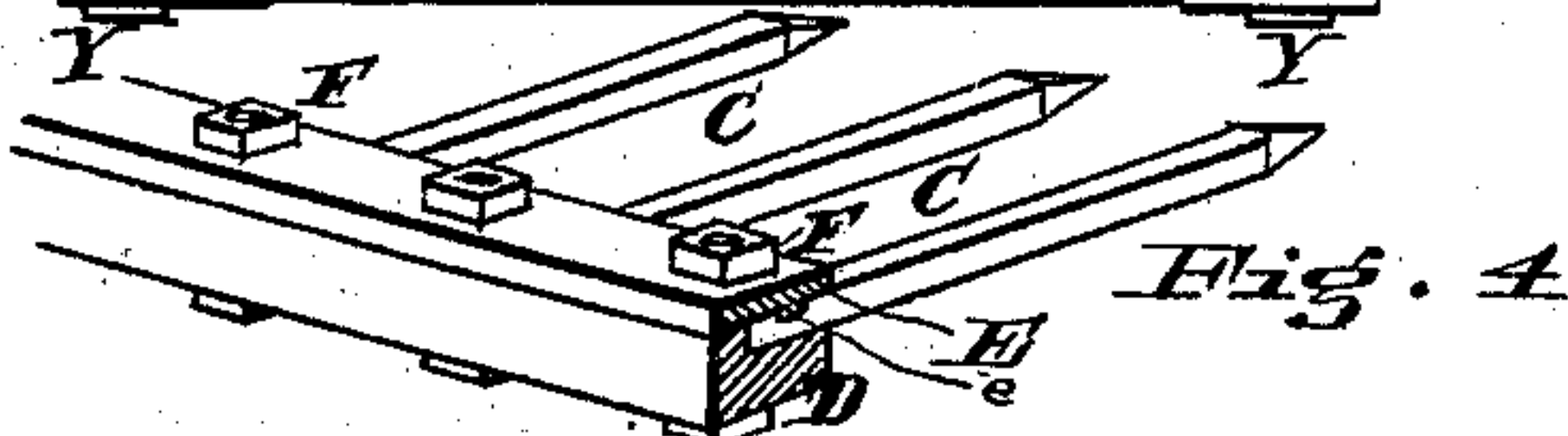
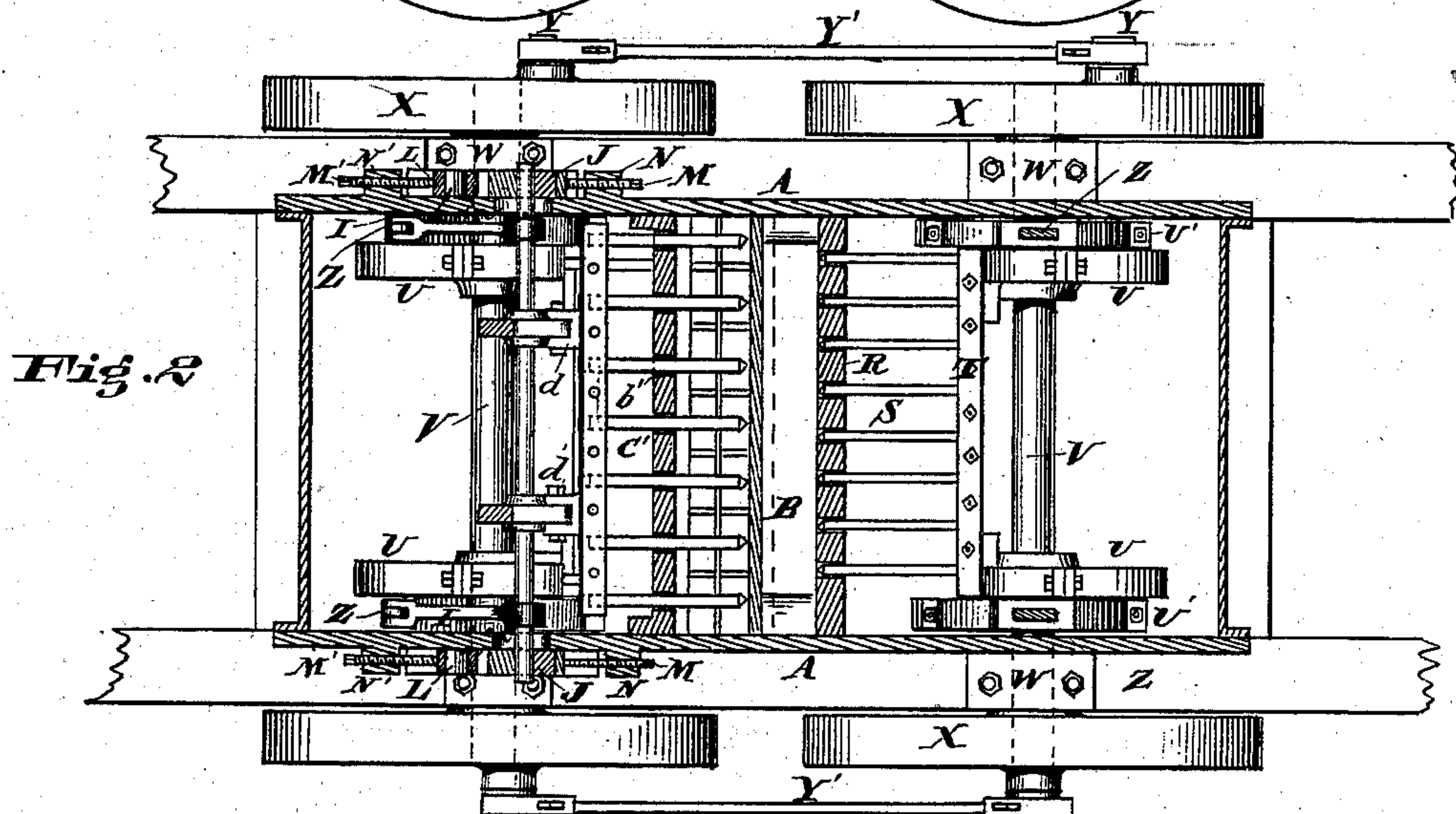
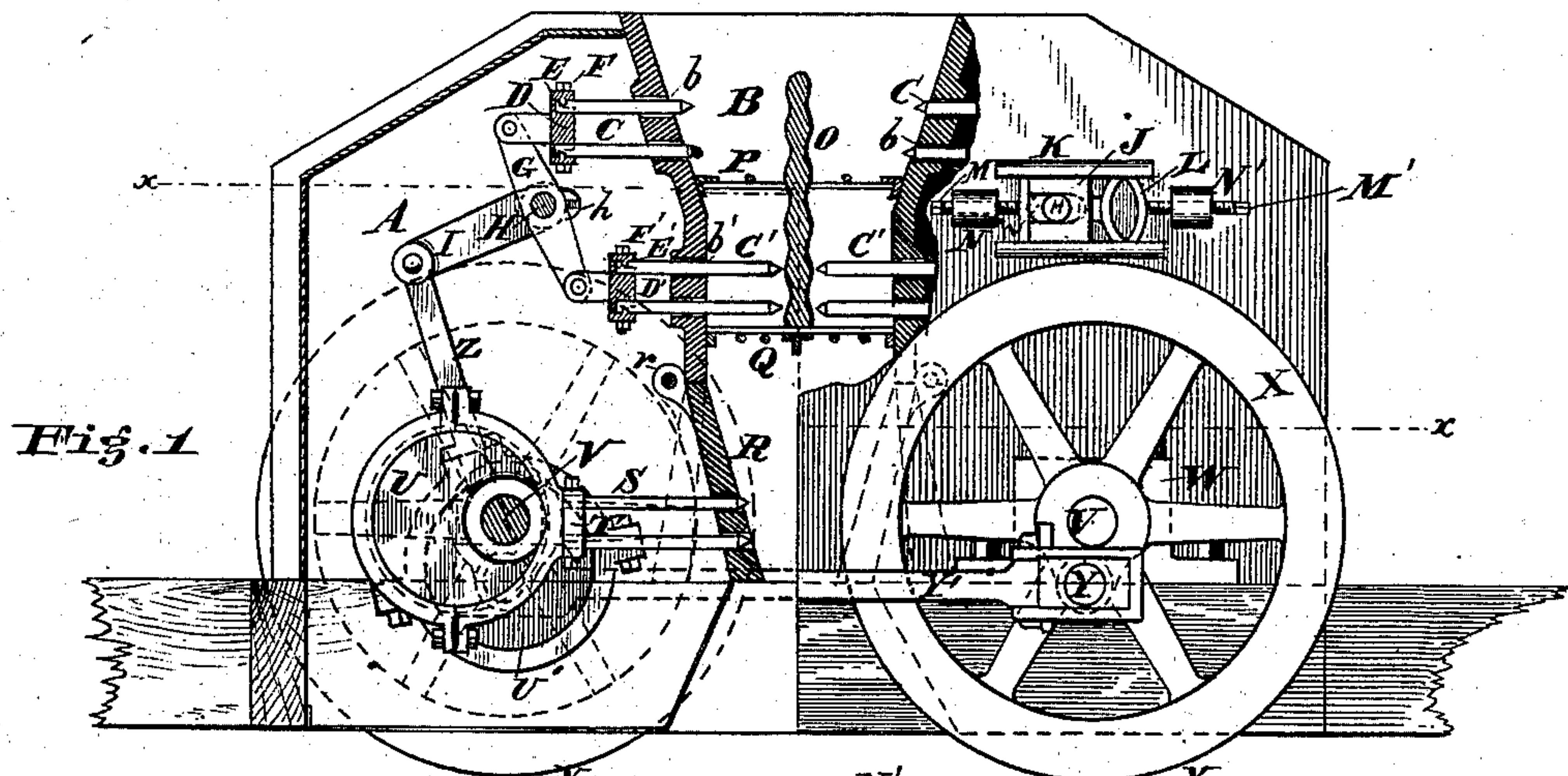
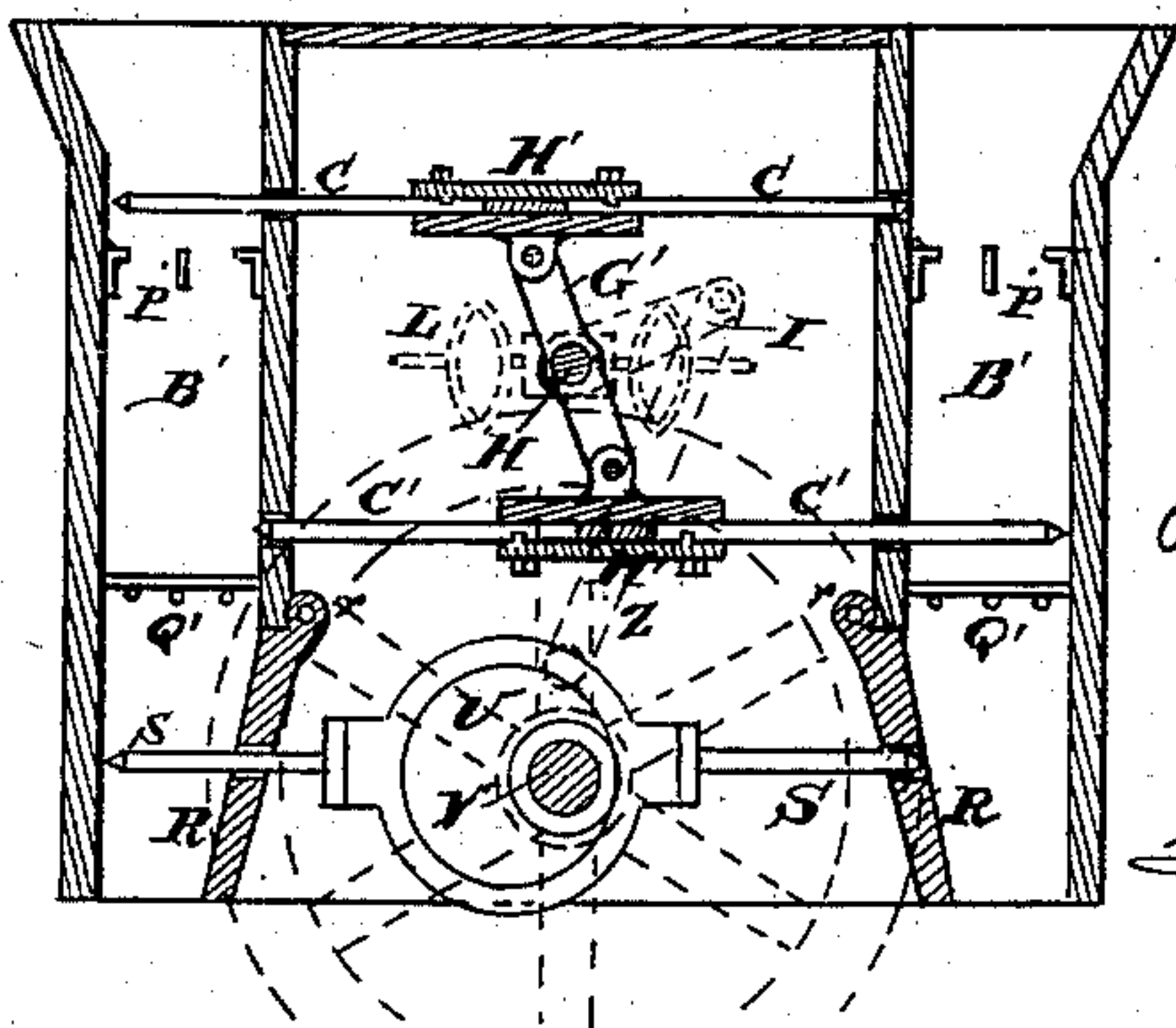


Fig. 3



Attests
L. J. Matos

Inventor
Philip H. Sharp
By his atty

[Signature]

UNITED STATES PATENT OFFICE.

PHILIP H. SHARP, OF HARRISBURG, PENNSYLVANIA.

COAL AND ORE BREAKER.

SPECIFICATION forming part of Letters Patent No. 239,626, dated April 5, 1881.

Application filed September 18, 1880. (No model.)

To all whom it may concern:

Be it known that I, PHILIP H. SHARP, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented an Improvement in Coal and Ore Breakers, of which the following is a specification.

My invention relates, in the first place, to that class of coal and ore breakers in which the mineral to be broken is placed in a combined stationary and adjustable hopper and is broken into various sizes by reciprocating picks moving from one or both sides of said hopper; and it consists in combining my inventions, as set forth in patents granted to me September 16, 1879, and January 6, 1880, to form a single and complete compound machine; and, further, in detailed constructions not shown or claimed in those patents, all of which are fully set forth in the following specification, shown in the accompanying drawings, and referred to in the appended claims.

The object of this combination is to produce a coal and ore breaker which may be specially adapted for reducing large coal to the intermediate and smaller sizes by means of a stationary hopper, or for reducing the intermediate sizes—such as “steamboat,” “broken,” “grate,” and “egg,” to “stove,” “chestnut,” and “pea” sizes by the use of the combined hoppers.

In the drawings, Figure 1 is an elevation of my improved breaker, shown partly in section. Fig. 2 is a sectional plan of the same on the line *x x*, Fig. 1.

A is the frame-work of the machine, and supports the stationary hopper B in the middle, and extending from side to side. This hopper may be graduated, stepped, or straight, but is preferably of the shape substantially as shown.

R R represent the plate forming, in conjunction with the frame A, the adjustable hopper, and hinged to the bottom of the fixed hopper B at *r*. The two hoppers may be used in conjunction, as shown in Fig. 1, when the smaller sizes of coal are required; or the movable plates may be thrown back, as shown in dotted lines, when it is desired to remove the lowest tiers of picks and use the fixed hopper only.

Through holes *b* in the fixed hopper B the picks C reciprocate. These rows of picks C may be single or double, as shown, arranged

preferably in horizontal tiers, each tier being operated simultaneously.

Working through holes *b'* lower down in the hopper B are picks C', substantially the same in all respects as those referred to above.

These picks are respectively secured to bars D and D' by fitting in recesses, and have caps E E', provided with tongues *e*, clamped down tightly upon them by bolts F F', as shown in detail in Fig. 4, the tongues *e* fitting into corresponding grooves in the picks. These bars D D' are provided near either end with lugs *d d'*, which are pivoted to either end of the levers G, firmly secured upon the rock-shaft H. By this arrangement, as the shaft H rocks, the picks C C' are reciprocated in different directions at the same time. The rock-shaft H passes through slots *h* in the frame A, and is supported at either end in bearings or boxes J, movable to and from the hopper in guideways K. The boxes J are kept from moving toward the hopper by the screws M, held in the hubs N, and from movement in the other directions by the screws M', which pass through hubs N' and rest against cast-iron ellipses L, the other sides of which are in contact with the boxes. By this arrangement, should a sulphur ball or some conglomerate rock pass into the hopper and the teeth of the picks strike it, instead of their breaking, the strain is put upon these cast-iron ellipses, which break, thereby saving the more valuable parts. The ellipses are cheap and replaceable. Reciprocating motion is imparted to the rock-shaft by means of levers I, keyed thereon, and connected by rods Z with the eccentric U' on the shaft V.

The picks S, working through the lower or adjustable hopper, are secured to bars T in a manner similar to that described for the upper tiers, and such bars are attached by suitable means directly to the straps of eccentrics U.

The plates of the movable hopper may be held in position by pins passed through the side frame and adjacent to such plates.

Situated in the hopper, and located under the first and second double tiers of picks, are retainers or arresters P and Q, the object of which is to hold the coal or other mineral in position before the picks until sufficiently operated upon. I have found in practice that the coal was not properly broken unless these retainers

were used. They may be of any shape or construction desired, and may be made of plain or serrated angle-iron alone or combined with bars or rods, or may be a grating of round or flat bars, the object being to give resistance to the downward passage of the coal until sufficiently broken. If desired, a metal thrust-plate, O, may be secured in the middle of the hopper, and extending across the same from side to side. This acts as a thrust-plate, against which the lumps of coal are held while being split. In the machine shown this plate would not extend much below the second double tier of picks.

The third or lowest double tier of picks are arranged to pass almost entirely across the opening in the hopper, the opposite sides meshing with each other. The upper rows may be arranged to meet point to point, minus the thickness of the thrust-plate and clearance of the same.

The fly-wheels X on either side of the shaft V have crank-pins Y, arranged respectively at right angles to each other to receive connecting-rods Y'. This arrangement enables me to dispense with gearing, and yet insure uniform and simultaneous action to the picks on both sides of the hopper in the same horizontal plane. Belting from counter-shaft pulleys to one or both of the fly-wheels on each axle imparts the actuating power.

From the above description it will be evident that I effect a combination of my two previous patents aforementioned as regards the use of picks secured directly to the eccentric-straps by the means described for the lowest series, and indirectly by means of the rock-shaft arrangement for the two upper series; also, I effect a combination of parts adapted to produce either intermediate sizes or what are known as "domestic" sizes at will by removing the lower series of picks and swinging back the hinged hopper-plates, or by using the same as shown in position.

A modified construction of my invention is shown in vertical section, Fig. 3, adapted more especially, but not solely, to the production of domestic sizes. This consists in the use of two hoppers having the working parts located between them. Such hoppers may have graduated inclined or straight sides, as desired. A single main shaft, V, placed centrally between the hoppers, is furnished at each extremity with a fly-wheel carrying crank-pins, which take the place of eccentrics of the construction already set forth. These latter are connected by rods Z with levers I upon the ends of the rock-shaft H, which projects through each side of the frame-plate. I thus dispense with the use of internal eccentrics for actuating the rock-shaft.

Bearing-boxes, guides, and adjusting-screws are provided (as in the machine previously described) for the ends of the rock-shaft, the cast-metal ellipses in this case being used on both sides of the bearing-boxes. Levers G, secured

to the rock-shaft H, carry the double pick bearers or carriers H', adapted to receive the ends of two single or double sets of picks, pointing in opposite directions, and each passing through perforations in plates of the respective hoppers.

Between the ends of the respective rows of picks, upon the bearing-plates, a loose bar is inserted for such ends to press against when in operation, and when desired, on account of the wear of the pick-points, a wider bar may be inserted. Caps similar to those previously described are used to secure the picks to the bearers by means of bolts. Arresting-bars P and grates Q' are used, as previously described.

The machine is operated by belts on one or both of the fly-wheels.

It will be seen that this arrangement presents a much simpler and cheaper form of breaker than the one previously described, only one main shaft, one rock-shaft, and one set of levers being requisite to actuate the pick shown.

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

1. In a coal and ore breaker, the combination of hoppers B, tiers of picks C C' S, bars D D', levers G, rock-shaft H, lever I, rods Z, shaft V, eccentrics U', bar T, and eccentric U, or their equivalent, substantially as and for the purpose specified.

2. In a coal and ore breaker, the arrester-bars P Q, arranged in a stationary hopper and immediately below the reciprocating tiers of picks, substantially as and for the purpose specified.

3. In a coal and ore breaker, the combination of two shafts, V, provided with cranks at right angles on each end, connecting-rods Y', eccentrics U, rods Z, levers I, rock-shaft H, picks C C', and hopper B, substantially as and for the purpose specified.

4. In a coal and ore-breaker, the combination of a rock-shaft, H, which actuates breaker-picks, bearings J, ellipses L, lever I, bars Z, and eccentric U', substantially as and for the purpose specified.

5. In a coal and ore-breaker, the combination of fly-wheels X, provided with crank-pins Y, connecting-bars Y', shafts V, eccentrics U, bars T, picks S, and movable hopper-plates R, substantially as and for the purpose specified.

6. In a coal and ore breaker, the combination of reciprocating picks C C', hopper B, thrust-plate O, and arrester-bars P Q, substantially as and for the purpose specified.

7. In a coal and ore breaker, the picks C, provided with grooves on their ends, in combination with tongued plate E, bar D, and bolts F, substantially as and for the purpose specified.

8. In a coal and ore breaker, the combination of reciprocating picks C C', hopper B,

thrust-wall O, arrester-bars P Q, movable hopper-plates R, picks S, rock-shaft H, ellipses L, and mechanism to operate said rock-shaft and picks, substantially as and for the purpose
5 specified.

9. In a coal and ore breaker, the combination of a stationary hopper for the production of domestic sizes of coal with an adjustable hopper attached to and situated below, for the

production of smaller sizes, and picks operated by suitable mechanism, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

PHILIP H. SHARP.

Witnesses:

ALBERT G. CUMMINGS,
ED. M. KILLOUGH.