

No. 707,945.

Patented Aug. 26, 1902.

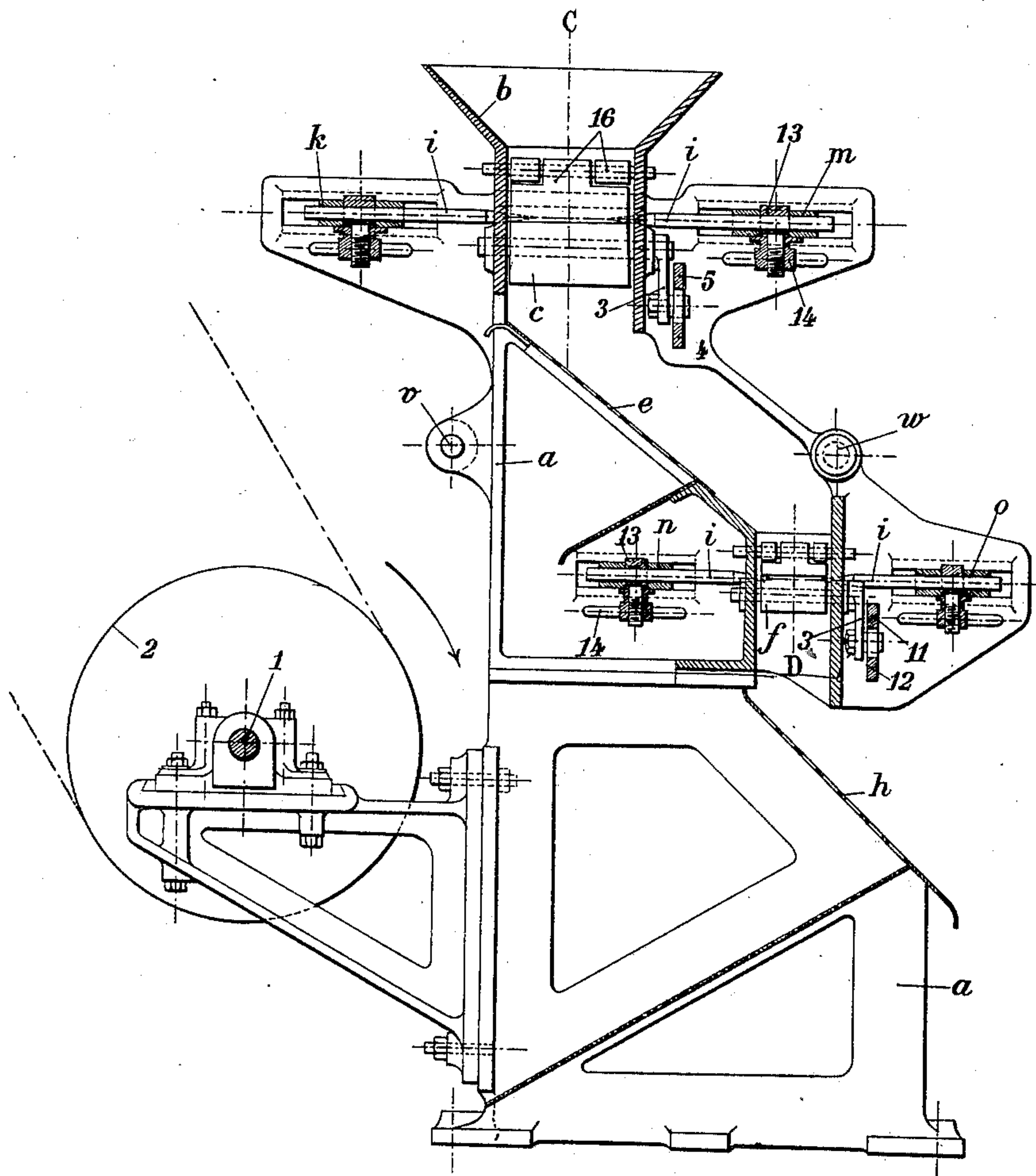
L. DE B. DE SAUVIGNY.
MACHINE FOR COAL BREAKING.

(Application filed July 15, 1901.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1



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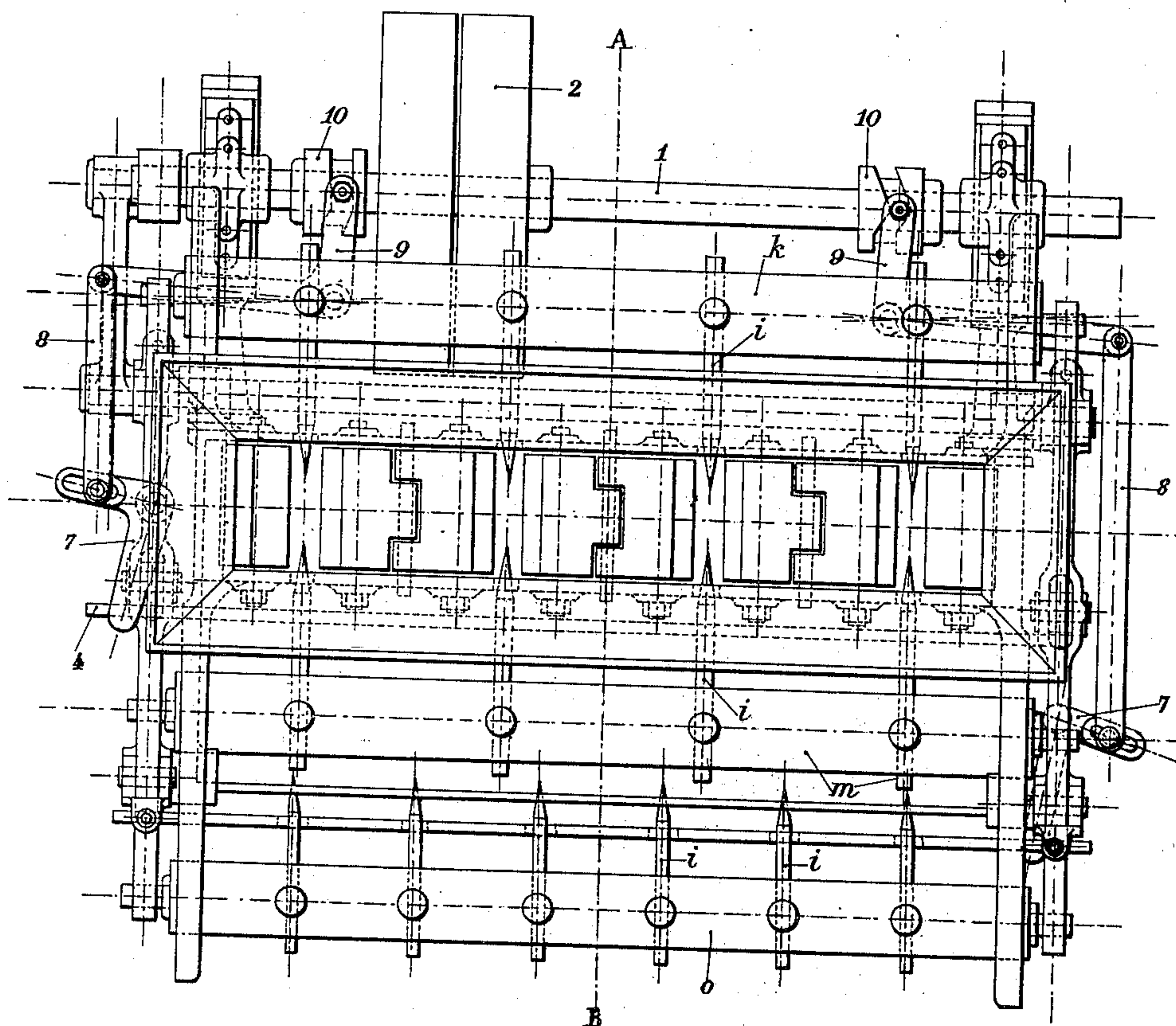
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Fig. 2



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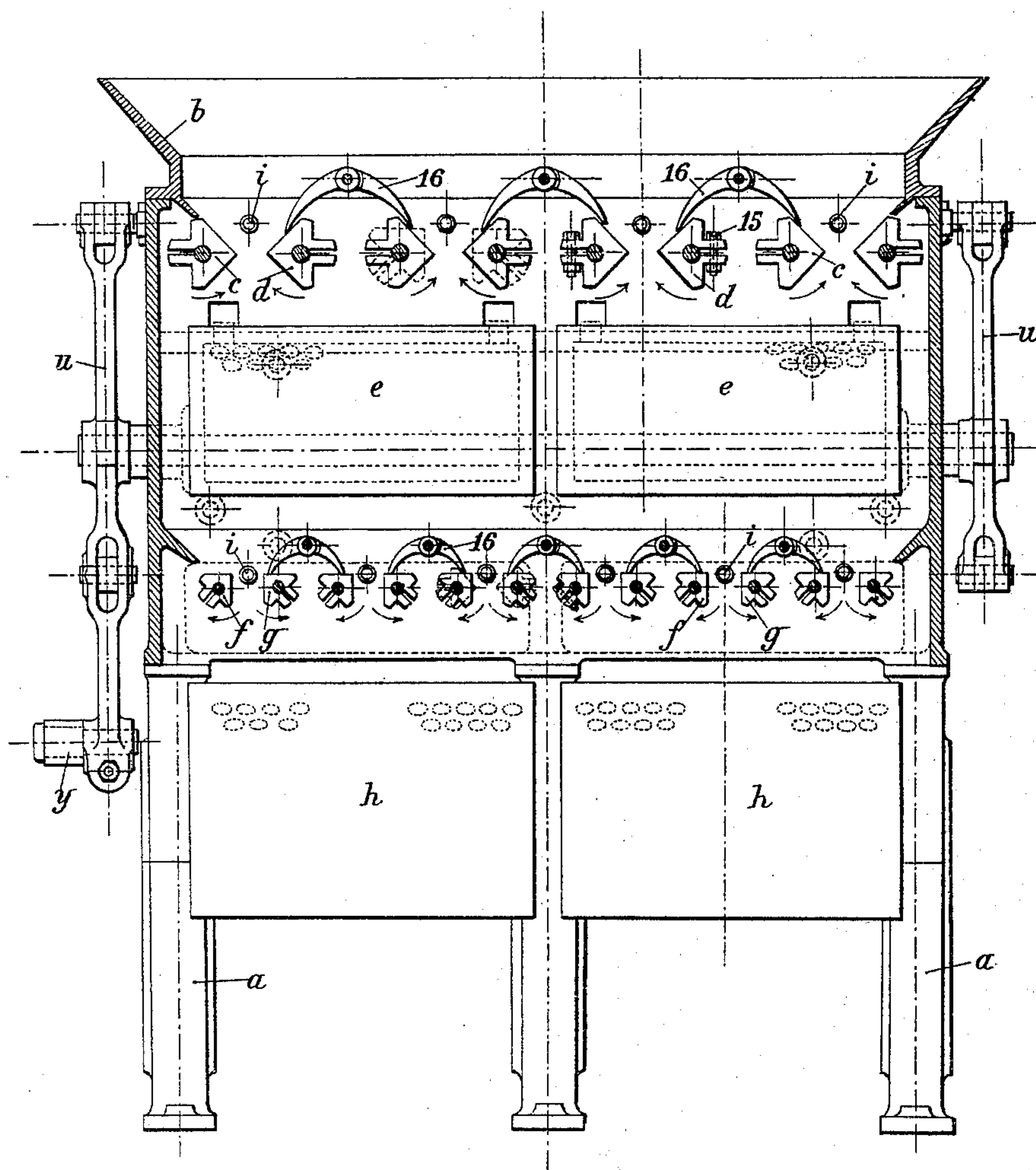
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Fig. 3



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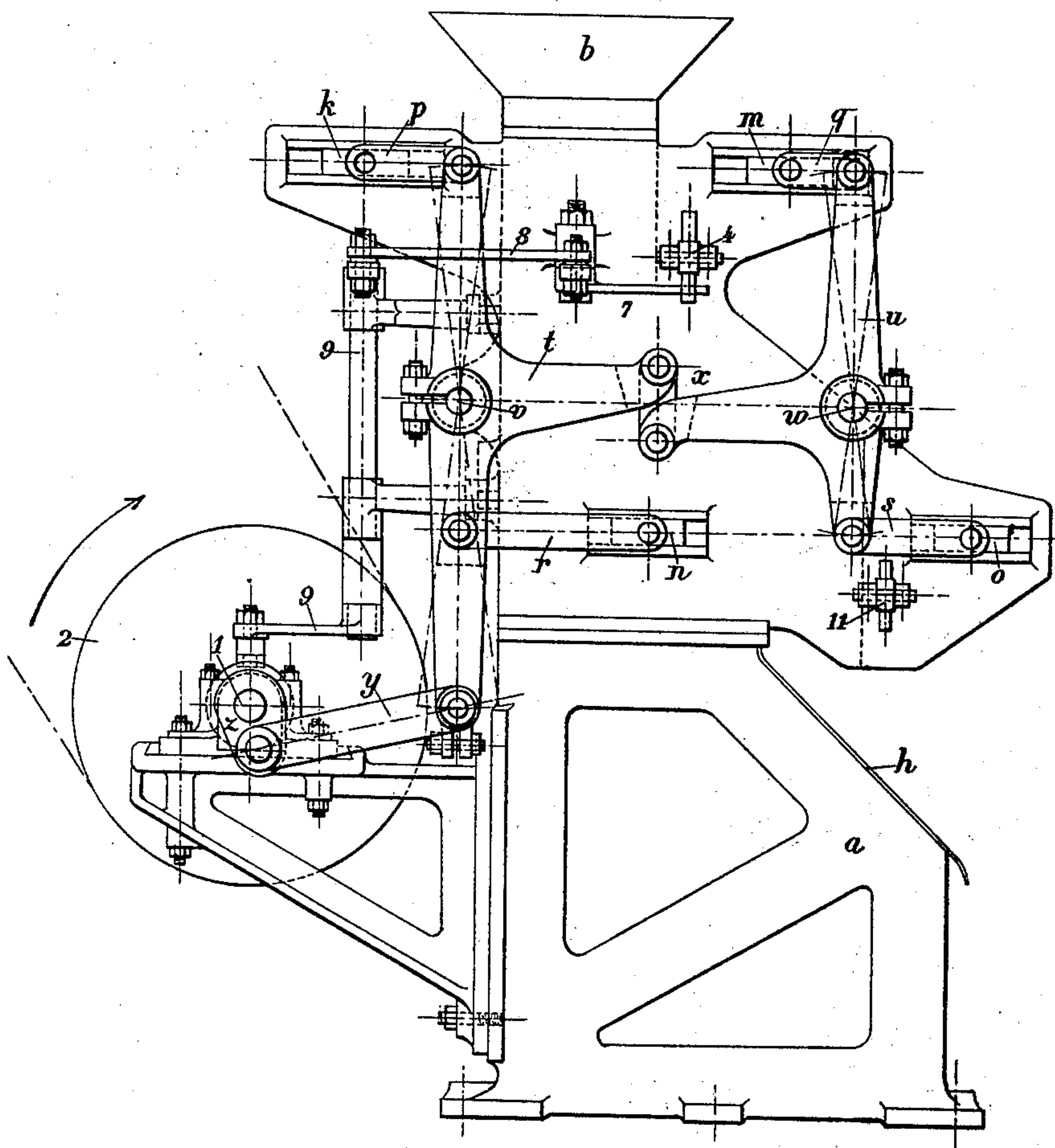
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Fig. 4



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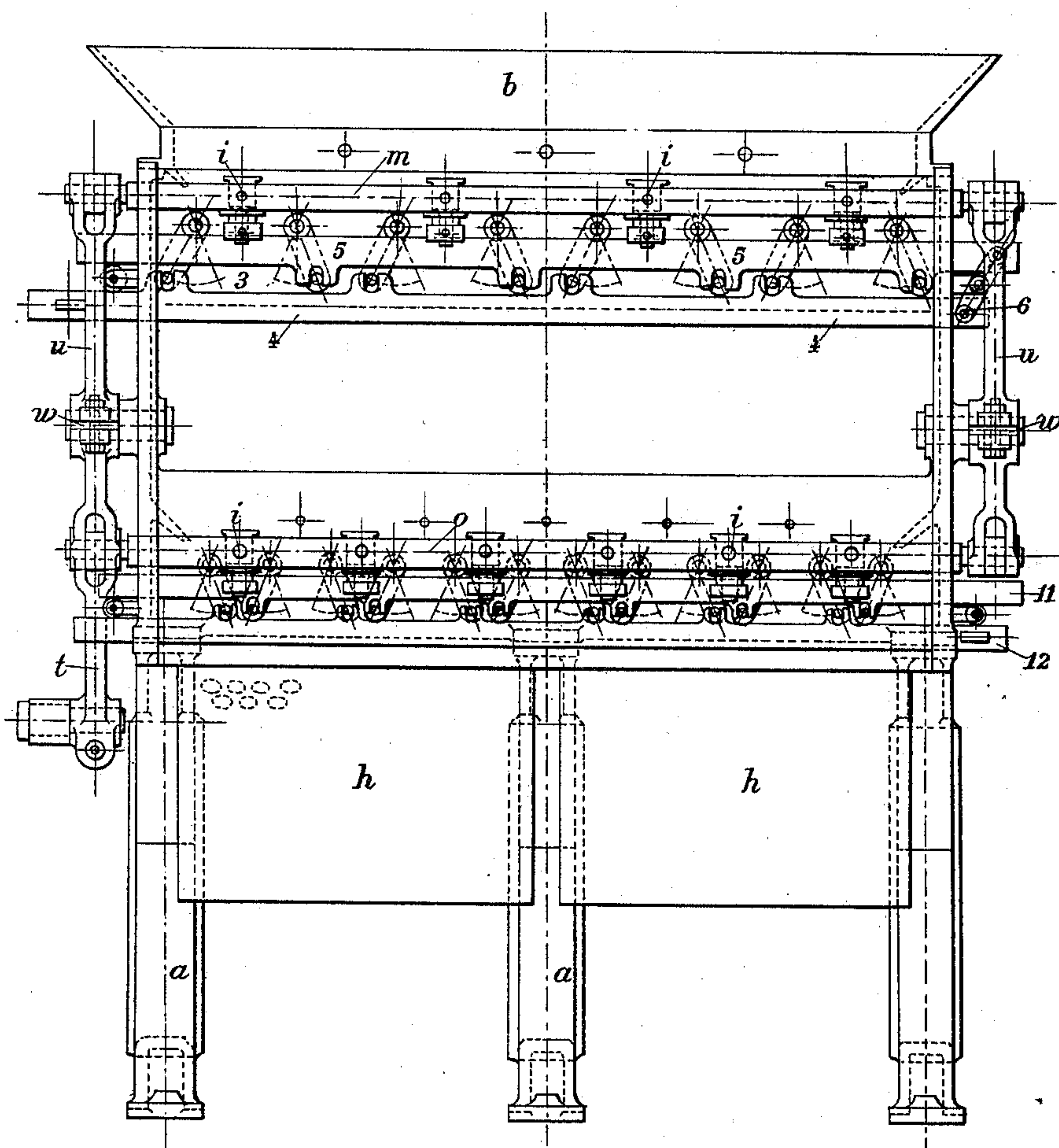
L. DE B. DE SAUVIGNY.
MACHINE FOR COAL BREAKING.

(Application filed July 15, 1901.)

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Fig. 5



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UNITED STATES PATENT OFFICE.

LÉON DE BERTIER DE SAUVIGNY, OF PARIS, FRANCE.

MACHINE FOR COAL-BREAKING.

SPECIFICATION forming part of Letters Patent No. 707,945, dated August 26, 1902.

Application filed July 15, 1901. Serial No. 68,376. (No model.)

To all whom it may concern:

Be it known that I, LÉON DE BERTIER DE SAUVIGNY, a citizen of France, residing at 17 Rue St. Marc, Paris, France, have invented certain new and useful Improvements in Machines for Coal-Breaking and the Like, of which the following is a specification.

This invention relates to machines for breaking coal, coke, and similar substances, it being adapted especially for the working of coal and being adapted to effect large savings in coal.

The principle of the machine consists in breaking each piece of coal by the action of two picks or points set opposite to each other and having an alternate approaching and receding motion, in combination with a system of prisms or prismatic roller-jaws movable about their axes and intended to retain each piece of coal until it has been subjected to the action of the picks. These prisms or jaws ought to remain fixed during the time that the picks are penetrating the coal, and they ought to commence to move immediately thereafter in order to permit the descent of the pieces of coal of the desired size. A certain number of sets or tiers of working parts, each consisting of a series of prism-jaws and two series of picks, are superposed above each other, so that the pieces produced by one set are brought under the action of the lower set.

The present invention has for its object a practical industrial machine in which certain existing defects have been carefully eliminated, as will now appear.

Figure 1 is a vertical transverse section on the axis of the machine, taken on the line A B of Fig. 2. Fig. 2 is a plan. Fig. 3 is a section on the line C D of Fig. 1. Fig. 4 is a side elevation. Fig. 5 is a front view.

The machine consists of a body or frame *a*, formed in two parts, placed one on the other. The upper part forms the hopper *b*, into which the coal to be broken is emptied and from which it falls onto the first tier or set of oscillatory rectangular prisms (hereinafter termed "jaws") *c* and *d*, Fig. 3. These jaws are actuated simultaneously approximately a distance equaling the one-eighth part of a circle, which is communicated to them in the manner hereinafter described. From this it results that the section of the passage or opening left

between the jaws keeps varying constantly, being at a minimum when the jaws occupy the position shown in Fig. 3 (upper set) and at a maximum when each prism has turned through forty-five degrees, so that the upper faces become horizontal, as shown in the lower set of parts in Fig. 3. This last section is so calculated as to only allow the medium-sized and small pieces of coal to pass and to retain the large pieces until they have been submitted to the action of the picks. The medium-sized and small pieces on leaving the upper tier fall upon a sieve *e*, which allows the small ones to pass and conveys the medium-sized ones into the second tier onto the set of jaws *f* and *g*, which are of smaller dimensions and closer together than those of the other tier. The small pieces which are allowed to pass through the sieve *e* fall onto an inclined plate, which discharges them from the machine. The arrangement of the successive tiers in echelon or alternating, with the interposition between each pair of consecutive tiers of a sieve *e*, has the effect of withdrawing or eliminating thirty per cent. of the coal without its passing into the lower tiers.

Parallel to the axes of the jaws and situated a little above them are the picks *i*, arranged two and two in line with each other and their points facing each other. These picks are each fixed on a slide, such as *k*, there being one set of picks for one set of jaws, the machine shown therefore allowing of four slides *k m n o*, which work in suitable guides arranged in the frame *a*. At each of their extremities these slides carry a pivot to which is coupled a link *p q r s*. These are in their turn coupled to the extremities of two rocking levers *t u*, working on pivots *v* and *w*, carried by the frame *a*, Fig. 1. The rocking levers at each side of the machine are connected to one another by a link *x*, and the lever *t* is actuated by a link *y*, secured to a crank *z*, carried by the shaft 1. This shaft extends along the whole length of the machine and receives its movements from the pulley 2. An inspection of Fig. 2 will show that under these conditions the two slides *k* and *m* will advance or approach each other while the two slides *n* and *o* are receding from each other. It is the advancing movements of the

slides, and hence of the picks, which effect the breaking or disintegration of the coal. The movement of the jaws through the one-eighth part of a circle in the direction required is communicated to said jaws in the following manner: On the axis of each of the upper jaws is keyed a crank-arm 3, the extremity of which is coupled to a controlling-rod 4 or 5, as the case may be, the jaws *c* being coupled to the rod 4, while the jaws *d* are coupled to the rod 5. The rod 4 itself actuates the rod 5, through the medium of a reversing-link 6, such that the two rods are displaced in opposite directions. The rod 4 receives a reciprocating motion from a bell-crank lever 7, coupled by a link 8 to another bell-crank or like lever 9, Fig. 4, which is actuated by a cam 10, keyed on the driving-shaft 1. On the other side of the machine is situated an identical arrangement for operating the jaws *f* and *g* through the medium of the rods 11 and 12.

The picks *i* are fixed on their respective slides *k m n o* by the aid of stirrups 13, tightened or clamped by means of screws 14, Fig. 1.

The jaws *c d f g* are slotted or divided parallel to their axes and are fixed on the latter by means of clamping-bolts 15, Fig. 3. As each two consecutive prisms turn in opposite directions, it should be arranged to have the breakage take place between the prisms pair by pair, to insure which the corresponding spaces or intervals are closed by the aid of hinged covers 16, Figs. 1 and 3.

From the preceding description it will be evident that my machine includes jaws arranged in pairs, picks arranged in pairs adapted to travel toward and from each other, and mechanism for coördinately reciprocating the picks and oscillating the jaws.

The action of the machine is as follows: Assuming the parts to be in the position shown in the drawings, the rotation of the crank-arm *z* brings about the advance or approach of the upper picks and the retirement or separation of the lower ones. During this time the cam 10 keeps the upper jaws stationary, while the corresponding cam imparts to the jaws of the lower set their movement of one-eighth of a turn. When the crank *z* has traveled through one hundred and eighty degrees, the parts are all returned to the position indicated in the drawings. As it continues its movement the upper picks become separated and the upper jaws commence their turning movement, while the lower picks commence to approach and their corresponding jaws become fixed. It is absolutely necessary that the jaws should be brought to a stop while the picks penetrate the coal to be broken.

What I claim is—

1. A machine of the class described including a plurality of superposed jaws arranged

in pairs, means for actuating said jaws, picks also arranged in pairs and adapted to coact with the respective pairs of jaws, means for actuating the picks, and a sieve adapted to receive the crushed material from the upper jaws and serving to separate the fine material from the coarse and to direct the latter toward the lower jaws.

2. A machine of the class described including a plurality of superposed oscillatory jaws arranged in pairs and polygonal in cross-section, picks also arranged in pairs and adapted to coact with the respective pairs of jaws, means for actuating the picks, and a sieve adapted to receive the crushed material from the upper jaws and serving to separate the fine material from the coarse and to direct the latter to the lower jaws.

3. A machine of the class described including a plurality of superposed jaws arranged in pairs, means for actuating said jaws, picks also arranged in pairs and adapted to coact with the respective pairs of jaws, means for actuating the picks, a sieve adapted to receive the crushed material from the upper jaws and serving to separate the fine material from the coarse and to direct the latter toward the lower jaws, and means bridging the adjacent jaws of the respective pairs to prevent the passage of material therebetween.

4. A machine of the class described including jaws arranged in pairs, picks arranged in pairs adapted to travel toward and from each other, and mechanism for coördinately reciprocating the picks and oscillating the jaws.

5. A machine of the class described including jaws arranged in pairs, picks arranged in pairs adapted to travel toward and from each other, mechanism for coördinately reciprocating the picks and oscillating the jaws, and means for bridging the jaws of the respective pairs to prevent the passage of material between the same.

6. A machine of the class described including a plurality of superposed oscillatory jaws, picks also arranged in pairs to coöperate with the respective pairs of jaws, a sieve arranged to receive the crushed material from the upper jaws and serving to separate the fine material from the coarse and to direct the latter toward the lower jaws, and mechanism for oscillating the upper and lower jaws in opposite directions and for simultaneously reciprocating said picks in opposite directions.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LÉON DE BERTIER DE SAUVIGNY.

Witnesses:

EDWARD P. MACLEAN,
ALFRED FREY.