April 8, 1941. J. SIMON 2,237,749

CRUSHING DEVICE FOR COAL CRUSHING MACHINES

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Fig. 2

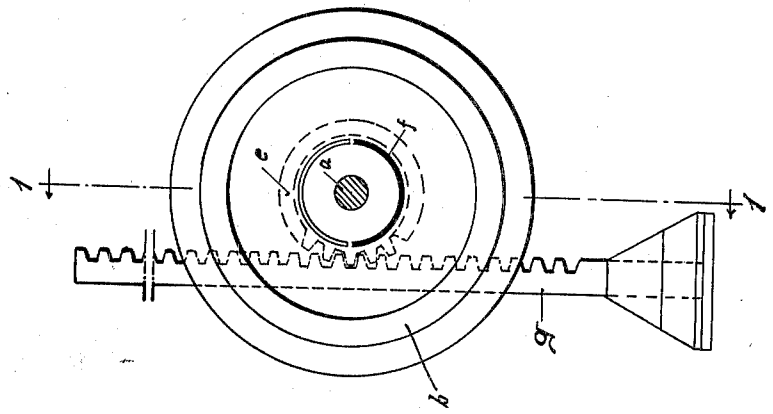

Fig. 1

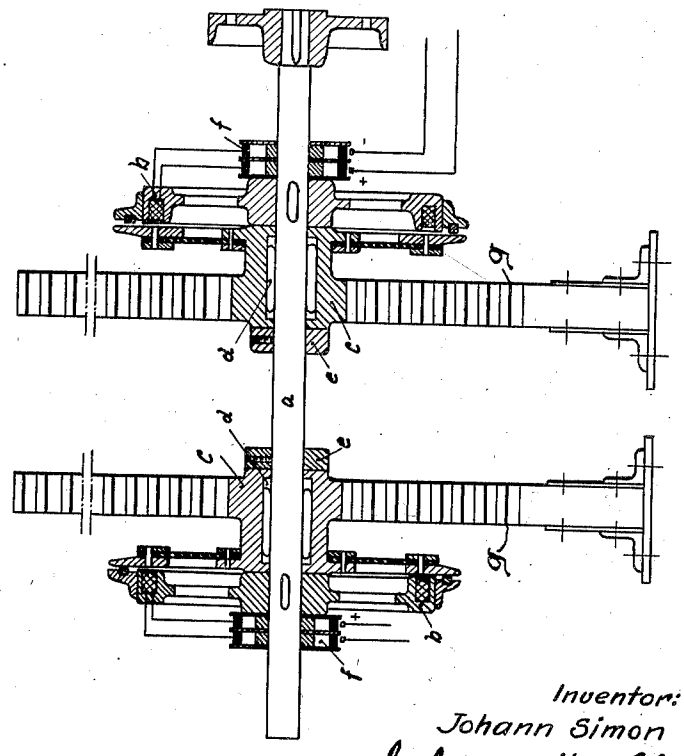

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Fig. 4

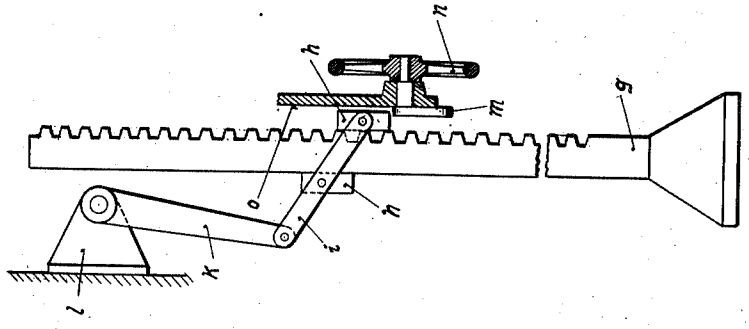
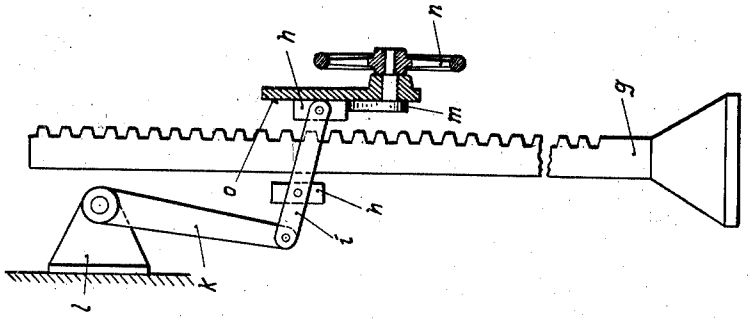


Fig. 3



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UNITED STATES PATENT OFFICE

2,237,749

CRUSHING DEVICE FOR COAL CRUSHING MACHINES

Johann Simon, Saarbrucken, Germany

Application August 19, 1939, Serial No. 291,014
In Germany July 11, 1938

2 Claims. (Cl. 74—34)

The crushing, compacting, or stamping rods of coal-crushing or compressing machines are, as is well known, lifted by means of a machine and then they drop down freely from the highest position.

Since the coal-cake is crushed or compacted from below upwards in individual layers, it is necessary that the crushing rod shall be automatically adjusted at any height without the stroke being reduced.

Different forms of construction of the operative means of the crushing rods are known for this purpose, for instance constructions comprising belts and clamping jaws and constructions comprising a crank drive and ratchet.

However, all these known forms of construction have the disadvantage that they comprise many movable parts, so that the reliability of operation suffers and the cost of maintenance is high.

According to the present invention the crushing rod is constructed in the form of a rack which is controlled from a decoupling device through the intermediary of a loose pinion.

The said coupling must be operative during the upward movement, that is to say, during half a revolution, and during the time that the rod moves downwards, that is to say, during the second revolution the coupling must be disconnected.

The invention is illustrated in the accompanying drawings, in which Fig. 1 is a partial side elevation in section on the line 1—1 of Fig. 2;

Fig. 2 is a partial end elevation of the apparatus shown in Fig. 1;

Figs. 3 and 4 are partial end elevations omitting parts shown in Fig. 2 and showing parts omitted in Fig. 2;

Figs. 1 and 2 show by way of example the improved crushing device which is provided with decoupling means consisting of a magnetic coupling.

The fixed halves *b* of the coupling are keyed on the shaft *a*. The loose coupling halves *c* are constructed as pinions and are mounted loosely on the shaft *a* through the intermediary of the roller bearing *d*. They are kept in position laterally by the adjustable collars *e*.

The control cylinders *f* are also secured to the shaft, which control cylinders carry current over half their periphery, being de-energised over the other half.

g are the crushing rods which are toothed. The whole of the device consists essentially of only 3 parts, viz., the toothed crushing rod, the magnetic coupling provided with the pinion and the control cylinders.

The magnetic coupling may be accommodated also in the driving gear of the crushing device; in that case the device is smaller, corresponding to the torque, and can nevertheless be controlled from the main shaft.

If a mechanical decoupling device is used instead of the magnetic coupling, the control cylinder is dispensed with and a mechanical controlling device is used instead.

In order that it may not be necessary to stop the machine when fresh crushing mass is introduced, the crushing means are provided with a fixing device in order to hold the crushing rod in its highest position. A form of construction of this arrangement is illustrated in Figures 3 and 4. The fixing device consists of two fixing members *h* which are rotatably mounted on levers *i* provided on both sides of the crushing rod. The two parallel levers *i* form a pair of levers, which is freely articulated to the pedestal of the machine on the one side of the crushing rod by means of the lever *k* and the bracket *l*. On the other side of the crushing rod the lever pair *i* is so arranged that the fixing member *h* may be lifted by means of an eccentric *m* which is operated by the hand wheel *n*. In order that the two fixing members may be lifted off the crushing rod when the lever pair is lifted by the eccentric a sliding surface *o* is provided on the side of the eccentric (see Figure 3). In the lifted position of the fixing members the crushing rod is freely movable. In the adjustment of the eccentric shown in Figure 4 the crushing rod is movable only upwards, since only during the upward movement is the crushing rod released by the fixing members. However, the fixing members clamp the crushing rod immediately the latter has a tendency to move downwards. For this reason the crushing rod is always reliably held in the uppermost position by the fixing device.

I claim:

1. A stamping device for coal compressing machines, comprising in combination a stamping rod including a rack bar portion, a main shaft, a pinion in toothed engagement with said rack bar portion, clutch means operable to connect and disconnect said shaft and pinion to effect lifting and permit falling means of said rod, and means for releasably holding said rod in an elevated position comprising a lever, holding members carried by said lever at opposite sides of said rod, lever supporting means pivotally connected to said lever at one side of the rod and

means for raising and lowering the portion of the lever at the opposite side of said rod to thereby move said members into and out of holding engagement with said rod.

2. A stamping device for coal compressing machines comprising in combination, a stamping rod including a rack bar portion, a main shaft, a pinion in toothed engagement with said rack bar portion, clutch means operable to connect and disconnect said shaft and pinion to effect lifting and permit falling means of said rod, and means for releasably holding said rod in an elevated position comprising a lever, holding members carried by said lever at opposite sides of said rod, lever supporting means pivotally connected to said lever at one side of the rod and means comprising an eccentric and a hand wheel for rotating said eccentric, adapted to raise and lower the portion of the lever at the opposite side of said rod when said hand wheel is rotated and thereby move said members into and out of operative engagement with said rod.

JOHANN SIMON.