

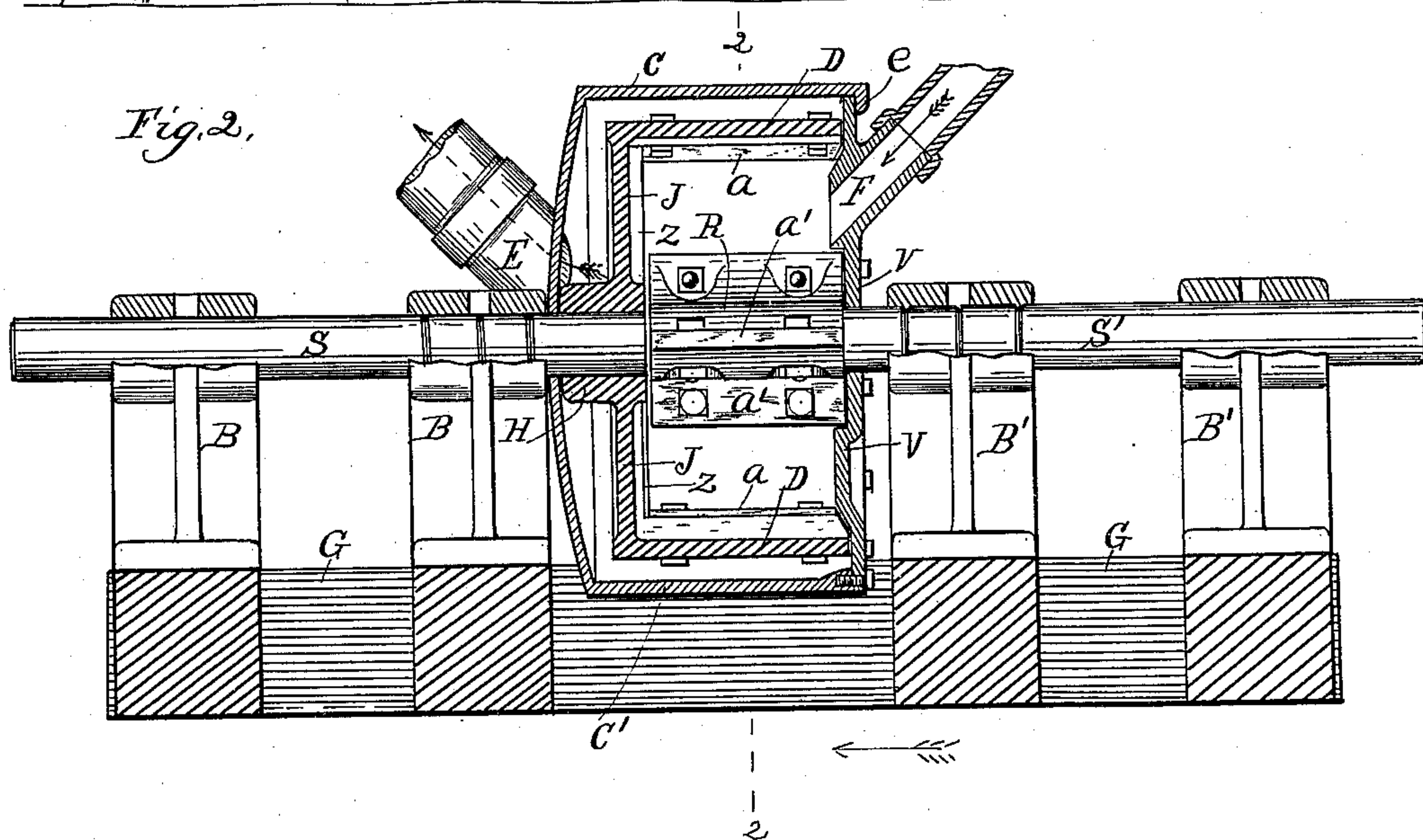
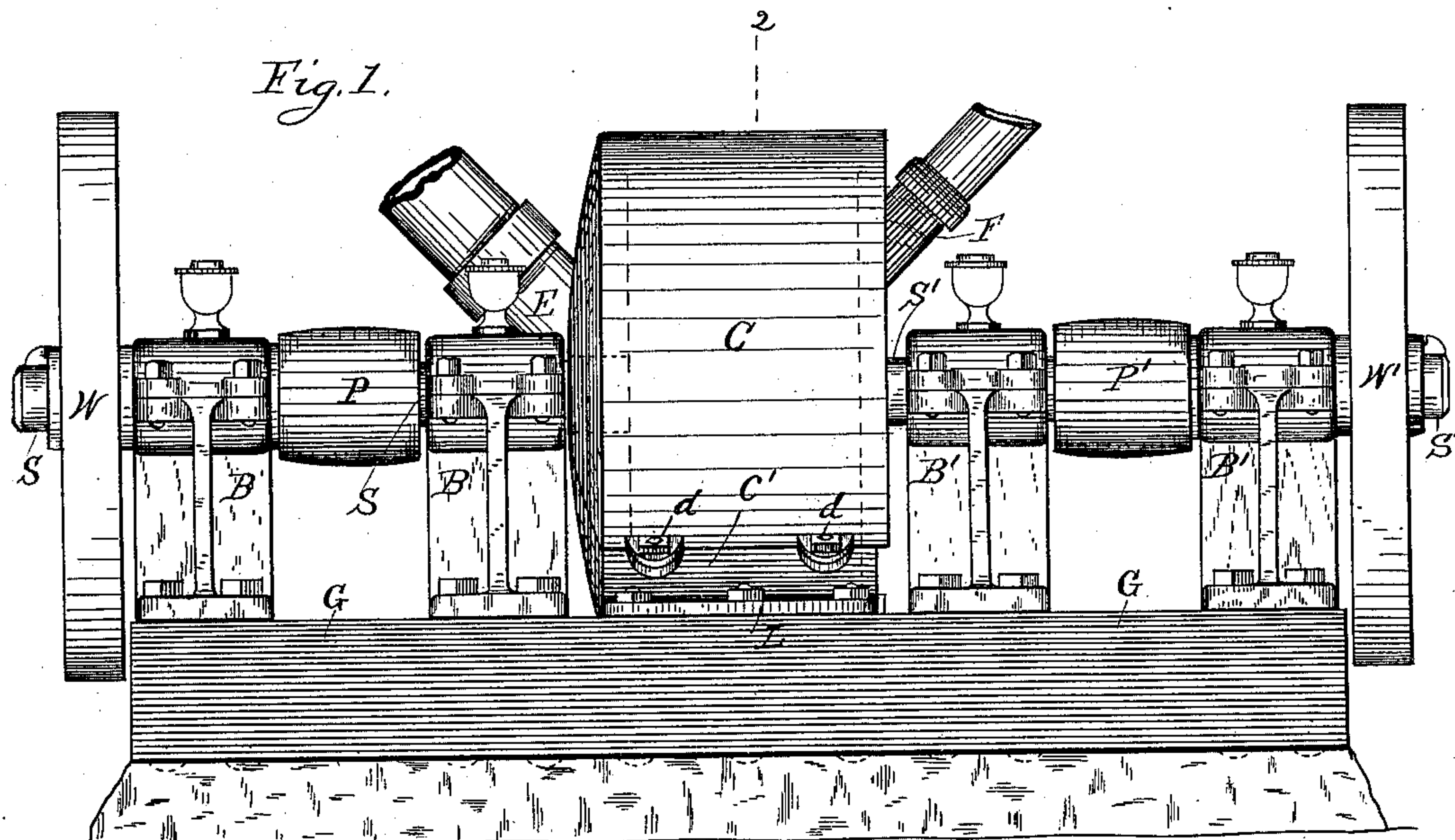
(No Model.)

2 Sheets—Sheet 1.

A. D. SEARLS, Sr., A. D. SEARLS, Jr., & D. C. SEARLS.
PULVERIZING MACHINE.

No. 376,112.

Patented Jan. 10, 1888.



Witnesses,
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Inventors,
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

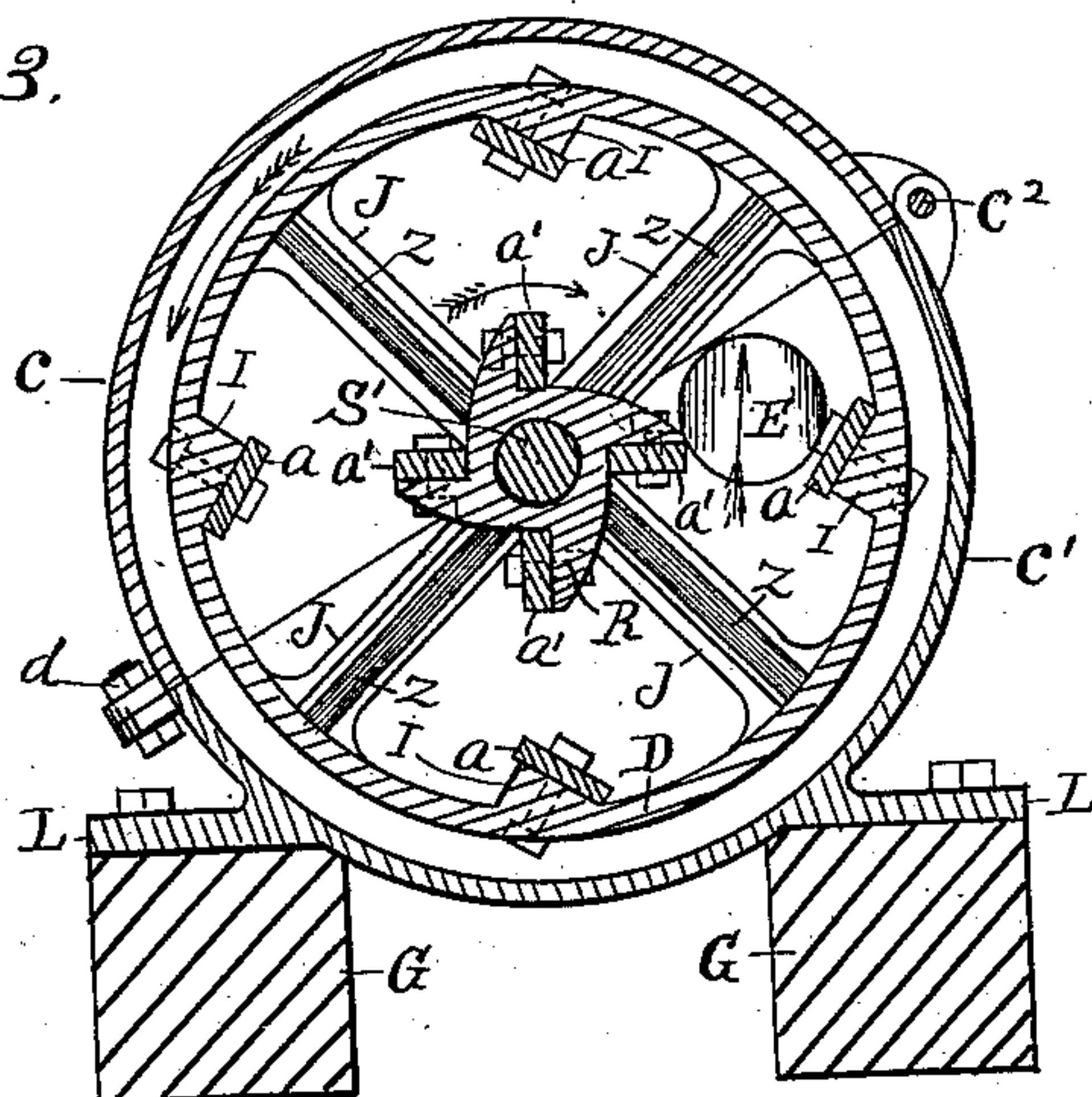


Fig. 4.

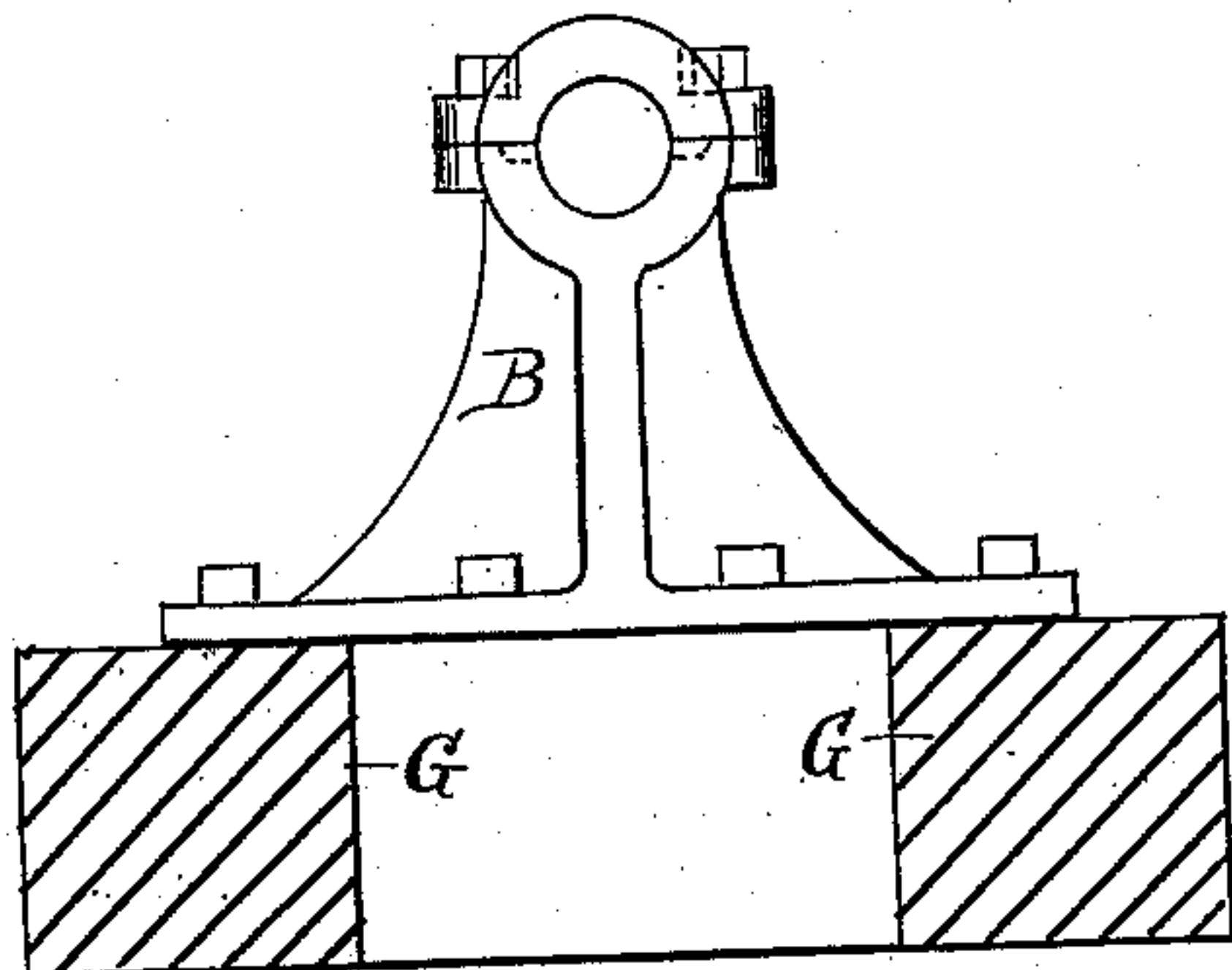


Fig. 5.

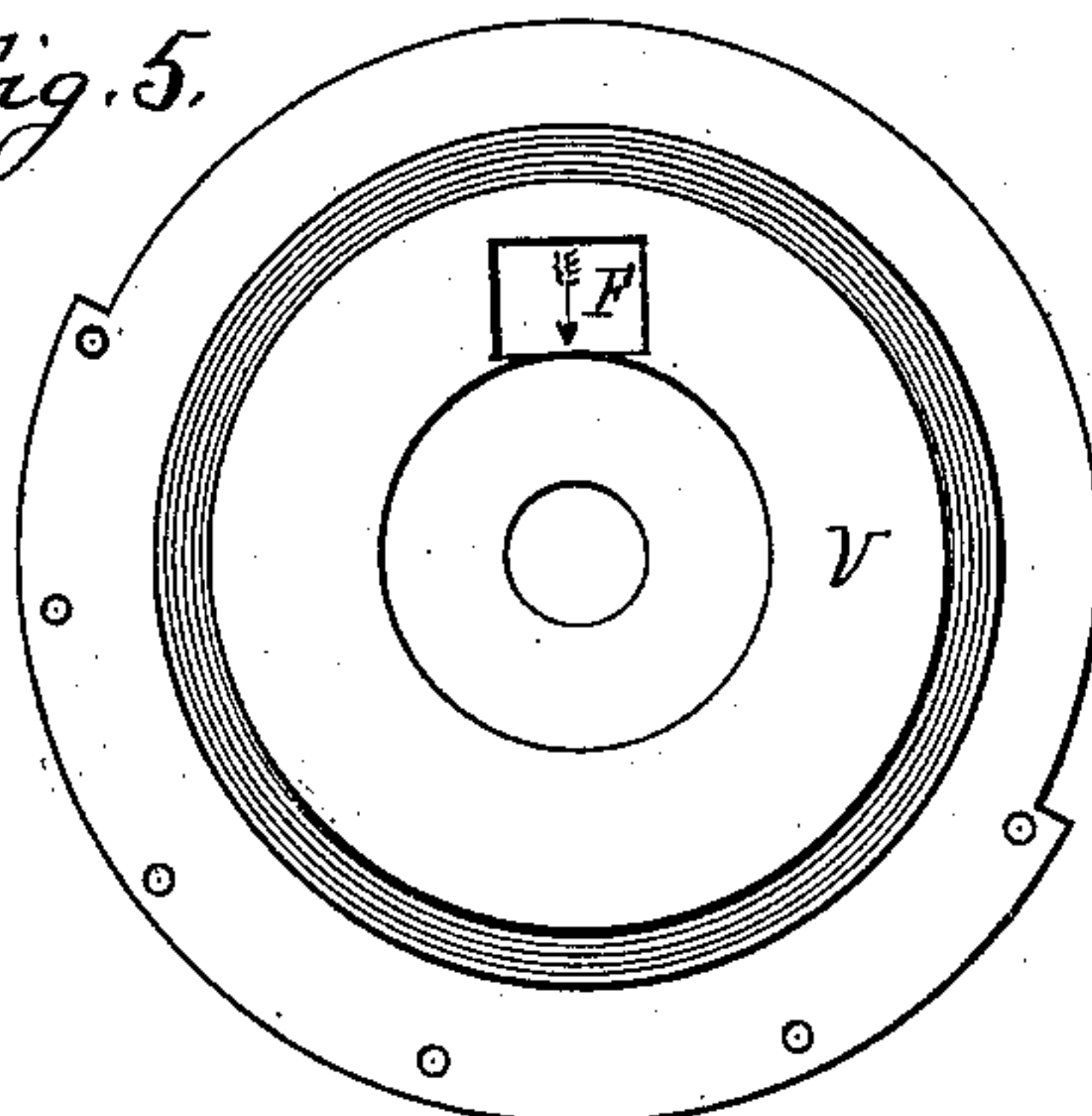


Fig. 6.

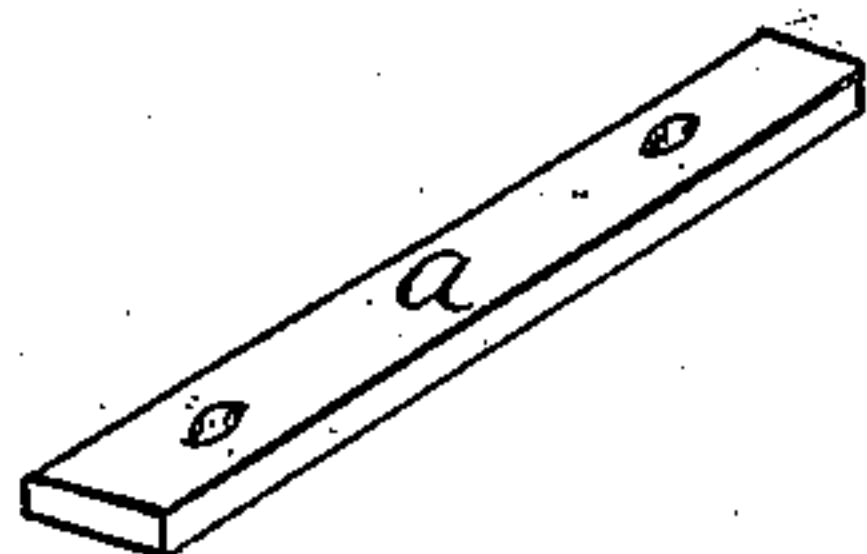
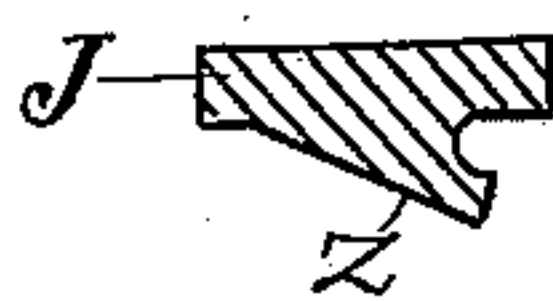


Fig. 7.



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UNITED STATES PATENT OFFICE.

AUSTIN D. SEARLS, SR., OF SEWARD, AUSTIN D. SEARLS, JR., OF CHANNAHON, AND DEWITT CLINTON SEARLS, OF TROY, ILLINOIS.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 376,112, dated January 10, 1888.

Application filed April 18, 1887. Serial No. 235,158. (No model.)

To all whom it may concern:

Be it known that we, AUSTIN D. SEARLS, Sr., residing at Seward, Kendall county, AUSTIN D. SEARLS, Jr., residing at Channahon, Will county, and DEWITT CLINTON SEARLS, residing at Troy, in Will county, in the State of Illinois, all citizens of the United States of America, have invented certain new and useful Improvements in Pulverizing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain improvements in pulverizing-machines for pulverizing dry materials—such as ores, paints, bark, and the like—the construction and operation of which are fully set forth and explained in the following specification and claims, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form a part of this specification, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a central vertical longitudinal section of the revolving drum, the stationary case, and the feed-spout of the machine and a portion of the boxes, and a side view of the revolving beater-head, the shafts, the exit-pipe, and box-standards. Fig. 3 is a vertical cross sectional view of the machine, on line 2 of Figs. 1 and 2, looking in the direction indicated by the arrow. Fig. 4 is a side view of one of the standard-boxes and a cross-sectional view of the bed-sills of the machine. Fig. 5 is an inside plan view of one head of the machine-case. Fig. 6 is a perspective view of one of the beater-plates of the machine. Fig. 7 is a cross-sectional view of one of the arms of the revolving drum of the machine.

Referring to the drawings, G represents a pair of parallel bed-sills, to which are securely bolted the stationary parts of the machine, and are arranged a little distance apart and connected by suitable cross-beams to form a strong solid frame.

B B and B' B' represent standard-boxes, and are securely bolted to sills G in such manner as to be in pairs and in exact line.

S and S' represent a pair of shafts, and are arranged, respectively, in the boxes B B and B' B' in such manner that their facing ends nearly

meet and their opposite ends project a short distance from their respective outer box.

D represents a drum open at one end, and having arms J (see Figs. 2 and 3) at its opposite end, connecting it with a central side projecting hub, H, which hub is bored to fit shaft S, and is securely keyed on the inner end of said shaft in such manner that said drum will surround the inner end of shaft S'. Said drum is provided on its inner surface with a series of inclined longitudinal ribs, I, as shown in Figs. 2 and 3, and to the inclined face of said ribs are securely bolted a series of beater-plates, a, also shown in said figures. The arms J of said drum are each formed or provided with a longitudinal inclined rib, Z, on their side, within drum D, as shown in Figs. 2 and 3, and in cross-section in Fig. 7, which incline in the same direction as plates a of the drum.

R represents a beater-head, which is securely fixed on the inner end of shaft S', within drum D, (see Figs. 2 and 3,) and is formed with a series of longitudinal ribs, to which is securely bolted a series of beater-plates, a', as shown in Figs. 2 and 3. Said drum and beater-head are adapted to rotate at high speed, one in the reverse direction from the other, which will cause the atmosphere within the drum to be actively agitated, and more especially by means of said beater-plates.

P and P' are a pair of belt-pulleys, respectively secured on shafts S and S' between their boxes, and are for the purpose of rotating said shafts with their fixed parts by means of belts passing over said pulleys in the usual manner. W and W' represent a pair of balance-wheels, respectively secured on the outer part of said shafts S and S', and are for the purpose of governing the speed of the machine; but, however, said balance-wheels may be omitted, if desired, as strong belts will drive the machine in a very uniform manner under all ordinary circumstances. The hubs of said pulleys and balance-wheels are arranged to bear against the shaft-boxes (see Fig. 1) in such manner as to prevent lateral movement of said shafts, in order that the drum D and beater-head R may be closely fitted when the balance-wheels W and W' are omitted. Collars are arranged on the shafts in their place,

which act in like manner to prevent lateral movement of said shafts. Annular grooves, as shown in Fig. 2, may be turned in said shafts within their boxes and run with babbet, which will also hold them from lateral movement.

c and *c'* and *v* represent parts forming a stationary case, (see Figs. 1, 2, 3, and 5,) which inclose the drum *D* and beater-head *R*, as shown. The lower part, *c'*, of said case is provided or formed with feet *L L*, as shown in Figs. 1 and 3, which rest upon and are firmly bolted to the bed-sills *G G*, to properly hold said case in position. The part *v* of said case forms one of its heads, and is fitted and secured to the lower fixed part, *c'*, by means of screws, as shown in Fig. 2. The upper part, *c*, of said case is hinged to part *c'*, as shown at *c''* in Fig. 3, and is adapted to be turned back to open said case to expose the parts within, and when closed it is secured to the lower part, *c'*, on its side opposite said hinges, by means of bolts *d d* through eye-lugs of said two parts, as shown in Figs. 1 and 3. Said part *c* is formed with an outwardly-projecting flange, *e*, (see Fig. 2,) on its side next head *v*, for overreaching and holding the upper part of said head when the case is closed. The opposite head of said case from part *v* is formed by the sides of parts *c* and *c'*. *F* represents a feed-spout arranged through and is a part of head *v*, (see Figs. 1, 2, and 5,) through which the material to be pulverized is conducted to the chamber within drum *D*, surrounding beater-head *R*.

E represents an exit-pipe (see Figs. 1, 2, and 3) arranged leading from said case, and through which the pulverized material is drawn from the machine by means of the suction of a forced air-blast connecting said pipe. (Not necessary to be shown.)

In operation the drum *D* and beater-head *R* are intended to be rotated at equal speed of about two thousand revolutions a minute in reverse directions from each other. The material to be pulverized is conducted through spout *F* from a supply above to the chamber within drum *D*, surrounding beater-head *R*, and as it enters said chamber it comes in contact with the said beater-plates, and is actively agitated by said beaters, by striking said beaters, by particles striking each other, and by being rapidly thrown from the beaters of head *R* to those of the drum, and from the beaters of the

drum to those of head *R* and against the walls of said chamber, and also by the action of the agitated air within said chamber until pulverized, when it is drawn from said chambers between arms *J* of said drum into the surrounding case and out through pipe *E* by means of the suction of a forced air-blast, as described. The open end of drum *D* operates close to head *v* of the case, and thus prevents the material from escaping from said chamber at that end, and while the material is within said chamber in the act of being pulverized it is prevented from escaping with the material which has been pulverized by means of the inclined ribs *Z* of arms *J* engaging and throwing it back, as it is then too heavy to be drawn out by the suction of air. It is intended that the beater-plates of the machine shall be of hardened steel, to preserve them from wear as much as possible.

The several arrows shown in the drawings represent the direction in which the beaters rotate and the course of material to the machine before pulverized and its course from the machine after being pulverized.

Air is supplied into the machine through feed-spout *F*, together with the material, and thus is constantly drawn across the pulverizing-chamber of the machine, and constantly gathering and taking from the machine the material as soon as it becomes pulverized and the particles light enough to be carried with the air.

Having thus described our invention, what we claim as new and useful, and desire to secure by Letters Patent, is as follows, to-wit:

In the pulverizing-machine shown and described, the combination of the rotatable drum *D*, having the inclined lugs or projections *I* on its inner peripheral surface, beaters *a*, secured to the inclined faces of said lugs, arms *J*, having inclined faces, beaters *Z*, secured to the inclined faces of said arms, rotatable beater-head *R*, arranged within said drum and adapted to rotate in an opposite direction therefrom, and the beaters *a*, secured to said beater-head, substantially as and for the purpose set forth.

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