

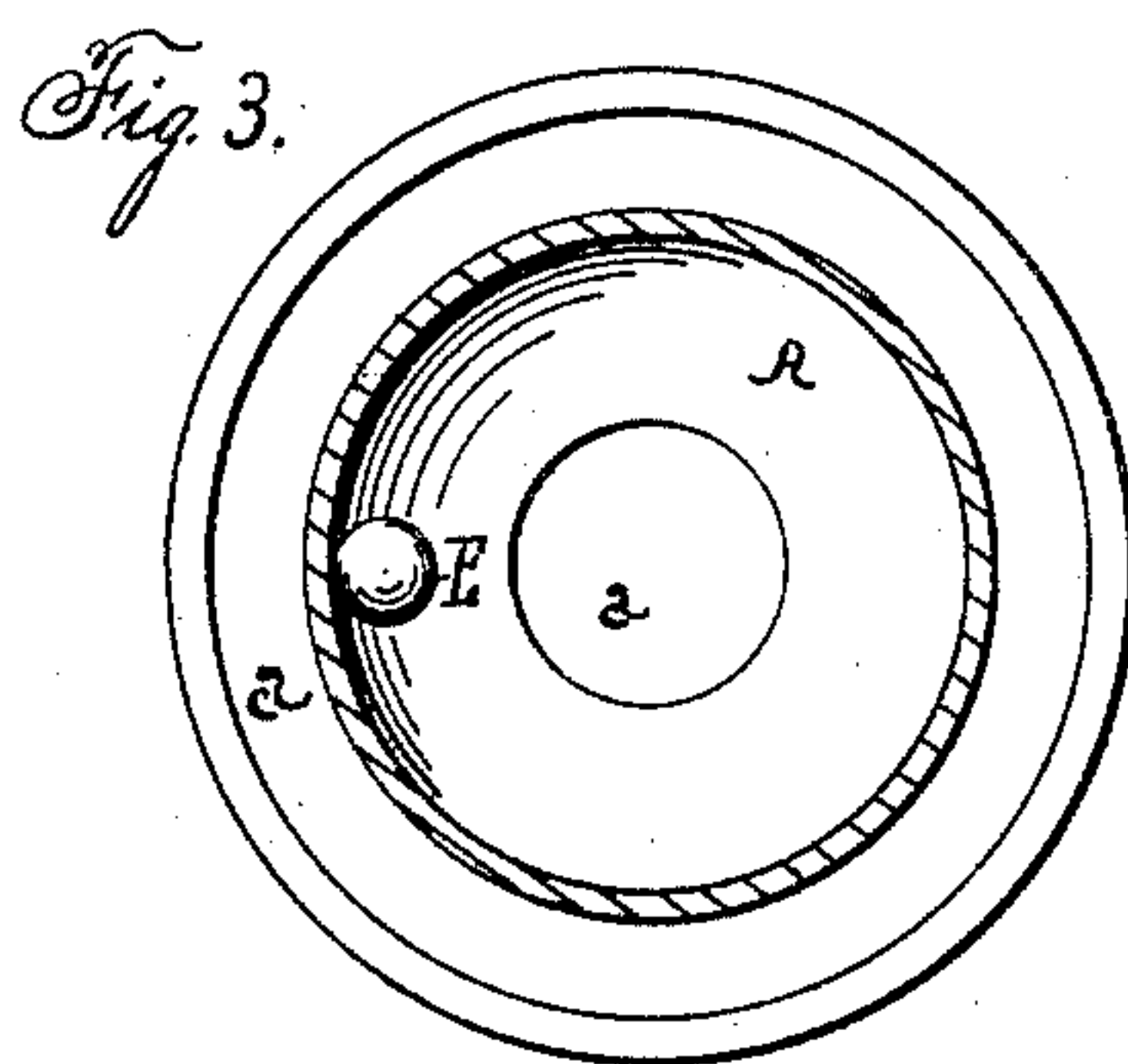
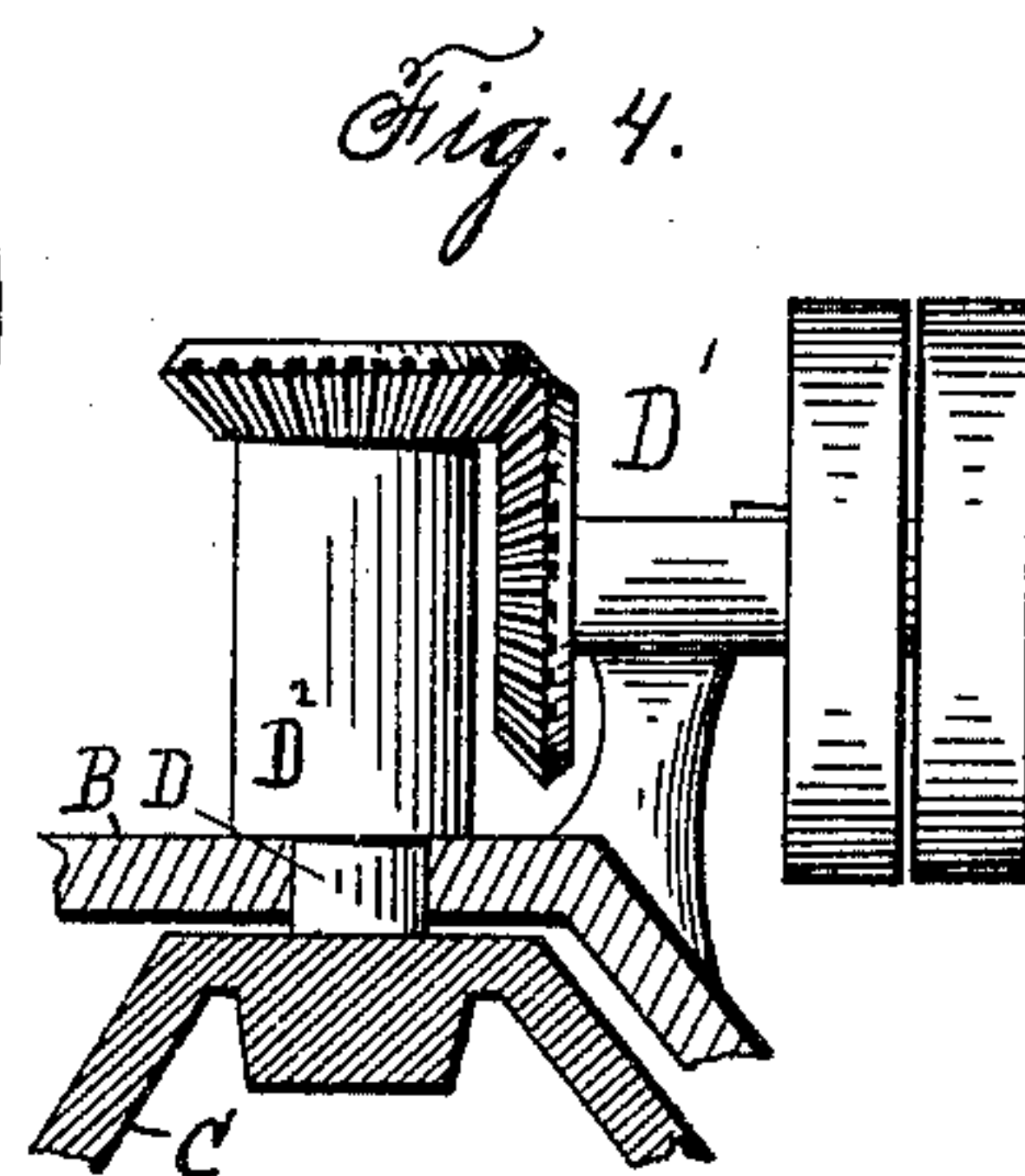
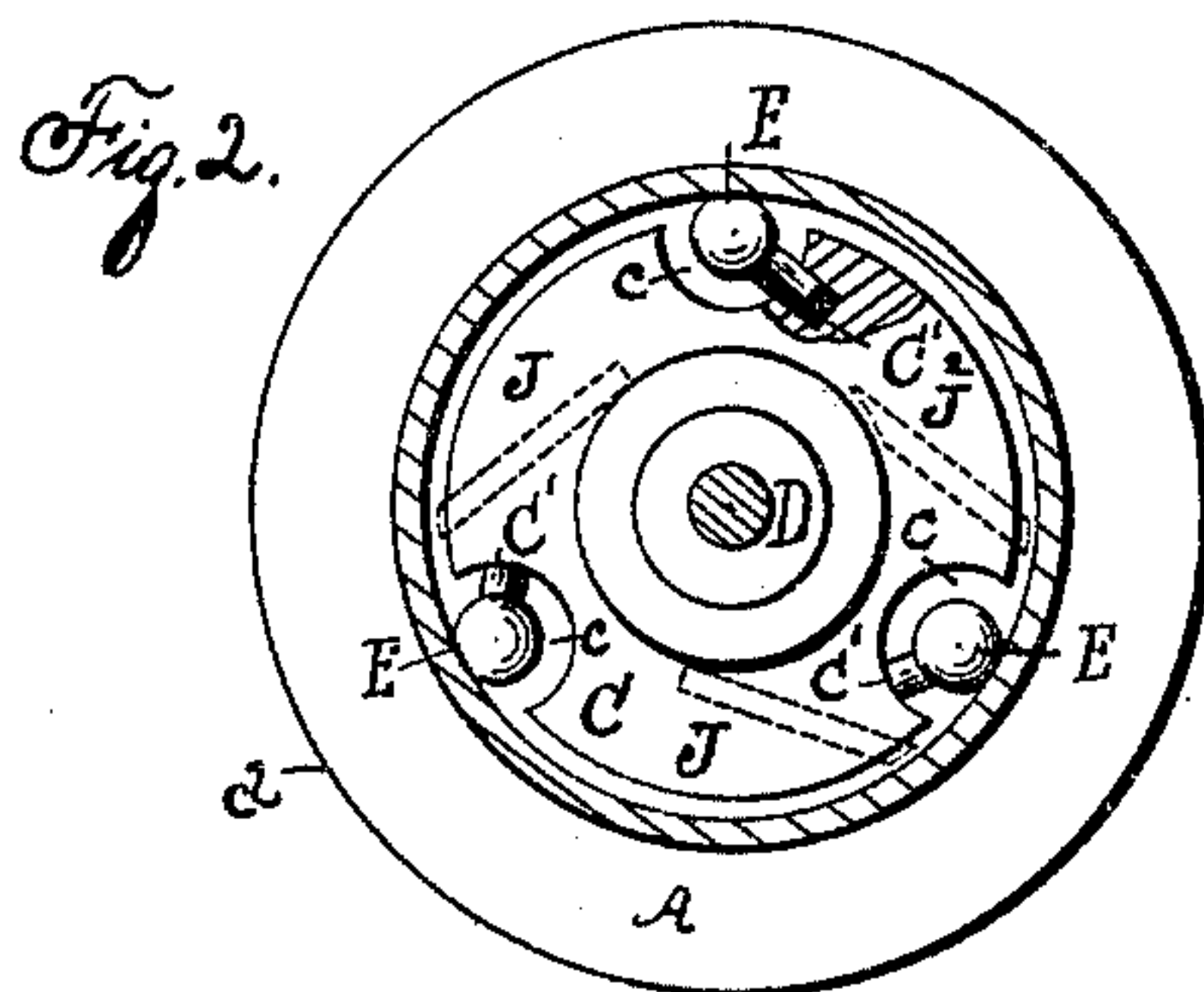
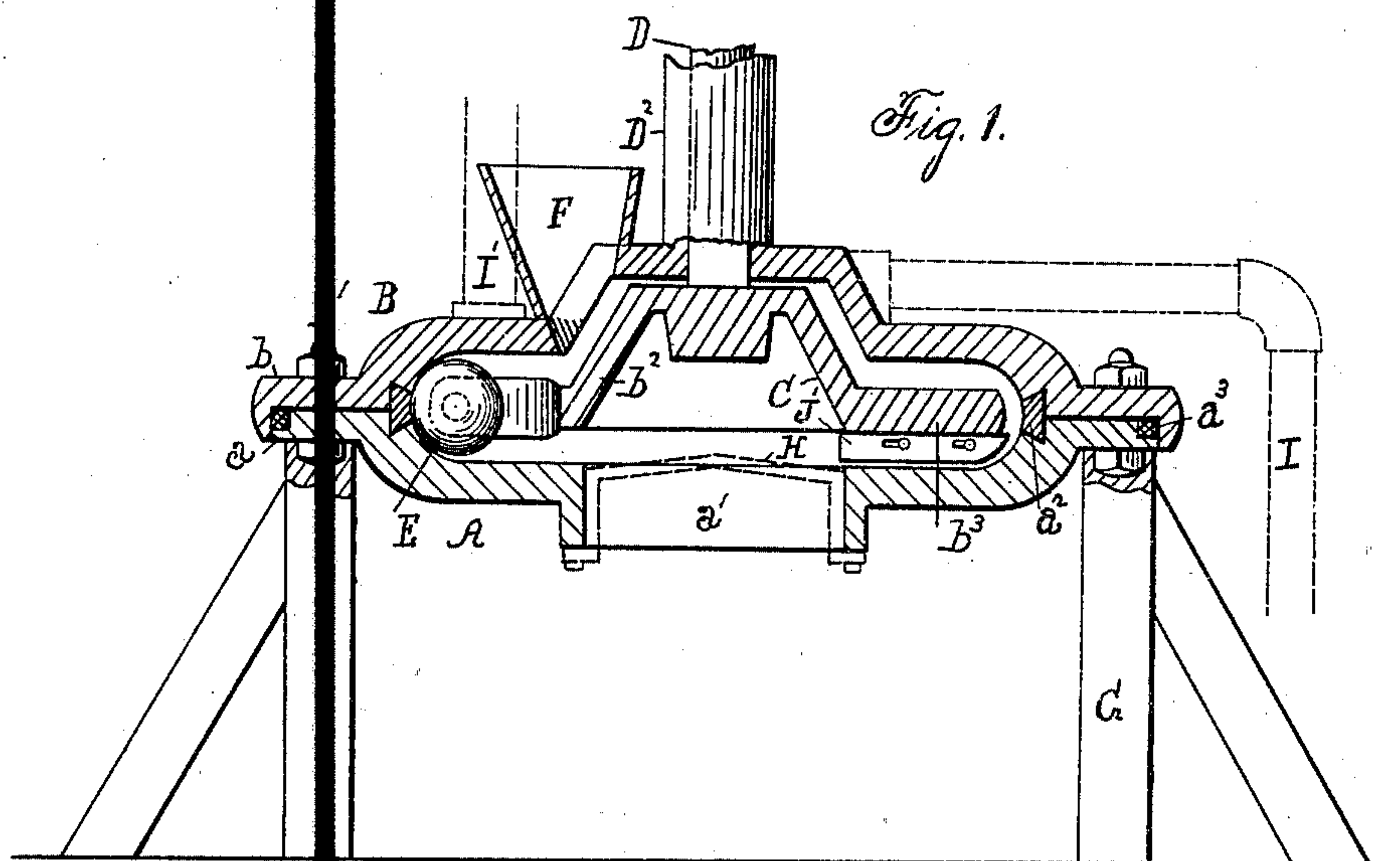
(No Model.)

J. B. SWEETLAND.

ORE PULVERIZER.

No. 271,285.

Patented Jan. 30, 1883.



WITNESSES

WITNESSES
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UNITED STATES PATENT OFFICE.

JEROME B. SWEETLAND, OF PONTIAC, MICHIGAN.

ORE-PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 271,285, dated January 30, 1883.

Application filed October 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, JEROME B. SWEETLAND, of Pontiac, county of Oakland, State of Michigan, have invented a new and useful Improvement in Ore-Pulverizers, and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter described, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical section of a device embodying my invention. Fig. 2 is a plan view with the top removed. Fig. 3 is a plan view of the lower portion of the case, with the top and web removed. Fig. 4 represents a suitable driving mechanism.

It is the object of my invention to provide an improved ore-pulverizer.

In carrying out my invention, A represents the lower portion or wall of a hollow case of suitable form, and B the upper portion or wall of said case. The two portions are provided with flanges a and b , and are adapted to be bolted together, as shown at b' . The portion or wall A is constructed with a discharge-orifice, a' . The portion or wall B is preferably constructed with a central elevation, as shown in Fig. 1.

C is a revolving web, which, as here shown, is constructed with a central inclined elevation, b^2 , and a horizontal flange, b^3 , forming the outer surface of the web. This construction facilitates the dispersion of the ore to the outer edge of the web.

D is a shaft extending upward through the upper portion or wall of the case, adapted to support the web, and by which said web is revolved within said case by any suitable mechanism—as, for instance, by a beveled gear, D' .

D^2 is a hub, by means of which the web is held up free from the bottom of the case.

I construct the revolving web with a suitable number of recesses or U-shaped spaces, c , each adapted to receive a metallic ball, E, and to allow its free rotation therein.

F is a hopper suitably located for feeding the ore into the machine.

G is a suitable frame, supporting the stationary case.

The operation of the device is as follows: The web is rotated by means of power applied to the shaft D. The ore fed through the hopper F is, by centrifugal force and the shape of the web, thrown to the exterior of the web and pulverized between the rotating balls and the inner edge of the case. I prefer to construct the web so that its periphery shall rotate freely without danger of wearing against the case. The whole device being so constructed, it is evident that the wear will come chiefly upon the balls E, and upon a limited space on the interior surface of the case, which receives the force of the rotating balls, and also upon those portions of the web within the U-shaped spaces against which the balls impinge, as the web itself runs free and clear of the case. To provide for the wear of these localities, I prefer to construct the two portions of the case with removable segments of chilled iron or steel, as shown at a^2 , of a width suitable to take the wear on the inner surface of the case, which can be easily replaced when desired. I prefer, also, to construct the U-shaped spaces of the web with suitable removable pins, C' , adapted to prevent the wear of the balls upon the web, said pins being secured in suitable sockets and provided with rubber or other elastic packing at the base, adapted to project the pins as the balls or the segments wear away until it is necessary to replace them. For this purpose I prefer to construct the web thicker where these pins are inserted. The elevated portion may be made of thinner metal. I also prefer to construct the case thicker at its periphery; and to make the two sections tighter when secured together, the flanges a and b may be provided with an intervening packing, (shown at a^3 .) It is preferable, moreover, to construct the lower section, A, concave from the discharge-orifice to the wearing-surface. In case it is desired to use this device as a dry-pulverizer the discharge-orifice a' is left open; but to adapt it for a wet-pulverizer I provide said discharge-orifice with a removable cap, H, which, when applied, will effectually close said orifice. I also provide the case with an additional discharge-pipe, I, suitably located to carry off the water and pulverized ore from the machine. The pipe I

may be located above or below the web, as may be desired. Moreover, a separate inlet-pipe, I' , for water may be provided; or water may be fed with the ore through the hopper.

5 J represents a suitable number of scrapers or deflectors, inclined from the middle of the web outward in the direction of the motion, adapted to scrape the pulverized ore to the discharge-orifice in the dry process when the
10 web is revolved as indicated by the arrow, Fig. 2.

J' represents one or more adjustable extension-wings, suitably secured to one or more of the scrapers in such a manner that it may be
15 adjusted near to or remote from the inner surface of the case, as may be desired. With the use of this device too fine pulverization of the ore may be prevented, should it be desired to concentrate the ore instead of pulverizing it.

20 J^2 is one or more scrapers or deflectors, inclined from the outer edge of the web inward in the direction of the motion, adapted to scrape the pulverized ore outward for a more thorough pulverization and prevent unpulverized ore from working into the discharge-orifice.

25 In the use of the machine the scrapers or deflectors J and J^2 are employed simultaneously, one serving to direct the ore to the outer edge of the web, while the other, by its different arrangement, serves to direct the more finely pulverized ore to the discharge-orifice. The arrangement of the scraper or deflector J is important, for the reason that if all the scrapers were arranged the same as the one J^2 their
30 tendency, in connection with centrifugal force, would be to clog up the machine at the periphery of the web; but the arrangement of the scraper J neutralizes the centrifugal force and directs the most finely pulverized ore to
40 the central discharge-orifice.

In a pulverizer so constructed it is evident that a peculiar grinding motion is given to the balls when the web is driven at suitable speed, caused by the positive forward force of the
45 web driving the balls, their motion not being dependent upon centrifugal force.

I have described my invention as an ore-pulverizer; but it is evident that it is also adapted for grinding grain and for other varieties of
50 work, and I would have it understood that I do not limit myself to its use as an ore-pulverizer, but also contemplate its use for grinding cereals and for other purposes for which it is adapted.

55 What I claim is—

1. The combination of a stationary casing provided with an inlet, and having its bottom wall constructed with a central discharge-orifice, with a web arranged to revolve in a horizontal plane, and having its central portion constructed with the inclined elevation b^2 , and loose balls carried at the periphery of the web, substantially as described.

65 2. The combination of a stationary casing composed of top and bottom walls, the former constructed with a central elevation and hav-

ing an inlet-opening, with a web, C, arranged to revolve in a horizontal plane, and constructed with a central inclined elevation, b^2 , and loose balls carried at the periphery of the web, substantially as described. 70

3. The combination of a stationary casing composed of top and bottom walls, the former having an inlet-opening, with a shaft, D, projecting through the top wall, the web C, attached directly to the lower end of the said shaft, the hub D^2 , attached to the shaft and supported by the top wall of the casing, for holding the web free from the bottom wall of the latter, and loose balls carried at the periphery of the web, substantially as described. 75 80

4. The combination of a casing, a revolving web, loose balls carried in recesses at the edge of the web, and movable pins or bearings arranged in the web, and against the projecting ends of which pins the balls rest, substantially as described. 85

5. The combination of a casing, a revolving web, loose balls arranged in recesses at the edge of the web, removable pins or bearings arranged in said recesses, and means for projecting the pins or bearings to retain their outer ends in contact with the balls, substantially as described. 90

6. The combination of a casing, a revolving web, loose balls arranged in recesses at the edge of the web, removable pins or bearings arranged in said recesses, and elastic packings operating to project the pins or bearings and retain their outer ends in contact with the balls, substantially as described. 95 100

7. The combination of a casing composed of top and bottom walls, the latter having a central discharge-opening and the former an inlet-opening, a web arranged to revolve in a horizontal plane, pulverizing devices carried at the outer edge of the web, and a scraper or deflector located horizontally between the web and the bottom wall of the casing, and inclined from the center of the web outwardly in the direction of motion of the latter, for carrying the material inward along the bottom of the wall to the delivery-orifice therein, substantially as described. 105 110

8. The combination of a casing composed of top and bottom walls, the former having an inlet and the latter a central discharge-opening, a web arranged to rotate in a horizontal plane, pulverizing devices carried at the edge of the web, and a scraper or deflector located horizontally between the web and the bottom wall of the casing, and inclined from the edge of the web inward to the center in the direction of motion of the web, for carrying the material outward along the bottom wall of the casing to the pulverizing devices, substantially as described. 115 120 125

9. The combination of a casing composed of top and bottom walls, the former having an inlet and the latter a central discharge-opening, a web arranged to rotate in a horizontal plane, and carrying pulverizing devices at its 130

periphery, and the oppositely-inclined scrap-
ers or deflectors J J², located between the web
and the bottom wall of the casing, the former
acting to carry the material inward toward the
5 discharge-opening and the latter to carry the
material outward to the pulverizing devices,
substantially as and for the purpose de-
scribed.

10 10. The combination, with the inclosed cas-
ing and the revolving web, having balls lo-

cated in recesses at its periphery, of a remov-
able cap at the base, whereby the devices are
adapted for use as a dry or wet pulverizer,
substantially as described.

In testimony whereof I sign this specifica- 15
tion in the presence of two witnesses.

JEROME B. SWEETLAND.

Witnesses:

FRANKLIN A. CRAWFORD,
LAFAYETTE BOSTWICK.