

W. E. DAMON.
DISINTEGRATOR.

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963,122.

Patented July 5, 1910.

Fig. 1.

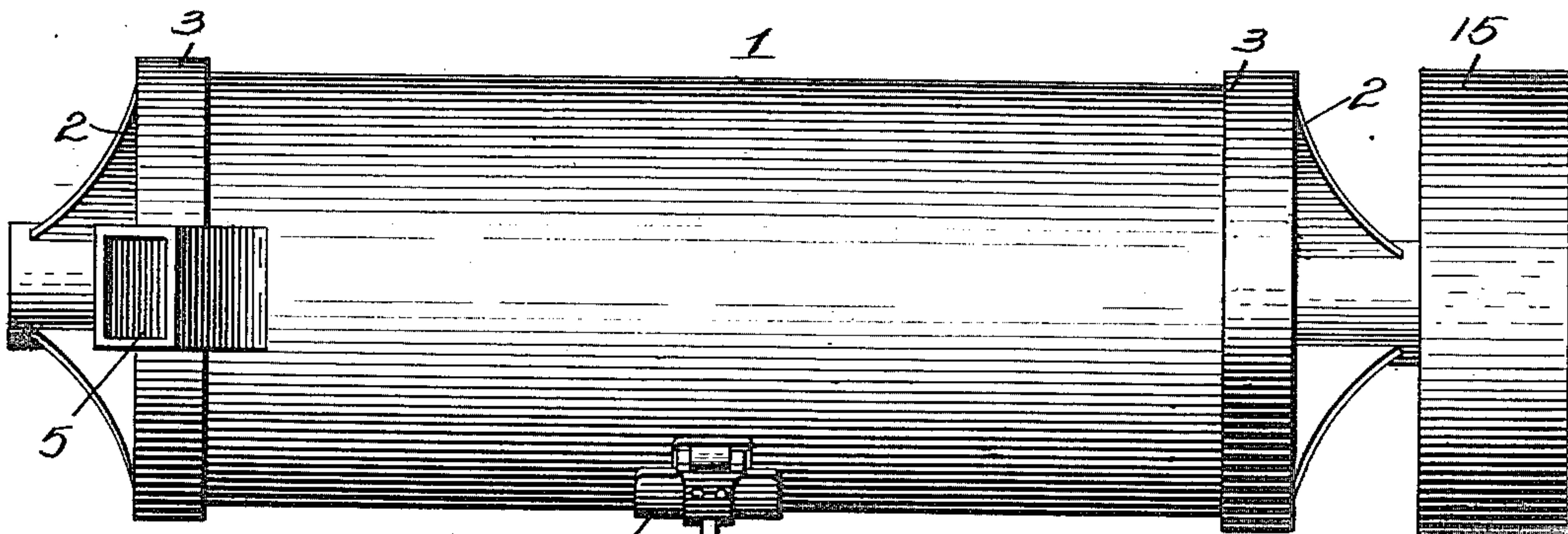


Fig. 4. / *Fig. 5.*

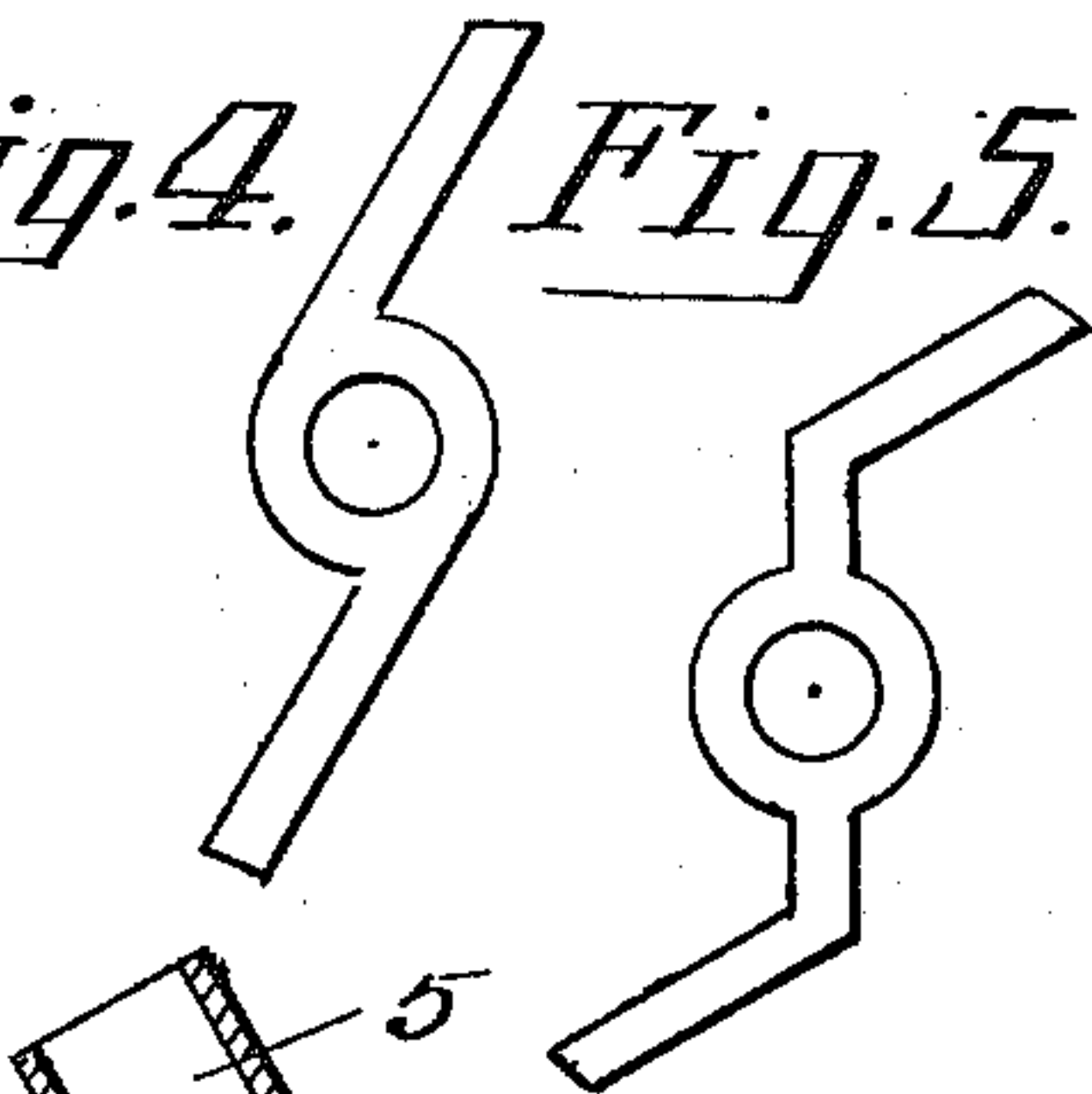


Fig. 3.

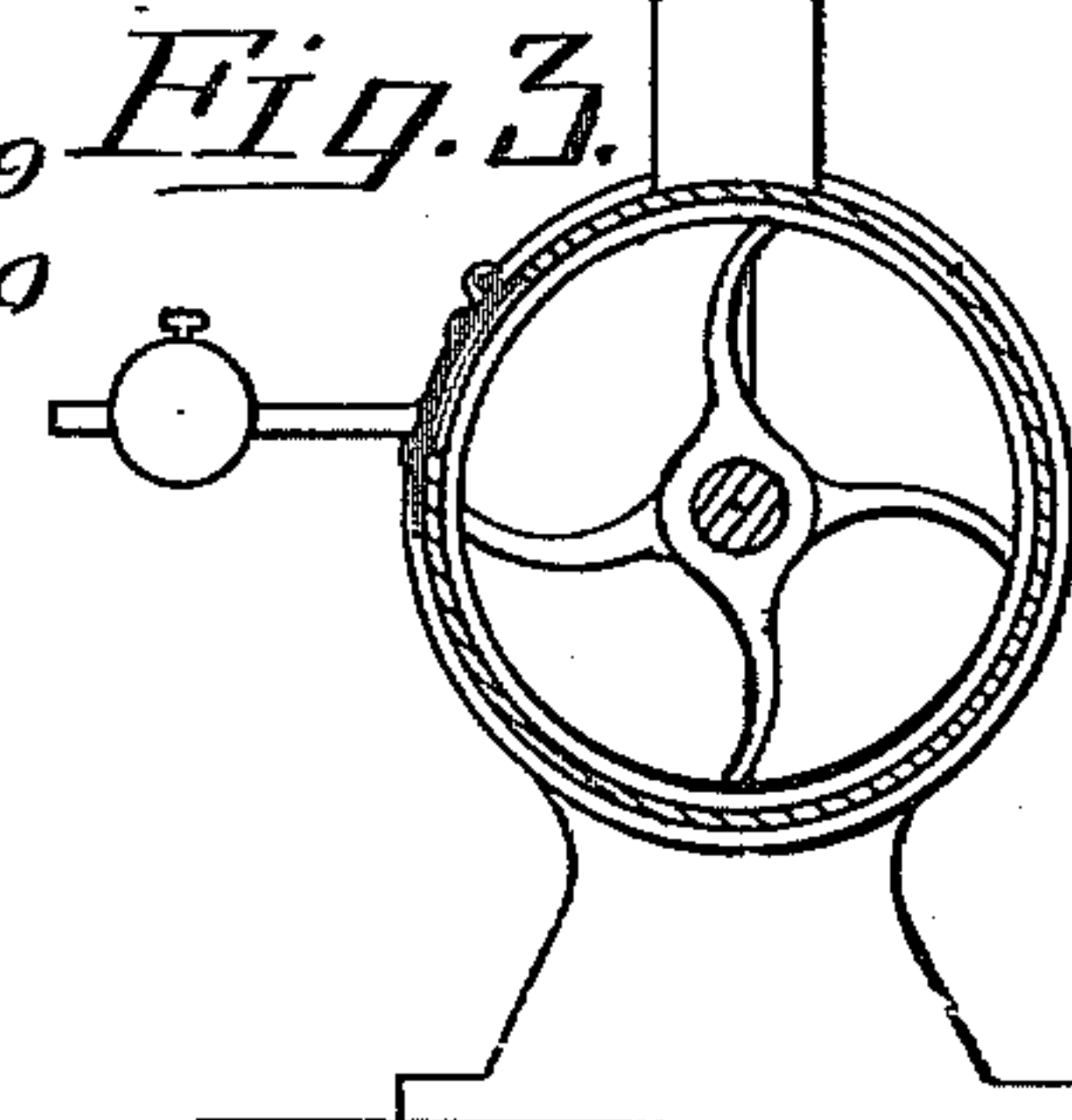
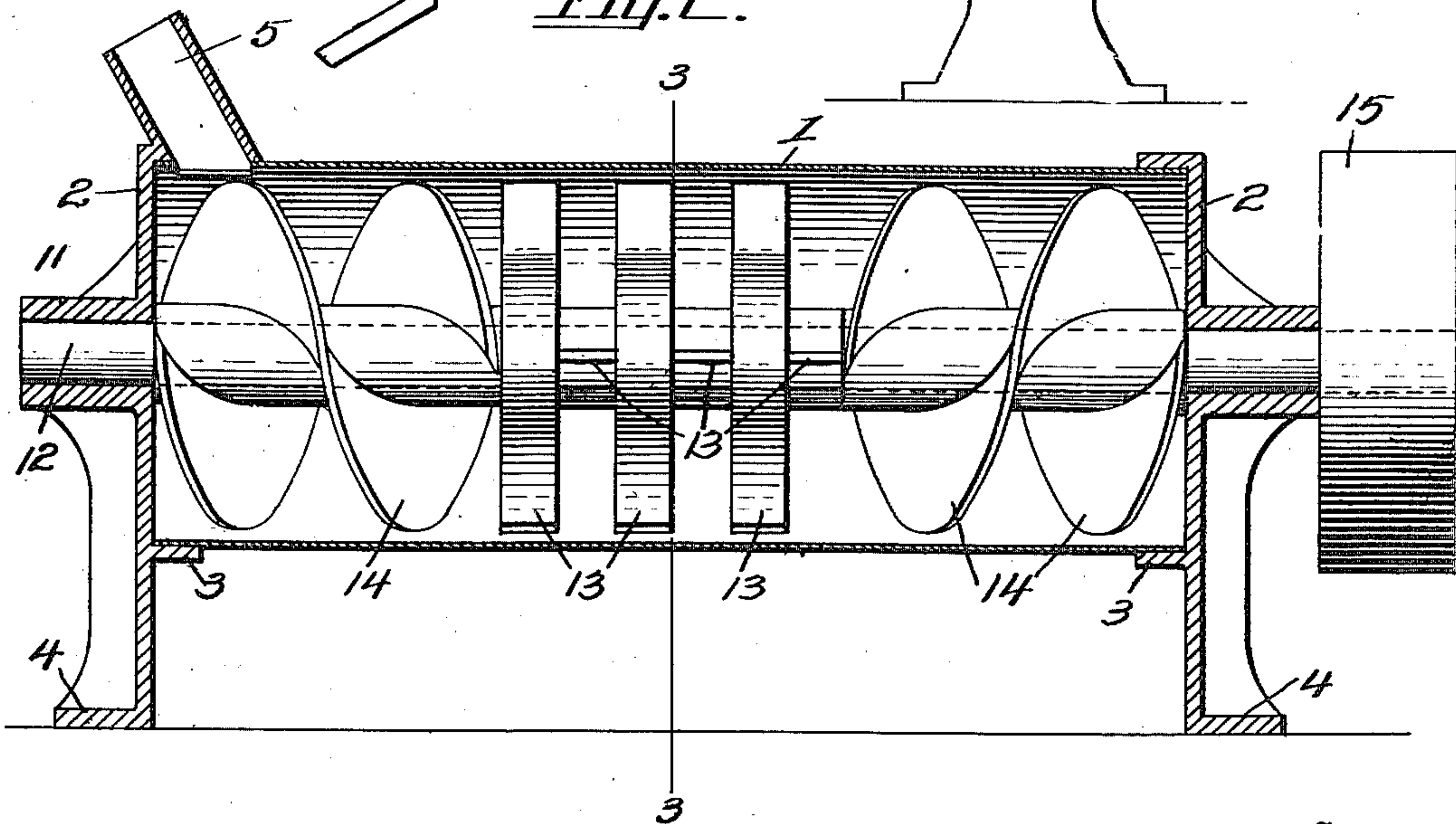


Fig. 2.



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UNITED STATES PATENT OFFICE.

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DISINTEGRATOR.

963,122.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM EDWIN DAMON, a citizen of the United States, residing at Bowling Green, in the county of Warren and State of Kentucky, have invented new and useful Improvements in Disintegrators, of which the following is a specification.

This invention relates to disintegrators for flour mills, and one of the objects of the invention is to provide a machine adapted to disintegrate or separate the flour from the middlings, the parts of which being so constructed and arranged as to provide a gentle action for breaking, through the process of attrition, cakes of flour, which have been softened by previous reductions on smooth rolls, so that the impurities are not also torn; the action of the machine being such as to free the third or fourth middlings from so much of this caked material as to render the stock in a better condition to be handled upon the smooth rolls of the milling machine.

Another object of the invention is to provide a disintegrating chamber having an inlet and an outlet provided with a yielding closure having means whereby the middlings are compressed upon the sides of agitator or disintegrating arms positioned adjacent the outlet, the arms being provided with a shaft and having suitable screws positioned adjacent the agitator arms and adapted to receive the caked flour or middlings, means being provided for operating the shaft whereby the cakes of flour are separated by attrition, and the doors being provided with regulating means whereby the disintegrated material may be discharged through the opening by the action of the agitator arms.

With these and other objects in view, which will appear as the description progresses, the invention resides in the novel construction and arrangement of parts hereinafter fully described and claimed.

In the accompanying drawings, forming part of this specification and in which similar numerals of reference indicate corresponding parts in all the figures, I have illustrated the preferred embodiment of the invention, as it now appears to me, but it is to be understood that minor details, within the scope of my claims, may be employed without departing from or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1

is a top plan view of a machine constructed in accordance with the invention. Fig. 2 is a central longitudinal sectional view of the device. Fig. 3 is a cross sectional view taken upon the line 2—2 of Fig. 2. Figs. 4 and 5 illustrate, in side elevation, modified forms of agitator or disintegrating arms.

In the accompanying drawings the numeral 1 designates a cylinder provided with closed ends 2. These ends 2 may be either integrally formed upon the cylinder 1 or may be formed separate and provided with inwardly extending annular flanges 3 adapted to receive the cylinder and may also be provided with downwardly extending portions terminating in feet 4 by which the cylinder is positioned a suitable distance above the ground or flooring of a flour mill. The cylinder 1 is provided with a hopper 5 and is also provided upon one of its sides, and preferably central of the cylinder with a suitable outlet or opening 6 which is provided with a hinged door or closure 7. This door 7 is provided with an outwardly extending arm 8 which is adapted for the reception of a slidable weight 9. The weight 9 has a threaded aperture communicating with its bore and adapted for the reception of suitable retaining elements 10. By this arrangement it will be noted that the door 7 may be regulated, so as to require a greater or lesser amount of pressure from the interior of the cylinder 1 before the same is opened.

By reference to Figs. 1 and 2 of the drawings, it will be noted that the ends 2 are provided with outwardly extending bearings 11, centrally arranged in regard to the cylinder 1, and adapted for the reception of a longitudinally extending shaft 12. Centrally arranged upon the shaft 12, and having one or more of their number positioned adjacent the door 7 is a plurality of agitator or disintegrating arms 13. These arms 13 may be arranged in a variety of shapes or forms as illustrated in Figs. 3, 4 and 5 of the drawings, but the arms are preferably secured upon the shaft 12 in a right angular relation to each other, as illustrated in Fig. 3 of the drawings.

Rigidly secured to the shaft 12, adjacent the outer agitator arms 13 are the spirally arranged blades 14. It will be noted by reference to the sectional views of the drawing that the blades 14 as well as the agitator or disintegrating arms 13 have their ends posi-

tioned a suitable distance away from the tubing 1. The object of this being to prevent the crushing of the grain or middlings during the process of disintegration.

5 The operation of the device is as follows: The shaft 12 is supplied with a pulley 15 which is connected with any desired source of power and by which the shaft carrying the spiral blades 14 and agitator arms 13
10 is revolved at a given velocity. Middlings are then fed through the hopper 5 and are conveyed through the medium of the spiral blades 14 adjacent the inlet 5 in the direction of the agitator arms 7 toward the opposite end of the device. It will be noted by
15 reference to Fig. 2 of the drawings that the spiral blades 14 are each arranged at an opposite angle and are adapted to force the middlings toward the agitator arms 13. The
20 middlings within the convolutions of the spiral blades 14 are not compressed and are subjected to a small amount of attrition as the shaft is revolved and the middlings are forced in both directions toward the agitator
25 arms 13 where they are compressed into a compact mass so that the revolving agitator arms produce a more complete disintegration. The weight 9 carried by the door 7, having been formerly set to overcome a cer-
30 tain predetermined amount of resistance, is opened by the pressure upon the inside of the cylinder 1 when the resistance of the weight is overcome, and the disintegrated material is forced through the door into
35 suitable receptacles.

It is to be understood that the middlings fed to the disintegrator are those which have passed through the middling rolls and that they are already fractured. To return the
40 middlings to the rolls without the process of disintegration would result in crushing the gluten of the grain.

With a machine constructed as described the middlings are subjected to a mild process of attrition while within the convolu-
45 tions of the spiral blades and are compressed against the agitator arms where they are completely disintegrated, thus providing a simple, cheap and effective device for separating the flour from the middlings and
50 whereby a finer grade of flour is produced.

From the above description, it will be noted that the process is adapted, as near as possible, to simulate the movement of a
55 human hand, as the caked material receives the same motion as though it were placed in the palm of the hand, and the fingers manipulated so as to describe a partial rotary as well as a partial reciprocatory move-
60 ment in the direction of the palm, this movement being limited so as to subject the mass to a squeezing action as well as agitat-

ing the mass when compressed to cause the particles to rub and to disintegrate by attrition, after which the mass is discharged
65 in particles when the body and the pressure of a mass increases to a determined degree.

Having thus fully described the invention what is claimed as new is: 70

1. An apparatus for disintegrating middlings, comprising a casing, means for feeding a constant stream of middlings into the casing to form a mass, rotary elements for
75 subjecting the mass to a squeezing action by opposing pressures, means intermediate the point of opposing pressures for agitating the mass while so compressed to cause the particles to rub and disintegrate by attrition, and means for discharging particles
80 of the mass at a time when the body and pressure of the mass increases to a determined degree.

2. In an apparatus for disintegrating middlings, a case having closed ends, said
85 casing being provided with a central opening, a weight regulated door for the opening, means for feeding a constant stream of middlings into the casing to form a mass, means for subjecting the mass to a
90 squeezing action by opposite pressures, means for agitating the mass while so compressed to cause the particles to rub and disintegrate by attrition and for discharging particles of the mass through the door at a
95 time when the body pressure of the mass increases to a determined degree.

3. In a machine adapted to disintegrate flour from middlings through the process of attrition, a casing, said casing being pro-
100 vided adjacent one of its ends with an inlet hopper and being centrally provided with an outlet opening, a hinged door for the opening, said door being provided with an outwardly extending arm having a slidable
105 weight positioned thereon, a shaft extending longitudinally through the cylinder, spiral conveyer members upon the shaft adjacent the ends of the cylinder, and angularly arranged disin-
110 tegrating arms between the conveying members and positioned adjacent the outlet opening of the cylinder so as to assist in the process of attrition when the middlings within the casing are formed into a mass
115 through the medium of the conveyers and to discharge particles of the mass through the door, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM EDWIN DAMON.

Witnesses:

JOHN L. FLETCHER,
WM. J. KOERTH.