

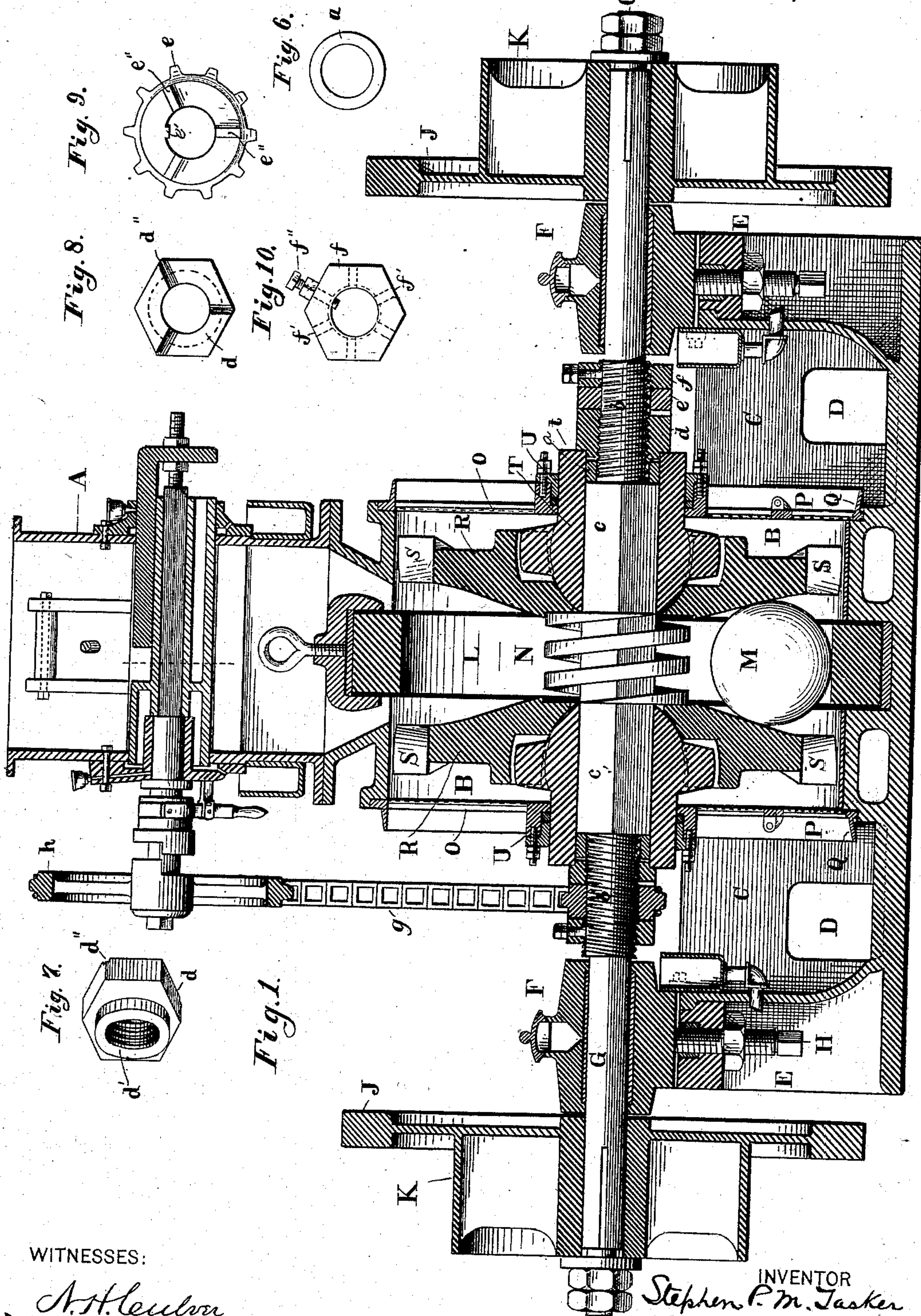
(No Model.)

3 Sheets—Sheet 1.

S. P. M. TASKER.  
PULVERIZING MACHINE.

No. 274,050.

Patented Mar. 13, 1883.



WITNESSES:

A. H. Leavelle  
John D. Lleyson

INVENTOR

Stephen P. M. Tasker  
By his Attorneys,  
Wm. C. Strawbridge  
Barnes & Taylor.



(No Model.)

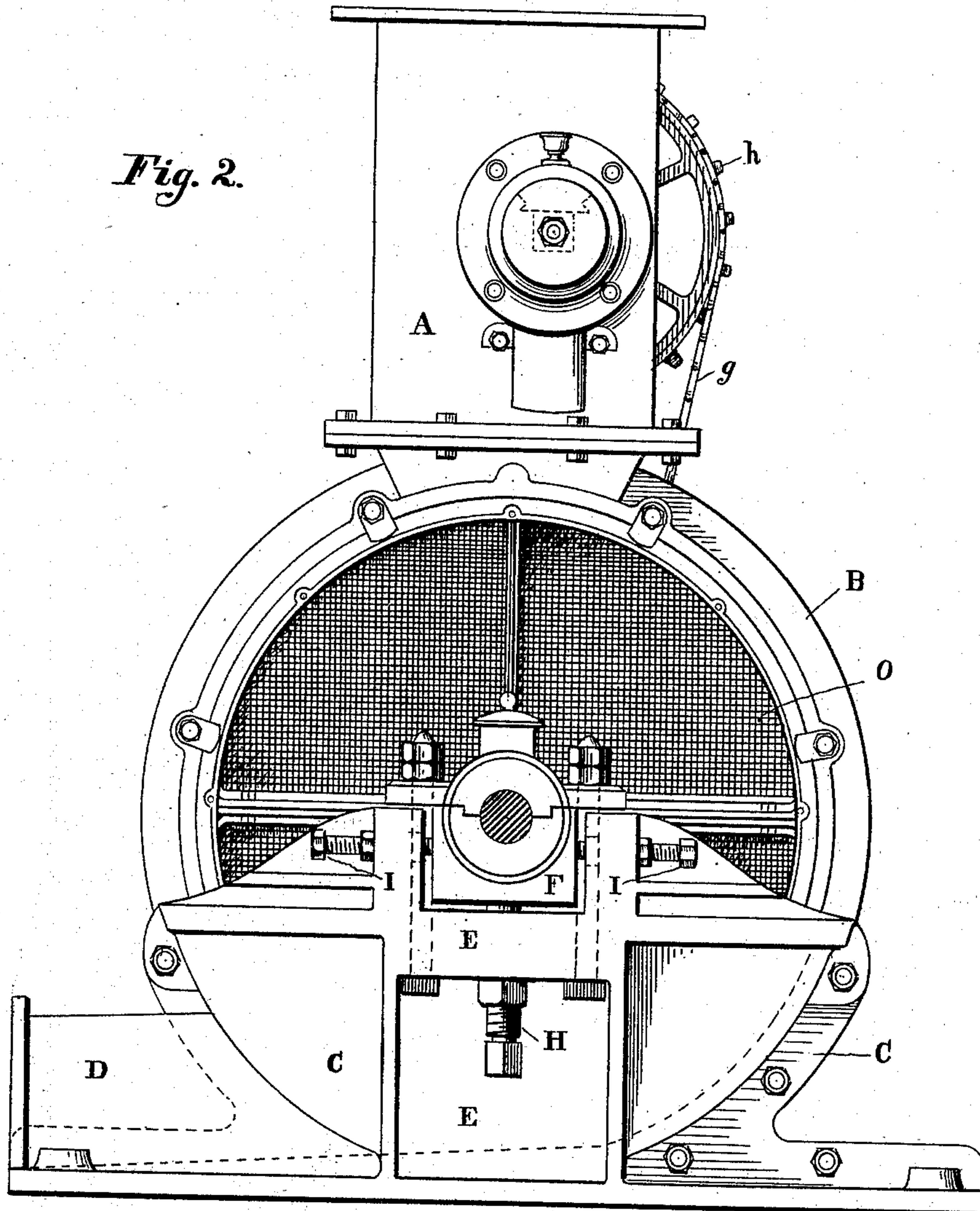
3 Sheets—Sheet 2.

S. P. M. TASKER.  
PULVERIZING MACHINE.

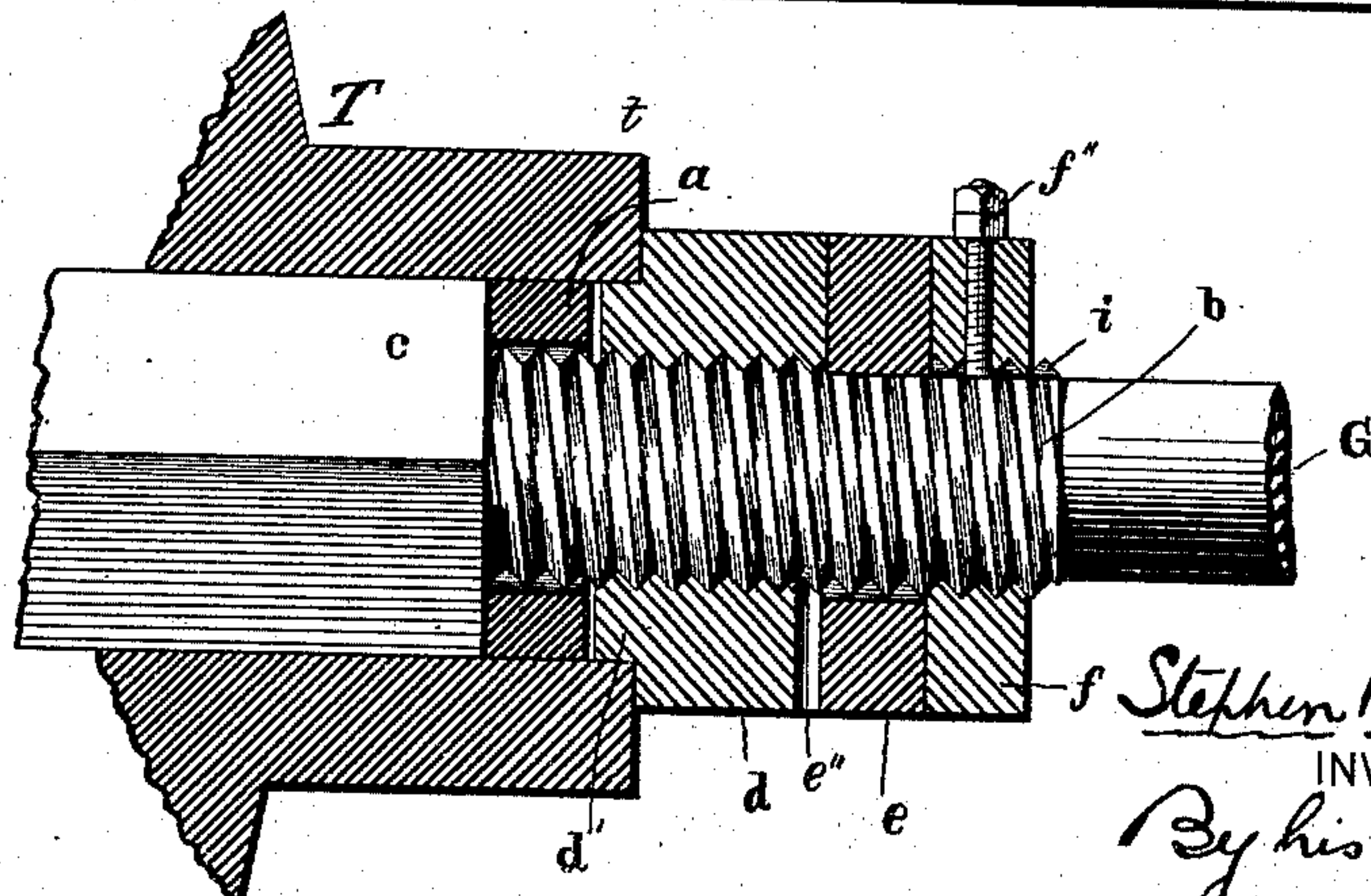
No. 274,050.

Patented Mar. 13, 1883.

*Fig. 2.*



*Fig. 11.*



WITNESSES:

*A. H. Leubron*  
*John D. Colley*

*Stephen P. M. Tasker*  
INVENTOR

*By his Attorney*  
*Wm. C. Strawbridge*  
*John B. Taylor*

(No Model.)

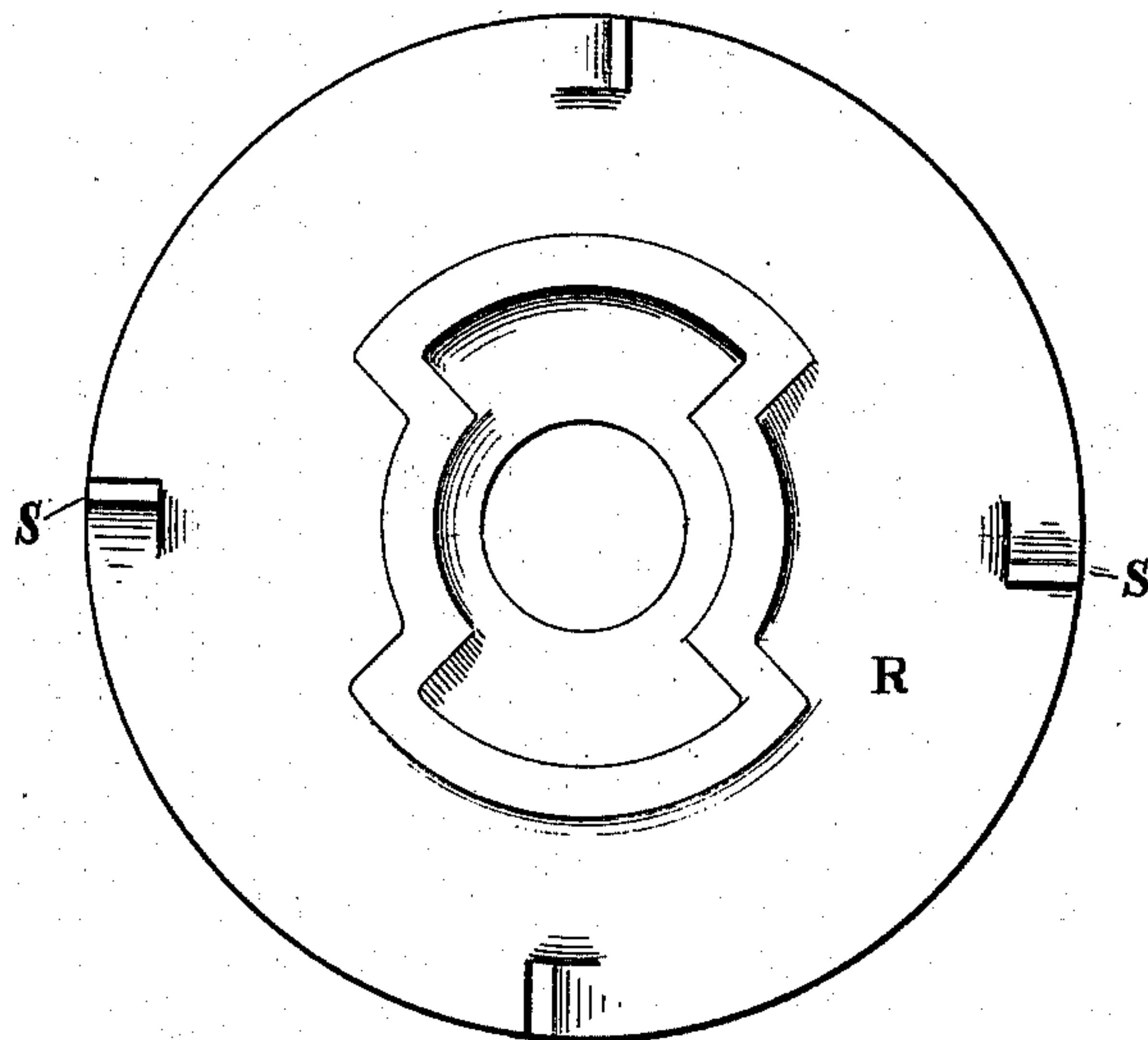
3 Sheets—Sheet 3.

S. P. M. TASKER.  
PULVERIZING MACHINE.

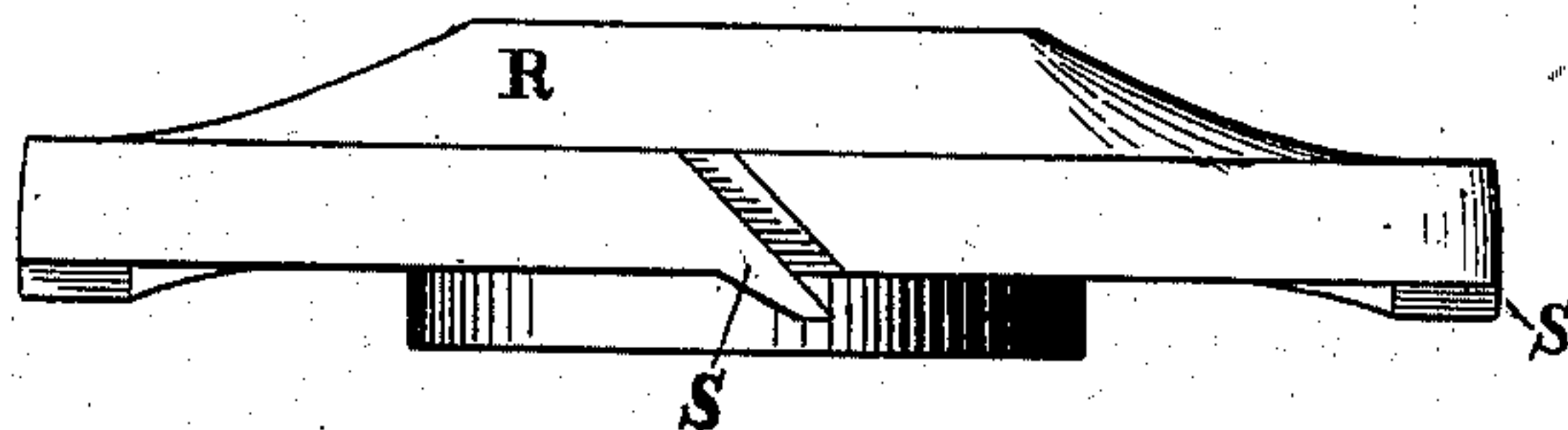
No. 274,050.

Patented Mar. 13, 1883.

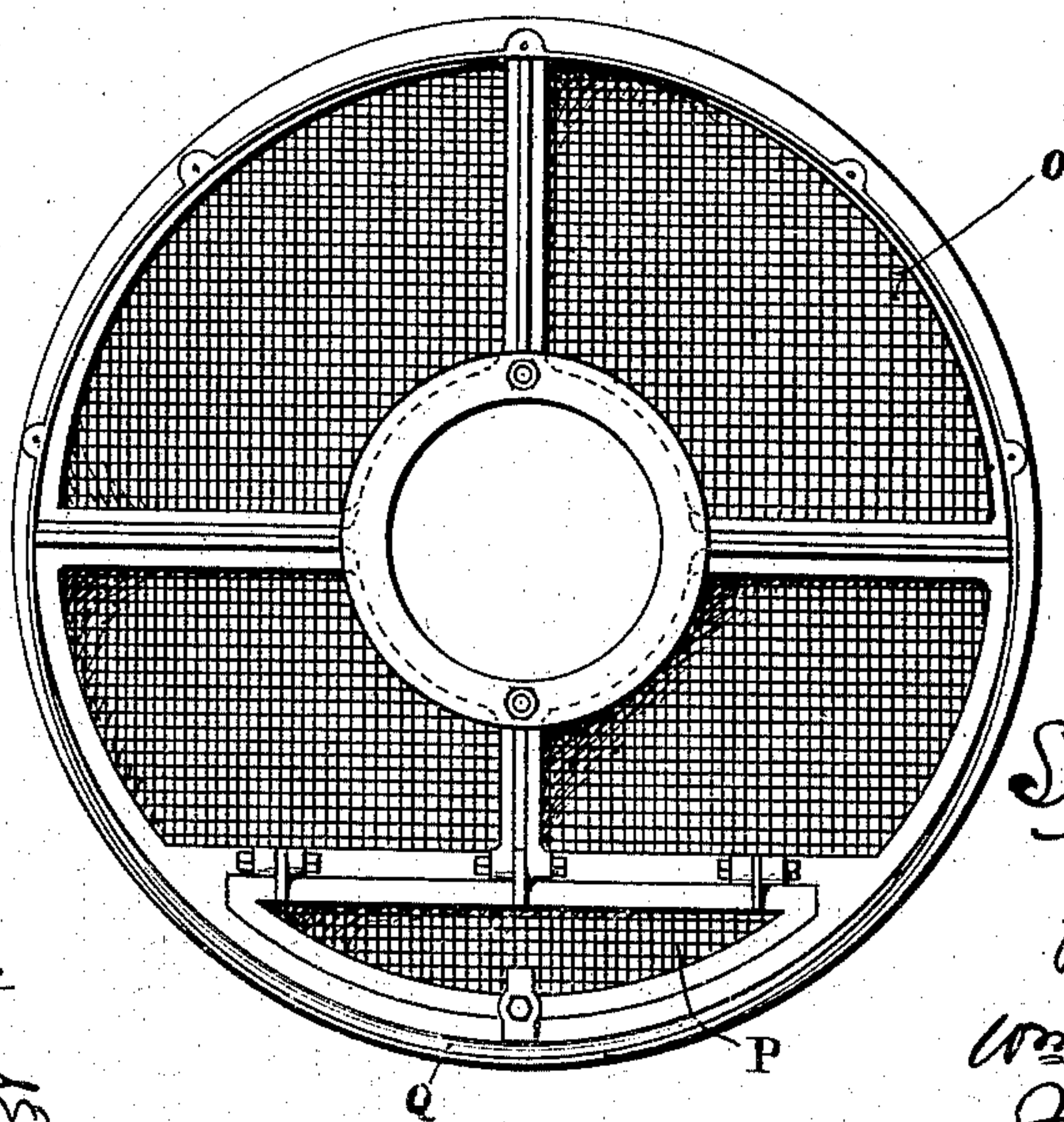
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



WITNESSES:

*A. H. Leubron*  
*John D. Leubron*

*Stephen P. M. Tasker*  
INVENTOR

*By his Attorney*  
*Wm. C. Strawbridge*  
*Edmond Taylor*



# UNITED STATES PATENT OFFICE.

STEPHEN P. M. TASKER, OF PHILADELPHIA, PENNSYLVANIA.

## PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 274,050, dated March 13, 1883.

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

*To all whom it may concern:*

Be it known that I, STEPHEN P. M. TASKER, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain  
5 Improvements in Pulverizing-Machines, of which the following is a specification.

My invention, broadly considered, relates to and embodies improvements upon a certain novel pulverizing-machine invented by William Henry Thompson, of Islington, county of  
10 Middlesex, Kingdom of Great Britain, and patented to him in and by Letters Patent of the United States No. 249,489, dated November 15, 1881, to which Letters Patent reference is first  
15 to be made for a more clear comprehension of my present improvement.

It also relates to and embodies improvements upon certain patented inventions which are improvements upon the Thompson machine, and are hereinafter mentioned.  
20

In view of the above fact, and in order to a better comprehension of my present invention, I regard it as necessary to briefly describe the several inventions upon which my present  
25 is an improvement.

Broadly stated, Thompson's invention consists in the combination, within a suitable inclosing-case, embodying in its own structure a vertically-erected hollow circular track, of an  
30 independent sphere or ball adapted to revolve around the casing, and of given means for imparting to the ball not only revolution around the casing-track, but also rotation about its own axis.

Certain other features of construction enter into the Thompson invention which are dispensed with by me, as the organization of my machine avoids their employment.  
35

In the Thompson machine, as also in mine, material to be pulverized is fed through a hopper into the casing, and is crushed by the combined revolution and rotation of the sphere or ball.  
40

The means employed by Thompson for effecting the combined movement of the ball are a pair of vertically-erected disks provided with peripheral beveled bearing-surfaces, and arranged face to face at some distance on either side of the center of a shaft horizontally journaled through the casing, and by which they  
45 are revolved. The disks are capable of rocking movements by virtue of being each loosely

hung or supported on the shaft between two collars having curved bearing-faces. The collars prevent a lateral movement of the disks at their center. Exterior to their peripheral bearing-surfaces the disks are provided with a circular series of blades, adapted by means of their location, inclination, and proximity to each other to prevent the escape of material  
55 undertreatment until it has become sufficiently pulverized, but thereafter adapted to permit of its escape into a receptacle exterior to the casing, from which receptacle the sufficiently-pulverized material is by suitable means removed.  
60 65

The operation of the disks and ball is described by Thompson in the following language, which also I regard as of importance to restate here in order that a more thorough  
65 70 comprehension of my improvements may be had. Thompson says: "The operation of the disks and ball is substantially as follows: When the disks are revolved their tendency is to assume a position exactly at right angles  
75 to the shaft; but as they cannot do this, for the reason that the diameter of the ball at the point of contact exceeds the distance between the adjacent bearing-faces, it follows that they bear or press upon the ball in their effort to  
80 assume this position and crowd the latter against the casing with greater or less force, according to the rapidity of the revolution. The disks, also, by the friction of the contact, carry the ball with them in their revolution  
85 about the casing, and thus communicate to it a centrifugal action. The disks, also, by the friction of this contact, communicate to the ball also an axial rotation. The ball then, it will be understood, is caused to act upon the material  
90 to be pulverized with a resultant force, which is obtained from three distinct sources, as follows: first, the direct radial thrust which is received from the efforts of the disks to assume a position at right angles to the shaft,  
95 the bearing-faces of the same acting as inclined planes to crowd the ball against the inner surface of the casing; second, the centrifugal action which results from the rapid revolution of the ball around the casing; and, third, the  
100 grinding action which results from the rotation of the ball upon its axis. By adapting the disks to rock upon the shaft the ball is permitted to move on radial lines to and from the



shaft, according to the amount of material in the casing, without being free at any time from the action of the disks."

My invention also relates to and embodies in its structure certain improvements upon the pulverizing-machine invented by Hermann Bernhard Feldmann, of Philadelphia, Pennsylvania, and patented to him in and by Letters Patent of the United States No. 265,791, dated October 10, 1882, to which Letters Patent reference is also to be made for the more clear comprehension of my present improvements.

Among other features of construction, Feldmann's machine embodies two sleeve-journals, described as of parrot-gun form, applied to and rigidly connected with the shaft, upon the rounded breech of which sleeve-journals the disks are seated, free to yield or rock to accommodate themselves to any varying movement of the ball, and the tapered muzzles or conically-tapered tubular extensions of which are fitted within correspondingly-shaped tubular journal-bearings inclosed within journal-boxes framed into the side plates of the casing, so that the shaft is, through the instrumentality of the sleeve-journals, adjustably journaled in the side plates or frame-work of the casing itself, and the weight of the shaft, sleeve-journals, disks, fly-wheel, pulleys, &c., is borne entirely by the casing.

My invention also relates to and embodies in its structure certain improvements upon the wet-pulverizing machine invented by me, and patented to me in and by Letters Patent of the United States No. 265,713, dated October 10, 1882, to which Letters Patent reference is also to be made for a more clear comprehension of my present improvements.

Among other features of construction, my patented machine referred to embraces continuous fixed screens tightly inclosing both sides of the casing, which latter is made after the pattern of Feldmann's casing.

It also embraces outwardly and downwardly inclined discharging-chutes, which operate, in connection with the screens, to discharge pulverized material completely clear of the bed-plate or base frame-work of the machine.

It also embraces take-ups, which are scoop-shaped devices formed in connection with the blades of the disks, being in effect oblique openings around the periphery of the disks, communicating from the rear to the front face thereof.

My invention also relates to and embodies in its structure certain improvements upon the dry-pulverizing machine invented by me, and patented to me in and by Letters Patent of the United States No. 265,715, dated October 10, 1882, to which Letters Patent reference is also to be made for a more clear comprehension of my present improvements.

Among other features of construction, my patented machine referred to embodies disks without blades and radially-disposed peripheral openings, which are not necessary, by rea-

son of the organization of the machine for dry pulverization only.

My present improved apparatus, hereinafter described and claimed, is also represented as equipped with a certain improved hopper for pulverizing-machines invented by me, application for patent for which having been executed by me November 20, 1882, and filed in the United States Patent Office November 22, 1882, no further reference is here necessary.

Generally stated, my present invention embraces the provision of an improved casing, a receiver for the pulverized material within which said casing is erected, discharging-spouts leading from said receiver, and pedestals for upholding the shaft formed as a part of said receiver; again, it embraces the provision of an improved sleeve-journal, which is employed solely to support and actuate the disks and not to constitute a device to assist in the journaling of the shaft; again, the provision of solid disks provided simply with take-ups, scoops, or kindred contrivances; again, the provision of a trap or outlet in the screens, constituting the lowermost portion of said screens, hinged to the upper portion and provided with any suitable fastening device for the occasional discharge of material too large to pass through the mesh; again, the provision of such discharging-chutes from the screens as co-operate with the discharging-spouts formed in the receiver; again, the provision of stuffing-boxes for the sleeve-journals applied to the screens; and, finally, an arrangement of lock and adjusting nuts for effectuating the exact adjustment of the sleeve-journals with respect to the shaft, disks, spring, and crushing-sphere, all as hereinafter described, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 represents in central vertical longitudinal sectional elevation a pulverizing-machine conveniently embodying a preferred form of my invention, the ball or crushing-sphere, shaft, and disk-spring being represented in elevation, representing also in place thereupon and in sectional elevation a hopper of the character invented by me, and described in the application for patent hereinbefore mentioned. Fig. 2 is a right-hand end elevation of the apparatus represented in Fig. 1. Fig. 3 is an elevation of the rear face or outside of one of my improved disks. Fig. 4 is a top plan or edge view of the same. Fig. 5 is a side elevation of one of my improved screens, represented as detached from the casing. Fig. 6 is a front elevation of a washer employed in connection with the several devices employed for the adjustment of the sleeve-journals on the shaft. Figs. 7 and 8 are respectively a view in perspective and a rear elevation of the adjusting-nut, which is threaded upon the shaft, and which serves to assist in the setting of the sleeve-journals. Fig. 9 is a front elevation of a form of sprocket-pinion employed in connection with the adjusting-nut, and Fig. 10 is a similar view of a set-screw nut which fixes the



set thereof, and Fig. 11 is an enlarged longitudinal vertical sectional elevation of the several adjusting devices in place upon the shaft.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings, A represents my improved hopper, hereinbefore referred to, represented as erected upon the cylindric casing B of the machine. This casing is in turn erected within or constitutes an integral portion of a receiver, C, which in addition forms the bed-plate of the apparatus. This receiver is closed upon all sides, so as to form a tank or containing-vessel, exit from which is had by means of the discharging-spouts D. The floor of the receiver is inclined toward the spouts, as shown by the dotted base-line of Fig. 2, so that pulverized material discharged into it from the casing gravitates out through the spouts. Upon both the sides of the receiver, and constituting an integral portion thereof, are pedestals E, for supporting the bearings F of the driving-shaft G. These pedestals are most conveniently cast as a portion of or secured by bolting to the receiver, and they are formed to contain vertical set-screws H, for adjusting the height of the bearing, and horizontal set-screws I for adjusting its lateral set. Beyond the pedestals, upon the projecting extremities of the shaft, are rigidly secured balance-wheels J and pulleys K, for the actuation of the shaft.

L is the ball-track; M, the ball or crushing-sphere, and N the spiral spring between the disks, all substantially as arranged in Feldmann's patent referred to.

O are screens fitted to completely incase both sides of the cylindric casing. One of these screens is shown removed in Fig. 5. Each screen is provided with a trap, P, near the lower portion thereof. The traps are preferably formed as hinged doors, embodying in their structure a screen, and secured by latches or kindred fastenings. The trap can, if desired, be opened while the machine is in operation to enable the removal of objectionable substances.

Q are discharging chutes, preferably formed as a part of the frame of the screens, or, if desired, applied as separate members thereto, substantially as shown in the drawings, the same being narrow bands or rings downwardly inclined as to the lower half of their circumference, and terminated short of the line of the discharging-spouts, so that material escaping through the screens will be delivered almost in the line of the discharge of the spouts. They are to be contradistinguished from my patented discharging-chutes hereinbefore referred to, in that, instead of discharging completely clear of the bed-frame of the machine, my present screens discharge into the spouts, and so co-operate therewith in freeing the receiver of my apparatus from pulverized material.

R are the disks, which are solid and not provided with radial blades, but which, unlike the

solid disks of my patented dry-pulverizing machine, hereinbefore referred to, are provided with take-ups S, and are of substantially the same diameter as the casing, so as to completely fill the same, in the latter particular resembling the disks represented in my Letters Patent No. 265,713 cited. I have discovered that this construction enables me to perform equally good work and avoid the expense incident to the construction of a bladed disk.

The take-ups are well represented in Figs. 3 and 4, and operate substantially in the manner of the take-ups described in my patent last above cited.

T are my improved sleeve-journals, the breech portion of which, or that portion which is provided with my patented clutch, being the same as that described in my Letters Patent last above cited, while their rearwardly-projecting extremities *t*, or "muzzles," so to speak, are of cylindrical shape and not tapered, and are fitted within stuffing-boxes U, applied to the screens. This construction prevents the material from passing out before it is properly pulverized, and also enables me to dispense with the journal-boxes described and claimed in my Letters Patent No. 265,713, last above cited.

As a means of adjusting the set of the sleeve-journals upon the shaft and with respect to the disks, spring, and crushing-sphere, I have devised a lock-nut contrivance, of which the following is a description. I now refer to one set only.

*a* is a washer, Figs. 1, 6, and 11, which is slipped over a portion of the driving-shaft, which is threaded and denominated by the letter *b*. This washer fits within the cylindric muzzle of the sleeve-journal and impinges against the squared central portion of the shaft.

*d*, Figs. 1, 7, 8, and 11, is an adjusting-nut threaded upon the threaded portion of the shaft. It is provided with a projecting annular boss, *d'*, formed upon one of its faces—viz., that face which impinges against the washer in the set of the parts represented in Figs. 1 and 11—while upon its opposite face it is provided with any given series of radially-disposed grooves *d''*. This adjusting-nut is adapted to be screwed up against the muzzle of the sleeve-journal, so as to force the sleeve-journal inwardly to the desired position.

In Figs. 1, 9, and 11, *ee* are what I term "sprocket-pinions," but which are, in fact, lock-washers, the functions of which are hereinafter very fully described. Only one of them is, for convenience and simplicity of construction, provided with sprockets.

In the following description I speak of but one set of devices, although there are two sets, one applied to each end of the shaft. The sprocket-pinion is adapted to slide over the threaded portion of the shaft, and provided with an internally-projected spline, *e'*, which slides into a spline-seat, *i*, channeled in the threaded portion of the shaft. That face of the pinion which fronts the rear face of the



adjusting-nut is provided with a corresponding series of radially-disposed tongues, *e''*, adapted to seat themselves in the grooves in the rear face of the adjusting-nut when the  
5 grooves are made to correspond in position therewith.

*f* is a set-screw nut, threaded upon the shaft, provided with a series of threaded set-screw holes, radially disposed, into any one of which  
10 happening to come in line over the spline-groove in the shaft the set-screw is entered.

By the above arrangement of parts it will be understood that the washer being slipped in place and the adjusting-nut screwed up, the  
15 sprocket-pinion can be slid up so that its tongues enter the grooves in the adjusting-nut, whereby the latter is prevented from rotating and the two devices together constituted into a clutch, and that when the set-screw nut is  
20 then screwed up and its set-screw screwed into the spline-seat in the shaft the entire device is fixed as a rigid whole upon the shaft, and the sleeve-journals fixedly adjusted in a predetermined position. The "sprocket-pinion," as  
25 I have termed it, is formed with sprockets for the purpose of actuating, by means of the sprocket-chain *g*, the sprocket-wheel *h* upon the driving-shaft of the hopper. This sprocket-pinion would be equally operative were the  
30 sprockets omitted from the periphery, and were the pinion made as a simple clutch-pin-ion provided with an internal spline, and the projecting tongues, substantially of the form shown, applied to the right-hand side of the  
35 shaft of Fig. 1, and illustrated in Fig. 11.

Having now sufficiently described both the construction and operation of my several improvements, I claim and desire to secure by Letters Patent—

40 1. In combination with a casing for a pulverizing-machine of the class herein recited, a receiver within which said casing is erected, and by which it is supported, pedestals formed as a part of said receiver, and discharging-  
45 spouts, substantially as set forth.

2. In combination with a casing for a pul-

verizing machine of the class herein recited, screens inclosing the sides of said casing, outwardly and downwardly inclined discharging-chutes, a receiver within which said casing is  
50 erected, and by which it is supported, and discharging-spouts leading from out the receiver, the arrangement being such that the pulverized material which passes through the screens is delivered by the chutes in the line of discharge of the spouts, substantially as set forth. 55

3. In combination with a screen for inclosing the sides of the casing, of a pulverizing-machine of the class herein recited, a trap constituting the lowermost portion of said  
60 screen hinged to the upper portion, and provided with any suitable fastening device, substantially as set forth.

4. In a pulverizing-machine, the combination of a casing, two oppositely-placed solid disks  
65 provided with one or more take-ups, and suitable means for actuating the disks, substantially as set forth.

5. A solid disk for a pulverizing-machine, provided with one or more take-ups, scoops,  
70 or kindred contrivances, substantially as set forth.

6. In a pulverizing-machine, two sleeve journals having rounded breeches with straight or cylindric muzzles, in combination with a  
75 casing and with stuffing-boxes adapted to said muzzles, substantially as and for the purposes set forth.

7. As a composite device for adjusting the set of the sleeve-journals of a pulverizing-machine of the class herein recited, the combination of the shaft, the sleeve-journals, the adjusting-nut, the sprocket-pinion, and the set-screw, together arranged and operating as  
80 hereinbefore set forth. 85

In testimony whereof I have hereunto signed my name this 21st day of November, A. D. 1882.

STEPHEN P. M. TASKER.

In presence of—

J. BONSALE TAYLOR,  
JOHN JOLLEY, Jr.