

R. D. SOARS.  
MIXING MACHINE.

APPLICATION FILED JUNE 4, 1910.

985,299.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

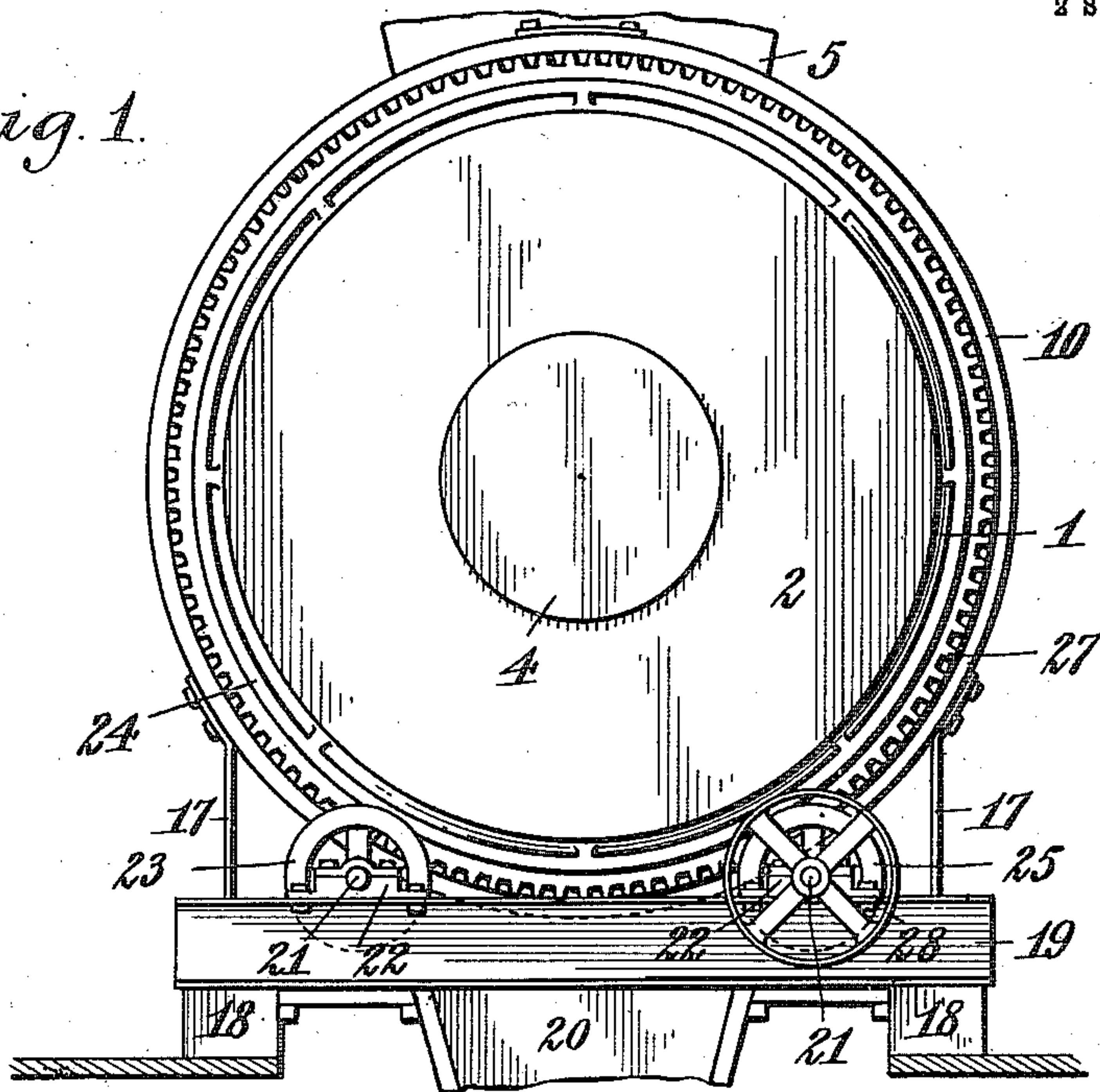
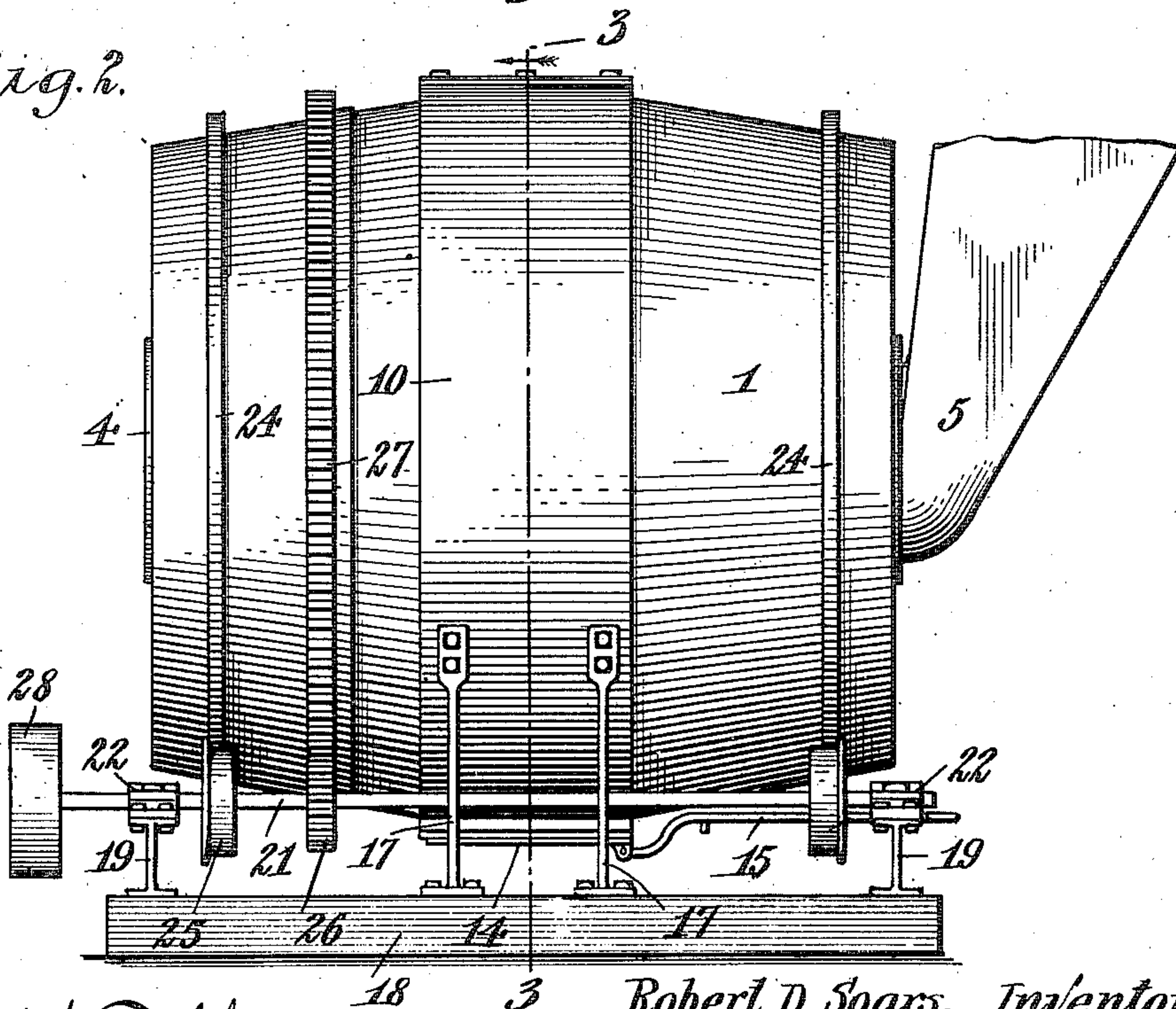


Fig. 2.



Christ Feinle, Jr.,  
Jacob L. Ober, Jr. } Witnesses By Emil Neuhart,  
Robert D. Soars, Inventor.  
Attorney.

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2 SHEETS-SHEET 2.

Fig. 3.

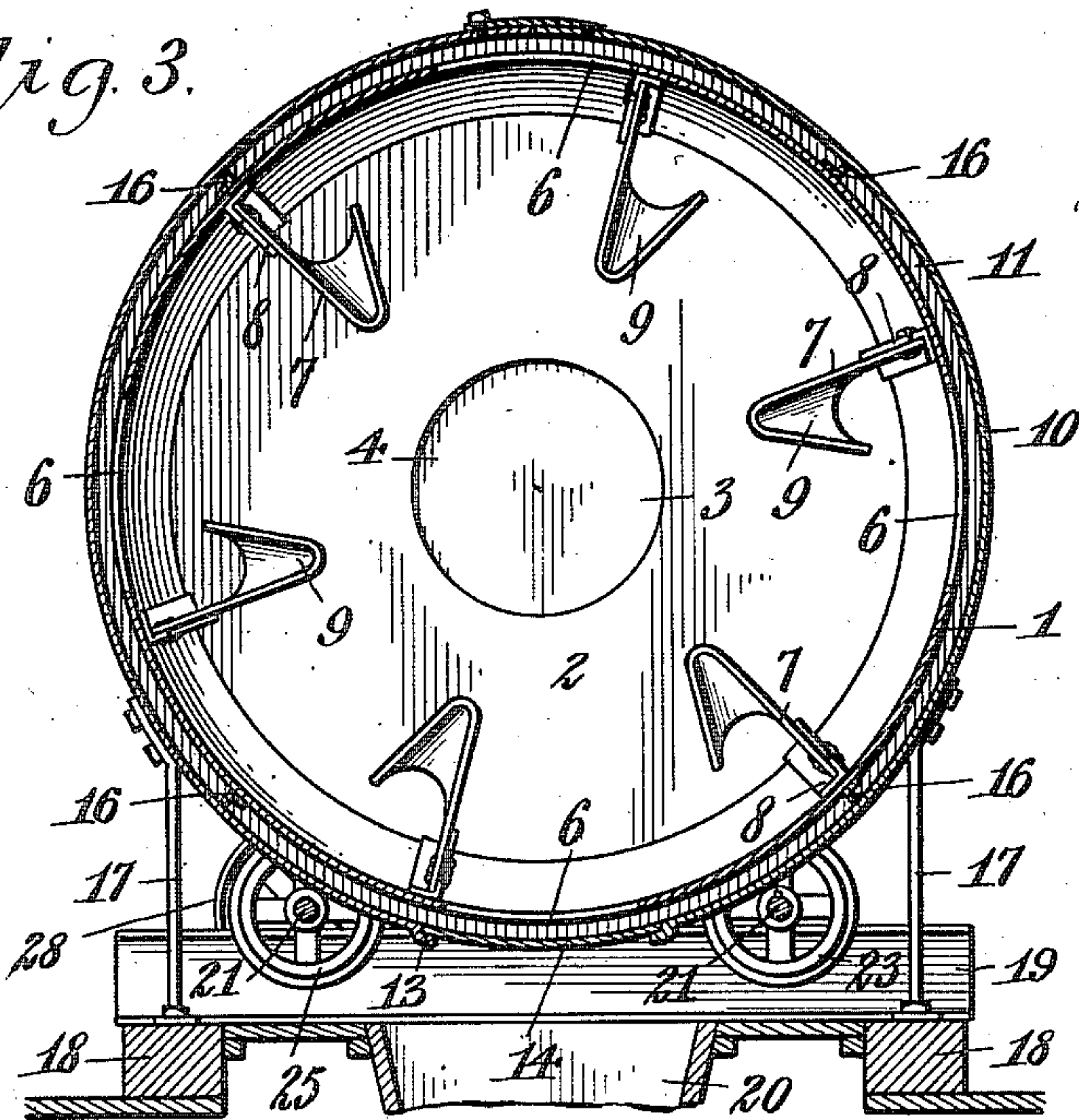
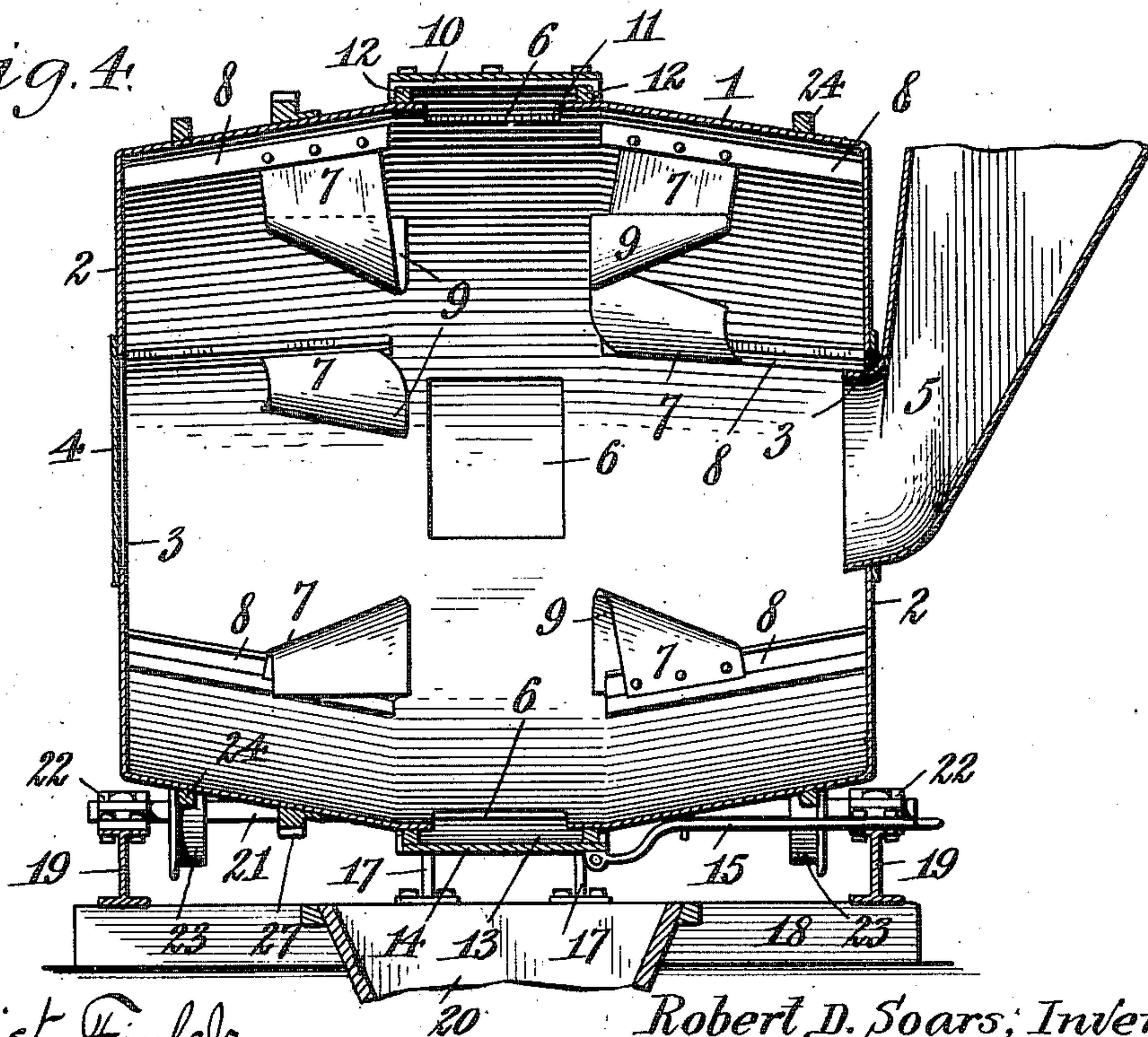


Fig. 4.



Christ Feinle, Jr.,  
Jacob L. Oberle, Jr. } Witnesses. By Emil Neikark Attorney.  
Robert D. Soars, Inventor.



# UNITED STATES PATENT OFFICE.

ROBERT D. SOARS, OF BUFFALO, NEW YORK, ASSIGNOR TO HUNSO MACHINERY COMPANY, A CORPORATION OF NEW YORK.

## MIXING-MACHINE.

985,299.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed June 4, 1910. Serial No. 565,143.

### *To all whom it may concern:*

Be it known that I, ROBERT D. SOARS, a citizen of the United States, and resident of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Mixing-Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in mixing machines and more particularly to machines for mixing fertilizers, and it has for its object the provision of a simple, inexpensive and effective machine of this character in which a continuous mixing of the material is obtained and which permits the discharge of the mixture at intervals without cessation of the mixing operation and without in any manner interfering with the feeding of the material into the mixer.

Another object of my invention is, to so construct the machine that it will receive the materials to be mixed, carry the same around in the drum and toward the center of the same to be discharged at a central point after having been mixed; to provide the drum with outlet openings and surround the drum at the point where it has said openings with a stationary inclosure forming an annular chamber provided with a discharge opening with which the outlet openings of the drum are adapted to register momentarily during the operation of the machine and to equip said discharge opening with a suitable closure; and further to otherwise improve on mixing machines now in use.

To these ends the invention consists in the construction, arrangement and combination of parts to be hereinafter described and particularly pointed out in the subjoined claims.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar characters of reference indicate corresponding parts in the several figures, and in which,

Figure 1 is an end view of my improved mixing machine. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse section taken on line 3—3, Fig. 2, looking in the direction of the arrow crossing said line. Fig. 4 is a central longitudinal section of the machine.

As illustrated in the drawings, the drum designated 1 is tapered from a point inter-

mediate its length toward opposite ends, its ends being closed, as at 2, and having central openings 3, one of which openings is shown closed, as at 4, Figs. 2 and 4 and the other opening serving as a feed opening and having a feed-spout 5 extending thereinto. If desired a feed-spout may be provided at each end of the drum. While I have shown the drum tapered from an intermediate point toward opposite ends, it is not absolutely necessary that such form be adhered to, as the drum may be otherwise formed if desired, and for some kinds of material it may be found advisable to change the form of the drum.

At a point centrally between the ends of the drum, I provide the same with one or more mixture outlet openings 6 and between the transverse center of the drum and the ends thereof, I arrange two series of mixing wings 7, each being riveted or otherwise secured to angle bars 8 suitably fastened to the wall of the drum at regular intervals around the same. Each wing 7 is formed of sheet metal bent at its inner end into the form of a trough or scoop 9 which is inclined toward the transverse center of the drum, or in other words, in a direction opposite to the conical or tapered wall of the drum. The mixture fed into the drum through the feed-spout 5 is carried upward during the revolution of the drum by these wings and discharged from the inner end thereof.

Surrounding the drum where it has its outlet openings, is a shell or housing 10 which forms an annular intervening space or chamber 11, said shell being constructed of sheet metal having opposite marginal portions bent inward and against two spacing rings 12 to which it is riveted or otherwise secured, said spacing rings lying in contact with the drum 1, as clearly shown in Fig. 4. At its lowest point the shell has a mixture discharge opening 13 which is closed by a slide-gate 14 operated by a rod 15 having its inner end secured to said gate and being suitably guided for lengthwise movement.

Secured to the drum and extending into the annular space 11 between the surface of the drum and the surrounding shell are scrapers 16 formed of angle bars having their radial members lying with their edges against the inner surface of the surround-



ing shell. The shell or housing is rigidly supported by means of uprights 17 or otherwise so that the drum rotates within the same.

5 It is intended that this mixing apparatus be either elevated and supported on a suitable frame work, or that it be suitably supported on a floor and the floor provided with an opening for the placement therein  
10 of a discharge hopper. In the drawings, I have shown a frame work consisting of longitudinal sills 18 which may form either part of an elevated structure or be supported on the floor of a building and bridging these  
15 sills are two cross-bars 19 in the form of I-beams. The hopper referred to is designated 20 and its enlarged receiving end is situated between the sills 18.

On each side of the longitudinal center  
20 of the machine is a shaft 21, journaled in boxes 22 secured to the I-beams 19 and on one of these shafts is secured two supporting-rollers 23 over which roll guide-tracks 24 riveted or otherwise fastened to the drum  
25 1. To the other shaft, supporting rollers 25 are loosely mounted on the shaft and on this shaft is secured a pinion 26 which meshes with a gear-rim 27 secured to the drum. This last-mentioned shaft also has  
30 secured thereto a pulley 28 around which is adapted to be passed a driving-belt for imparting rotary motion to the shaft and through the medium of the pinion 26 and gear-rim 27, this motion is imparted to the  
35 drum. The supporting rollers on said last-mentioned shaft are loosely mounted thereon for the reason that they are larger than the pinion 26 and by so constructing the rollers, all unnecessary friction is eliminated.  
40

By the provision of the fixed housing around the central portion of the drum, the materials after being mixed may be readily discharged without interfering with the materials being fed into the drum, thus resulting in a mixing machine which is in continuous operation and may be fed into or discharged therefrom at will. The mixture as it reaches the center of the drum escapes  
50 through the outlet openings therein and is carried around within the fixed housing by the scrapers 16 and when opening the slide gate 14, the mixture is discharged through the discharge-opening in said housing.

55 In the drawings, I have shown four outlet openings in the drum, thus permitting the mixture to escape from the drum at four different points when said points are brought into registration with the discharge-opening, but any other number of outlet  
60 openings may be used, if desired.

From the construction described it will be apparent that the fixed shell or closure is disposed in the longitudinal length of the  
65 drum between the end mixing portions there-

of, and preferably at its central zone; that the discharge openings leading from the drum into the space between the drum and fixed shell have, at each side thereof in the length of the drum, the mixing devices, and  
70 that these mixing devices deliver the material from opposite end portions of the drum toward said openings; and that the sweeps or projections extending into the space between the drum and fixed shell move  
75 the annular mass of material over the fixed wall of the shell and when the discharge door or closure is opened, such material is forced out of the machine. When material is fed into one end of the drum it is first  
80 mixed by the revolving motion of the drum and by the mixers projecting from the surface of the drum adjacent the feed opening; the material then gradually fills the space between the drum and the fixed shell, and  
85 distributes toward the opposite end of the drum beyond the discharge openings through which the mixed material passes from opposite sides thereof to the space in the zone covered by the fixed shell, as material is discharged from time to time by opening the  
90 door or closure of the shell.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is,—

95 1. In a machine for mixing fertilizers, the combination of a drum having end mixing portions and a feed opening at one end thereof and a peripheral discharge opening disposed between the end mixing portions  
100 of the drum, a closure or shell disposed in a zone between the end mixing portions of the drum, and means for relatively rotating said drum and closure with respect to each other.  
105

2. In a machine of the character described, the combination of a rotatable drum having end mixing portions and a feed opening, an outlet in the peripheral wall disposed between the end mixing portions of  
110 the drum, and a stationary closure or shell surrounding a zone of said drum between the end mixing portions thereof, said shell or closure inclosing said peripheral opening and preventing discharge of material from  
115 the machine.

3. A rotatable mixing-drum having end mixing portions and provided with a feed-opening at one end with an outlet-opening in its peripheral wall disposed in a zone of  
120 the drum between the end mixing portions thereof, a housing in the zone of said peripheral opening, surrounding said peripheral wall between the end mixing portions of the drum and serving to prevent the discharge of the mixture from the machine, said  
125 housing having a discharge opening and means for closing said discharge opening.

4. A mixing-drum having end mixing portions and provided with a feed-opening  
130



at one end and an outlet opening in its peripheral wall, a stationary shell surrounding said drum in a zone disposed between the end mixing portions of the drum and providing a chamber between the two in constant communication with the interior of the drum, said shell having a discharge opening and means for opening and closing said discharge-opening.

5. A rotatable drum gradually enlarged from the ends and having a feed opening in one of said ends and an outlet opening in one of its peripheral walls at the enlarged portion of said drum, a stationary housing surrounding the enlarged portion of said drum in which said drum rotates and forming a space between the enlarged portion of the drum and said housing in which mixed material is adapted to be circularly moved, a discharge opening in said housing, and means for opening and closing said discharge opening.

6. A rotatable drum tapered toward opposite ends and provided with a feed-opening at one end and an outlet opening in its peripheral wall at a point centrally between the ends of said drum, mixing-wings within the drum adapted to mix and deliver the materials from the end portions of the drum toward said central peripheral outlet opening, and a stationary housing surrounding the enlarged central portion of the drum and in constant communication therewith and having a discharge opening and means to open and close said discharge opening.

7. In a fertilizer mixing machine, the combination of a drum, means for feeding material thereinto, said drum having a peripheral opening for discharge of material from the drum, a stationary casing or housing disposed about the drum and preventing discharge of material therefrom, and means within the drum for directing the mixed material from the mixing portions of the drum toward the said peripheral opening and into the space between the drum and stationary casing or housing.

8. A rotatable drum having an outlet opening in its peripheral wall and radial mixing wings secured to the inner side of said wall and provided with scoop portions at their inner ends, said scoop portions being inclined to deliver the materials into the plane in which said outlet opening is formed, means for feeding material into said drum, and means for controlling the discharge of the mixture through said outlet opening.

9. A rotatable oppositely-tapered drum having a plurality of outlet openings at a point centrally between its ends, a feed-opening at one end, mixing means therein to deliver the material toward said series of outlet openings, and a housing in which said drum rotates, said housing having its peripheral walls separated from the wall of

the drum the space between the housing and drum being in constant communication with the drum and said housing having a discharge opening at its lowest point, and a closure for said discharge opening.

10. A rotatable drum having a feed-opening at one end and an outlet opening in its peripheral wall, a housing surrounding said drum and in which said drum rotates, said housing having its peripheral wall separated from the wall of the drum by an intervening space, scraping bars fastened to the drum within said intervening space and adapted to carry the materials in said space to the lowest point of said housing, a discharge opening at the lowest point of said housing, and means for opening and closing said discharge opening.

11. In a mixing machine of the character described, the combination of a rotatable drum, means for feeding material thereinto to be mixed, said drum having a peripheral opening for the discharge of material from the drum, a stationary shell or housing surrounding the portion of the drum containing said peripheral opening and forming a space for mixed material, and means projecting into said space between the drum and shell or housing for moving the mixed material circularly with the drum.

12. In a mixing machine of the character described, the combination of a rotatable drum, means for feeding material thereinto to be mixed, said drum having a peripheral opening for the discharge of material from the drum, a stationary shell or housing surrounding the portion of the drum containing said peripheral opening and forming a space for mixed material, means projecting into said space between the drum and shell or housing for moving the mixed material circularly with the drum, and means for discharging the material from said space as it is moved with the drum.

13. In a mixing machine of the character described, the combination of a drum, means for feeding material into the drum to be mixed, said drum having a peripheral outlet for the discharge of material, a stationary shell or housing disposed about the drum in the zone of the peripheral opening and forming a space between the drum and shell or housing, means for preventing the escape of material from said space, devices controlling said means to discharge the material from said space, and means within the drum at each side of the peripheral opening for directing mixed material to said opening and into the space between the drum and shell or housing which is in constant communication with the drum.

14. In a mixing machine of the character described, the combination of a drum, means for feeding material into the drum to be mixed, said drum having a peripheral out-



let for the discharge of material, a stationary shell or housing disposed about the drum in the zone of the peripheral opening and forming a space between the drum and shell  
5 or housing, means for preventing the escape of material from said space, devices controlling said means to discharge the material from said space, means within the drum at each side of the peripheral opening  
10 for directing mixed material to said opening and into the space between the drum and

shell or housing, and means for moving the material in said space about the axis of the drum.

In testimony whereof, I have affixed my 15 signature in the presence of two subscribing witnesses.

ROBERT D. SOARS.

Witnesses:

ELLA C. PLUECKHAHN,  
EMIL NEUHART.