

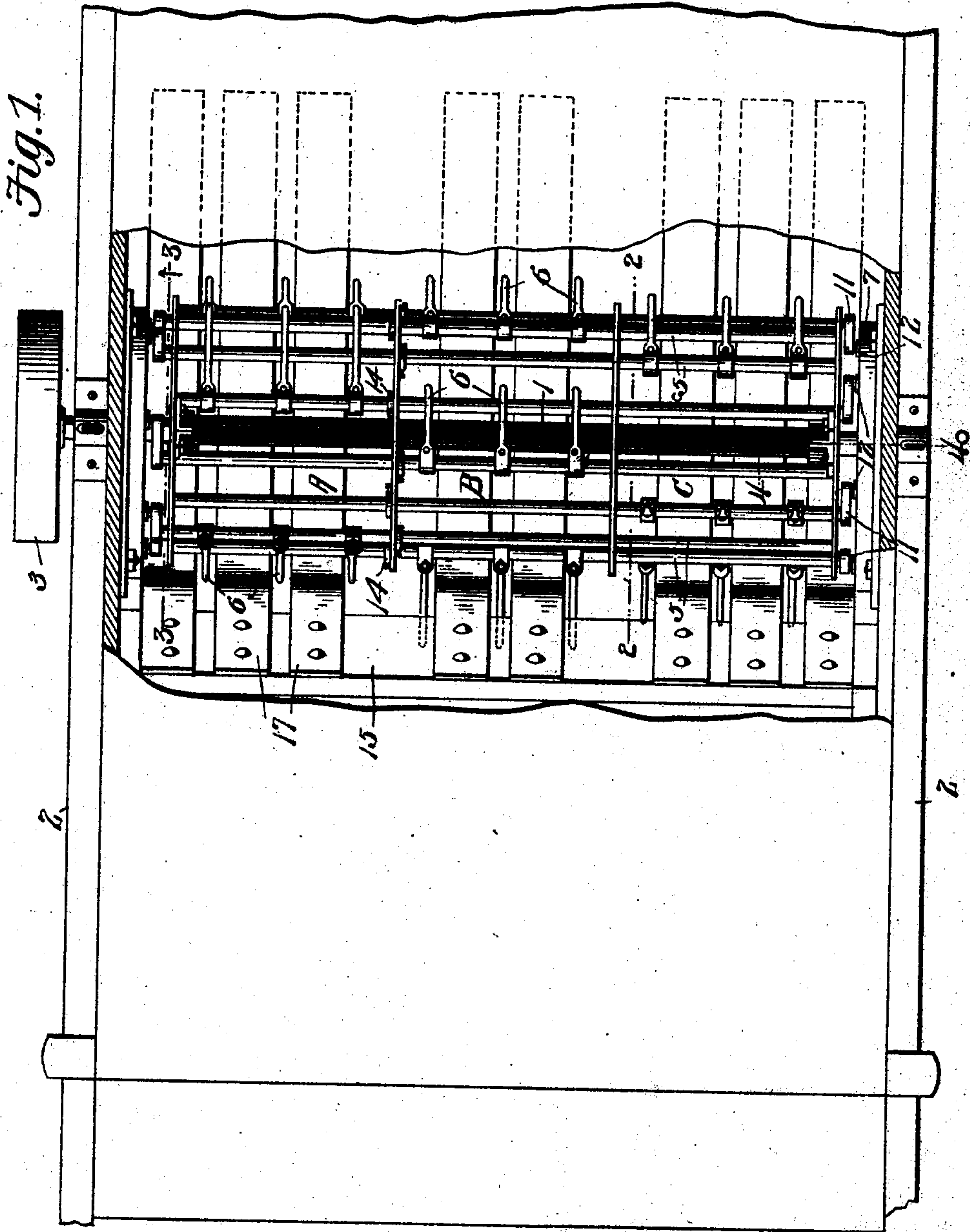
No. 816,067.

PATENTED MAR. 27, 1906.

G. BOETTLER.
SEPARATOR.

APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 1.



Witnesses

E. J. H. H. H. H.
Wm. Ragger

George Boettler,

Inventor.

by

C. A. Snow & Co.

Attorneys

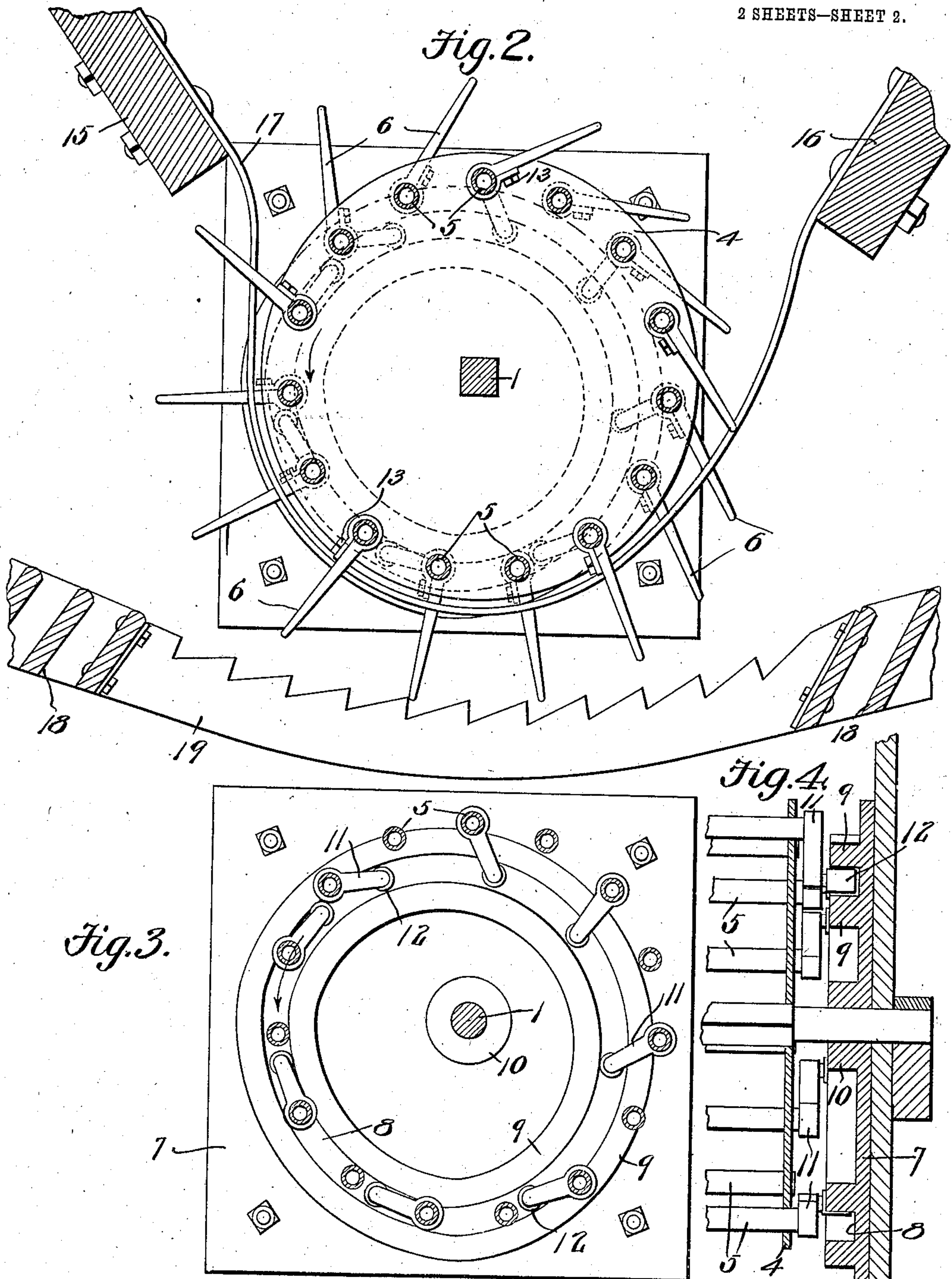
No. 816,067.

PATENTED MAR. 27, 1906.

G. BOETTLER.
SEPARATOR.

APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 2.



Witnesses

E. J. Stewart
Wm. Bagger

George Boettler,

by

C. A. Snow & Co.

Inventor

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE BOETTLER, OF ST. PETERS, MISSOURI.

SEPARATOR.

No. 816,067.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed October 9, 1905. Serial No. 282,027.

To all whom it may concern:

Be it known that I, GEORGE BOETTLER, a citizen of the United States, residing at St. Peters, in the county of St. Charles and State of Missouri, have invented a new and useful Separator, of which the following is a specification.

This invention relates to separators employed in threshing-machines for the purpose of assisting in the process of separating the grain from the straw, the object of the invention being to simplify and improve the construction and operation of this class of devices.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations, and modifications within the scope of the invention may be made when desired.

In the drawings, Figure 1 is a top plan view showing the improved separator applied to a threshing-machine, the top portion of the casing being broken away to exhibit the parts constituting the invention. Fig. 2 is a sectional view taken on the plane indicated by the line 2 2 in Fig. 1. Fig. 3 is a sectional view taken on the plane indicated by the line 3 3 in Fig. 1. Fig. 4 is a sectional detail view taken on the plane indicated by the line 4 4 in Fig. 1.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

The present invention relates to that class of separators which comprise a cylindrical structure supported for rotation and including as parts thereof a plurality of rock-shafts having independent oscillatory movement and armed with teeth or fingers adapted to engage the straw as the latter moves in a rearward direction in the machine, thus operating to tear and to agitate the mass of straw and to loosen it, so as to permit the grain which has been detached from the heads by the threshing-cylinder and which is being detached by the operation of the sepa-

rating-cylinder to drop to the grain-pan or other conveying means which is located in the lower part of the machine.

The main shaft 1, carrying the improved separating-cylinder, is provided with bearings in the sides 2 of the casing of the machine to which the invention is applied. It is to be understood that the separating-cylinder of the invention may be applied to almost any modern threshing-machine and that its precise location may be changed according to the special construction of the machine to which it is applied, it being sufficient for the purpose of description to state that the separating-cylinder is to be located a suitable distance in rear of the threshing-cylinder, which latter has not been shown in the drawings.

The shaft 1 carries a pulley or band-wheel 3, which is to be driven by means of a belt or band deriving motion from any suitable source of power, which may be the cylinder-carrying shaft of the threshing-machine.

Securely mounted upon the shaft 1 between the sides of the machine-casing are a plurality of heads consisting of circular disks 4 4, of which in the accompanying drawings four have been shown, said disks being equidistantly spaced. The disks 4, all of which are firmly secured upon the shaft 1, the disk-carrying portion of which is preferably non-circular in cross-section, afford bearings for a plurality of equidistantly-spaced rock-shafts 5 5, which are parallel to the axis of the cylinder. Upon each of these rock-shafts there is mounted a plurality of teeth 6, extending radially therefrom; but it will be specially noted that the teeth 6 are mounted only upon such portion of each shaft as extends between two of the heads or disks 4. Thus assuming that the cylinder is divided lengthwise into three spaces or compartments A, B, and C of approximately equal dimensions, it is necessary to the equal distribution of the teeth that the teeth upon three successive shafts be placed within the limits of the three successive compartments A, B, and C. It is also desirable that the number of rock-shafts employed be a multiple of the number of spaces or compartments into which the cylinder is lengthwise divided. Thus in the accompanying drawings, the cylinder being divided by four disks or heads into three lengthwise compartments, fifteen rock-shafts have been shown, and the circumference of the cylinder will thus be provided with five broken rows of teeth extending lengthwise of the cylinder

and transversely across the casing of the machine. It is to be distinctly understood, however, that I do not limit myself to a subdivision of the cylinder into three spaces, although this is the number preferably used. Likewise a greater number of rock-shafts—for instance, eighteen, twenty-one, or twenty-four—might be used. Again it is not absolutely necessary that the number of rock-shafts used should be an exact multiple of the number of subdivisions of the cylinder, although in order to insure uniformity in the distribution of the teeth it is desirable that the proportions stated be preserved.

Upon the sides of the casing are secured bearing-plates 7, having cam-grooves 8, formed by upstanding flanges 9 9, which are concentric to each other but obviously eccentric to the axis of the shaft 1, which extends through the bearing-plates, which are preferably provided with collars 10, affording bearings for said shaft. The rock-shafts 5 5 are provided at the ends thereof with cranks 11, carrying friction-rollers 12, which operate in the cam-grooves 8, it being observed that the cranks are mounted or secured at opposite ends of alternate rock-shafts, thus enabling a relatively large number of rock-shafts to be used in the construction of the cylinder without causing confusion in the co-operation of the cranks and cam-grooves by placing the cranks too closely together. Thus when an even number of rock-shafts are used the cranks connected with one half of said shafts will be in engagement with the cam-groove of the bearing-plate at one side of the machine, while the other half will be in engagement with the cam-groove of the bearing-plate at the opposite side of the machine. When, as in the drawings, an uneven number of rock-shafts are employed, the cam-groove of the bearing-plate at one side of the machine will accommodate an extra crank in excess of the number accommodated by the bearing-plate at the opposite side. This, however, is not found to interfere with the successful operation of the invention.

The rock-shafts used in connection with the present invention are preferably iron tubes of suitable dimensions, and the teeth 6 are clamped thereon and secured by bolts 13. The rock-shafts are also provided with set collars 14, adjacent to one of the disks 4, for the purpose of preventing lateral displacement.

Cross-bars 15 and 16, supported between the side members 2 of the casing of the machine in front and in rear of the separating-cylinder, serve to support a plurality of spaced straps or bands which extend beneath the separating-cylinder, said straps being spaced sufficiently to permit the teeth 6 to operate between them. These straps or bands serve as guards to prevent the straw from becoming entangled with the separating-cylinder

when carried rearwardly through the casing over the shaking-screens 18, which have been shown as being connected by means of fish-backs 19 beneath the separating-cylinder. Ordinary well-known means are to be employed for suspending and for imparting reciprocatory motion to the shaking-screens and related parts; but such means have not been illustrated, as they form no part of the present invention.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains. As the threshed material moves rearwardly through the casing of the cylinder, carried by the means usually employed, it will pass into engagement with the teeth of the separating-cylinder. The arrangement of the cranks upon the rock-shafts and the cam-grooves in which said cranks operate is such that the downgoing teeth upon the front side of the cylinder will be thrown forward to a radial position with relation to said cylinder, so that they will project between the straps 17 to the greatest possible extent and engage the threshed material to their utmost capacity while the upgoing teeth upon the rear side of the cylinder will gradually assume a position which is approximately tangential with relation to the cylinder and which is most favorable for shedding the engaged material, which continues its movement in a rearward direction.

Owing to the arrangement of the teeth, as hereinbefore described, the moving material will not be simultaneously engaged by a row of teeth extending transversely across the machine, but only by a section of teeth extending across approximately one-third the width of the casing, the teeth connected with three successive rock-shafts being required to operate upon the entire width of the machine. This is a feature which is considered of the greatest importance in connection with this invention, for the reason that the threshed material will thereby be thoroughly disintegrated and torn asunder, much more so than if simply subjected to the beating and feeding action of a transverse row of teeth. This disintegration and mastication of the straw places the latter in the most favorable condition for the separation therefrom of grain and grain-loaded particles, which will drop between the fish-backs or through such straw-carrying means as may be employed to receiving means underneath. Again, it will be observed that the movement whereby the individual teeth are thrown from an approximately tangential into an approximately radial position with relation to the cylinder is timed to occur at the point where the teeth enter into engagement with the moving mass of threshed material, which is thus subjected

to a distinct whipping action, which is extremely effective in stirring the straw and loosening therefrom such grains as may still adhere.

5 The general construction of the improved separating device is simple and inexpensive and is of such a nature as to enable the device to be readily applied for operation to threshing-machines of various well-known
10 constructions.

Having thus described the invention, what is claimed is—

1. A separating-cylinder including a plurality of disks, a plurality of rock-shafts supported in said disks, and teeth upon successive rock-shafts disposed between successive pairs of disks according to the arrangement of the latter longitudinally of the shaft.

2. A separating device for threshing-machines including a cylindrical structure supported for rotation and comprising a plurality of spaced disks and a plurality of rock-shafts supported circumferentially in the disks, each of said rock-shafts having a
25 toothed portion extending between two of the supporting-disks.

3. A separating device for threshing-machines including a cylindrical structure sup-

ported for rotation and comprising a shaft, a plurality of disks supported upon said shaft 30 and spaced apart, a plurality of rock-shafts extending through all of the disks and each having a toothed portion extending between two of the disks only, cranks upon the rock-shafts, and bearing-plates having cam-
35 grooves engaging said cranks.

4. A separating device for threshing-machines including a cylindrical structure supported for rotation and comprising a shaft, a plurality of spaced disks upon said shaft, a
40 plurality of rock-shafts extending through all of the disks and each having a toothed portion extending between two of the disks only, cranks upon the rock-shafts, and bearing-plates having cam-grooves engaging said
45 cranks; in combination with supported straps extending beneath and partially encircling the cylinder, said straps being spaced apart for the passage of the teeth.

In testimony that I claim the foregoing as
50 my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE BOETTLER.

Witnesses:

W. P. HINES,
J. W. KELSICK.