(No Model.) 3 Sheets—Sheet 1.

L. WOMMER & J. BUCK.

CENTRIFUGAL BOLTING REEL.

No. 329,423. Patented Oct. 27, 1885.

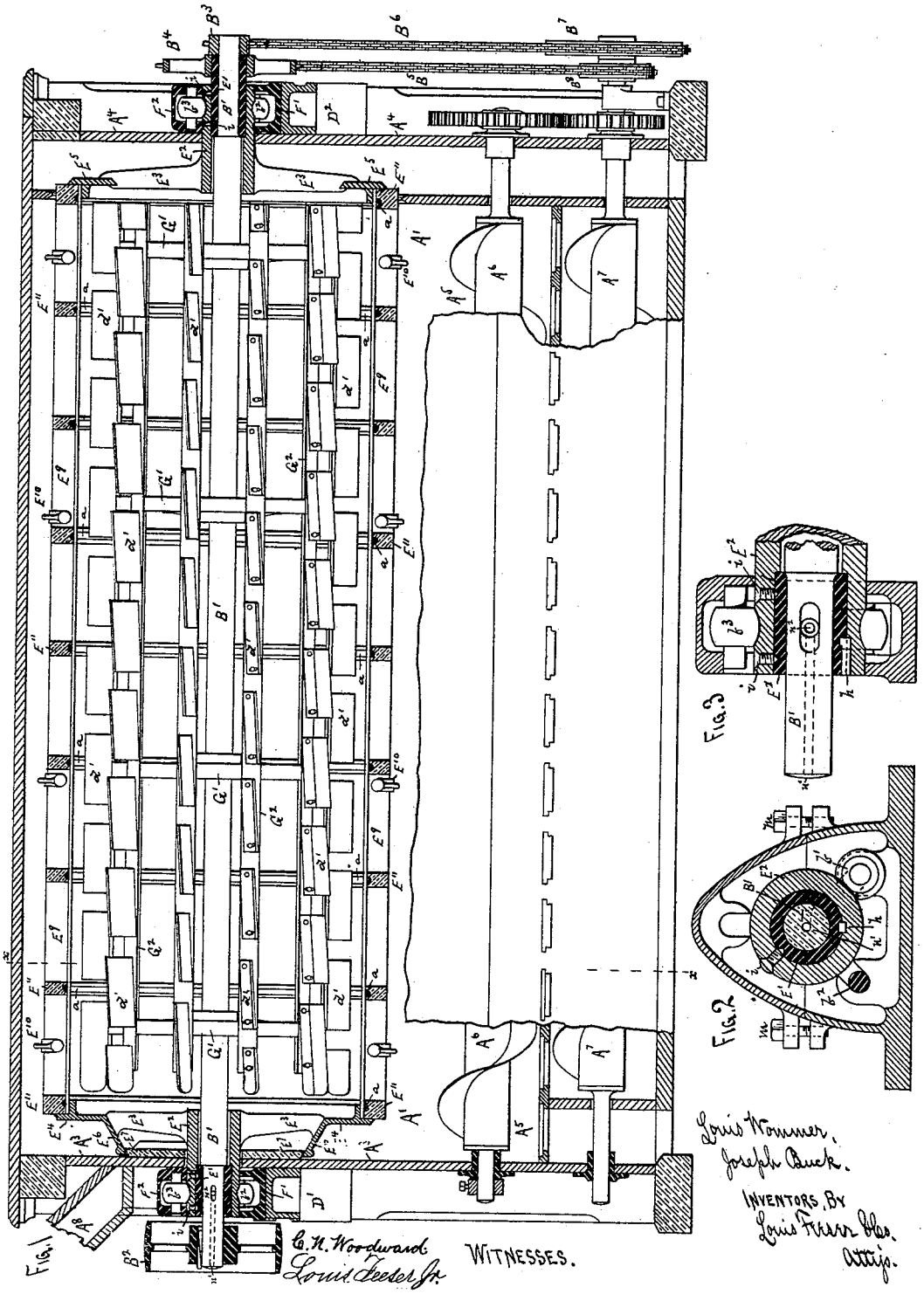


Fig. 1.

Fig. 3.

Fig. 2.

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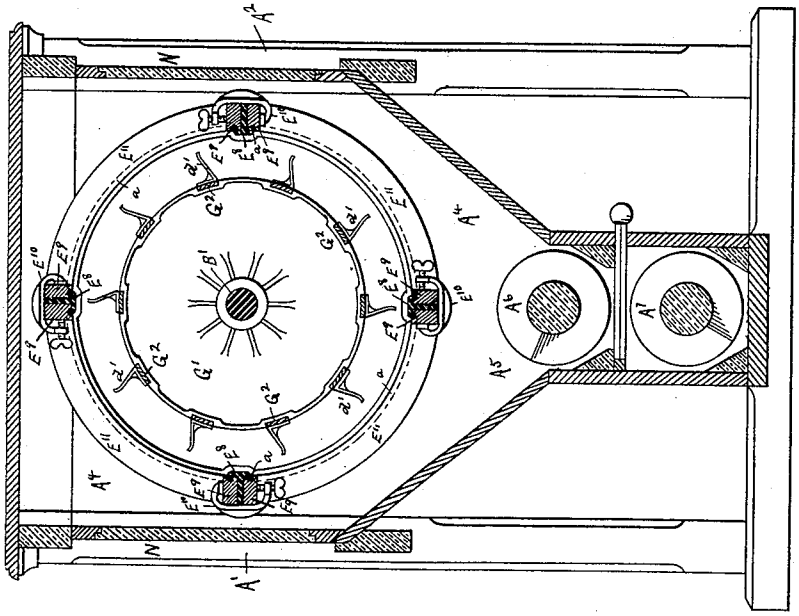


Fig. 5

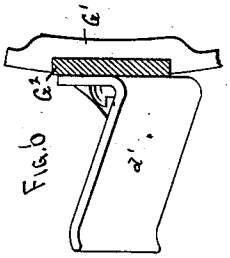


Fig. 6

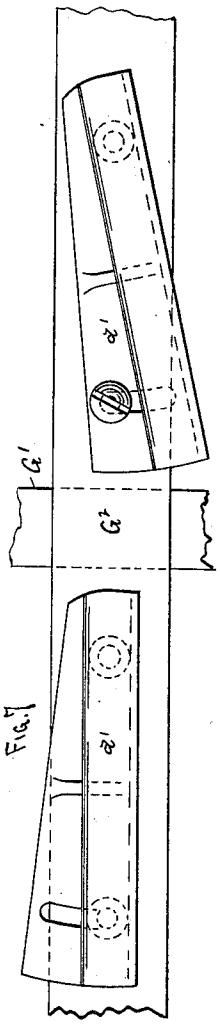


Fig. 7

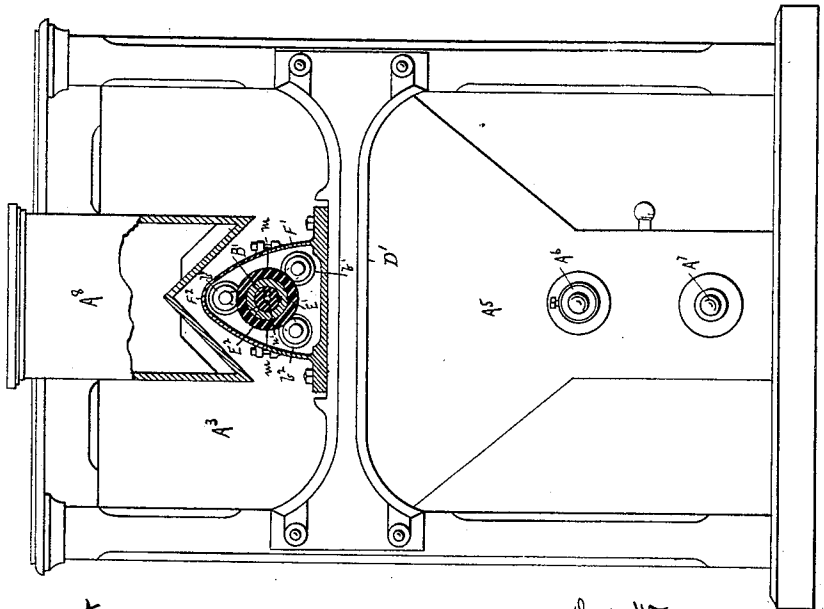


Fig. 4

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CENTRIFUGAL BOLTING REEL.

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Fig. 9

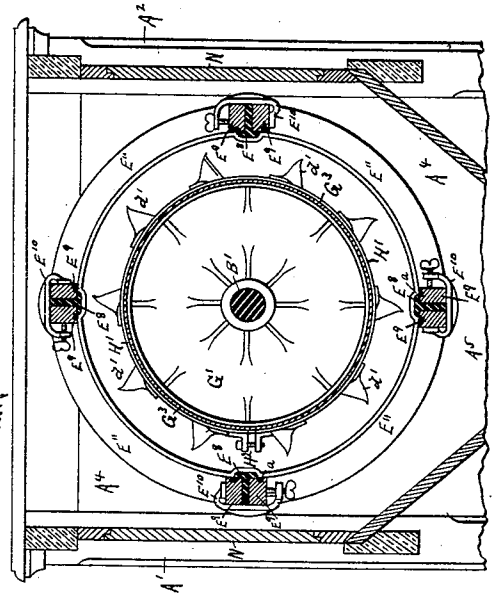


Fig. 10

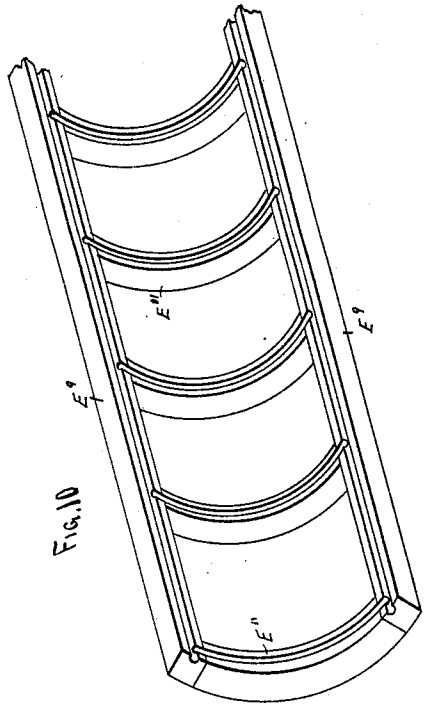


Fig. 8

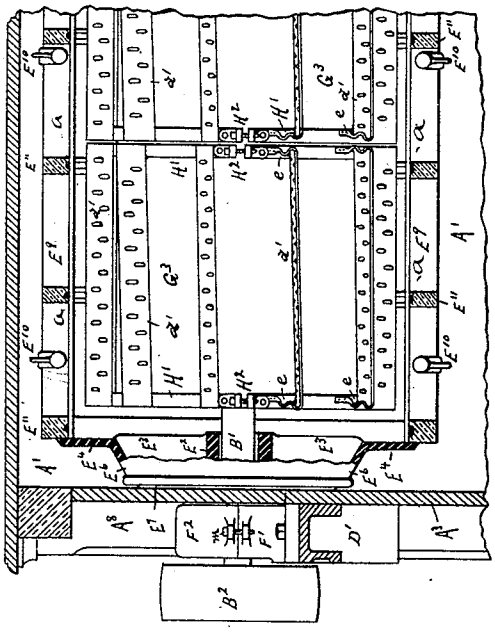
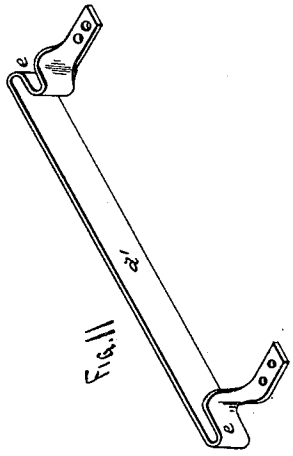


Fig. 11



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UNITED STATES PATENT OFFICE.

LOUIS WOMMER AND JOSEPH BUCK, OF MINNEAPOLIS, MINNESOTA.

CENTRIFUGAL BOLTING-REEL.

SPECIFICATION forming part of Letters Patent No. 329,423, dated October 27, 1885.

Application filed March 13, 1885. Serial No. 158,712. (No model.)

To all whom it may concern:

Be it known that we, LOUIS WOMMER and JOSEPH BUCK, both subjects of the Emperor of Germany, and both residing at Minneapolis, in the county of Hennepin and State of Minnesota, have jointly invented certain new and useful Improvements in Centrifugal Bolting-Reels, of which the following specification is a full, clear, and exact description, reference being also had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation. Fig. 2 is an enlarged cross-sectional view, and Fig. 3 is an enlarged longitudinal sectional view of one of the anti-friction bearings of the reel and beater-cylinder shafts and sleeves. Fig. 4 is an elevation of the "head" end of the machine with the anti-friction bearing and feed-hopper partially in section. Fig. 5 is a cross-sectional view on the line *x x* of Fig. 1. Fig. 6 is an enlarged cross-sectional view; and Fig. 7 is an enlarged plan view of a portion of the beater-cylinder, illustrating more fully the construction and manner of adjusting the beater-blades. Fig. 8 is a longitudinal sectional view of a portion of one end of the machine; and Fig. 9 is a cross-sectional view of the same, showing a slight variation in the manner of adjusting the beater-ribs. Fig. 10 is a perspective view of a portion of one of the cloth-supporting frames of the reel. Fig. 11 is an enlarged perspective view of one of the beater-ribs detached.

This invention relates to machines for detaching the loose particles of middlings and flour from the bran and partially-reduced wheat during the process of milling, and also for "dressing" the flour.

The frame or casing of this machine consists of the usual sides, A' A^2, head end A^3, tail end A^4, and hopper-bottom A^5, the latter having conveyers A^6 A^7 set in its lower part, as shown, and with a feed-hopper, A^8, on the head end A^3.

B' is the main central driving-shaft, having the driving-pulley B^2 on one end and a sprocket-pinion, B^3, on the other end outside the ends of the casing of the machine.

D' D^2 are two bridge-trees, one attached across each end of the frame of the machine, as shown, and upon these bridge-trees are mounted the bearings which support the shaft B' and the beater-cylinder and reel. Both these bearings are precisely alike, so that like letters of reference are used to indicate corresponding parts therein. Fitting loosely upon the shaft B', above each of the bridge-trees D' D^2, are collars E' E', of brass or other similar suitable metal or composition, and surrounding each of these collars are sleeves or tubular bearings E^2 E^2, secured to the collars by keys *h* and set-screws *i*, or by any other suitable means. These sleeves project inward, and are provided with arms E^3 E^3, connecting the sleeves at the head end of the machine with a ring, E^4, and at the tail end with a ring, E^5. The ring E^4 has a conical rim, E^6, running backward toward the head end A^3, and with its edge fitting over a disk, E^7, attached to the head A^3. By this means a flour and dust tight joint is formed between the head A^3 and the reel, the conical rim also serving to convey the material from the feed-hopper A^8 into the reel.

E^8 are T-iron ribs connecting the rings E^4 E^5 at equal and suitable intervals. In the drawings four of these ribs are shown, which will be the number usually employed; but any suitable number may be used. The rings E^4 E^5, sleeves E^2 E^2, connecting-arms E^3, and ribs E^8 thus serve as the frame-work of the bolting-cloth reel. Between each pair of the ribs E^8 segmental bolting-cloth supporting-frames are held by clamps E^{10}, or by other suitable means. The construction of these segmental frames is clearly illustrated in Fig. 10, which shows a portion of one of them detached. They consist, as shown, of longitudinal side pieces, E^9, and curved intermediate ribs, E^{11}. The longitudinal ribs E^9 rest upon each side of the outwardly-projecting webs of the ribs E^8, and are clamped thereto, as before stated, by clamps E^{10}, while the segmental ribs E^{11}, which occur at the ends of the sections, rest upon the rings E^4 E^5. Each of the ribs E^{11} and sides E^9 are grooved on the inner side, in which grooves the edges of the bolting-cloth will be held by strips of rubber or other similar suitable material, *a*. The grooves and strips will thus enable the cloth to be secured to the frames without tacking or other fastening, and avoid injury thereto, so that when it is de-

sired to change the clothing of the reel it can be easily and quickly accomplished without injury to the cloth, and the cloth saved and restored to the reel when required.

Another important advantage gained by this manner of securing the cloth is that the clothing may be very quickly and easily changed by loosening the clamps E^{10} and removing the frames E^9 E^{11} through the side doors, A^9. This ability to remove the frames E^9 E^{11} also renders access to the beater-cylinder, when required, a matter of easy accomplishment.

Another advantage gained by this arrangement is that the cloth may be divided into small separate pieces; hence it can be cut and applied with greater economy, and in event of one part wearing more quickly than the other the worn part can be replaced at a small expense, and without the necessity for the replacing of the whole section of cloth. No binding is required to the cloth, thus saving expense on that account.

The bearings for the shaft B′ consist of hollow casings, one attached to each bridge-tree D′ D^2, and each made in two parts, F′ F^2, secured together by clamping-bolts *m*, each of the lower parts, F′, being provided with rollers *b′* b^2, upon which the sleeves E^2 E^2 rest, while a third similar wheel, b^3, is arranged in each of the upper parts, F^2, above each of the sleeves. By this means the sleeves run in contact only with the rollers *b′* b^2 b^3, thereby reducing the friction to a minimum. The shaft B, is reduced in diameter where it passes through the collars E′ E′, and the sleeves E^2 E^2 are provided with channels in which the edges of the rollers *b′* b^2 b^3 run, the reductions of the shaft preventing it from moving endwise, and the channels in which the rollers run preventing any end movement of the sleeves. By this means both the reel and beater-shaft are held in fixed relations horizontally, while at the same time the shaft is free to revolve within the collars and sleeves. By this manner of mounting and connecting the beater-shaft B′ and reel-bearings the parts are all held firmly together and adjusted simultaneously, so that the "centering" is always true, and no danger exists of the beaters coming in contact with the reel. Holes *n′* are bored into each end of the shaft B′ opposite the centers of the collars E′ E′, and outlets n^2 bored into these holes from the outside to form oil-ducts to the collars, so that they may be lubricated from the outside and while the machine is running. By using a semi-solidified lubricant no danger exists of oil or grease working out from the bearings and soiling the frame of the machine or becoming mixed with the material passing through the machine. The collar E^2 at the tail end projects outward beyond the bearings and casing F′ F^2, and is provided with a sprocket-wheel, B^4, close alongside the sprocket-pinion B^3, these two sprocket-wheels being connected by chain-belts B^5 B^6 with sprocket-wheels B^7 B^8 on the shaft of the lower conveyer, A^7, as shown in Fig. 1. The outer wheel, B^7, is larger than the wheel B^8, so that the speed of the reel will be less than that of the shaft B′, as will be readily understood by the arrangement of wheels and belts shown.

In this class of machines it is generally the custom to revolve the shaft about two hundred revolutions per minute, and revolve the reel at about twenty to thirty revolutions per minute and in the same direction. The beater-cylinder is formed of disks or spiders G′, attached to the shaft B′ at suitable intervals, and connected at their rims by slats or bars G^2, as shown in Figs. 1 and 5, or by a sheet-iron cylinder, G^3, arranged around the spiders, as shown in Figs. 8 and 9. The beater-ribs are formed of short sections *d′*, each pivoted by one end to the bars G^2 or to the sheet-metal cylinder G^3, and each provided with a slot at the other end, through which set-screws are tapped into the bars G^2 or cylinder G^3. By means of these slots the beater-ribs may be set at a slight angle to the shaft B^2, so that when the cylinder is revolved the beaters, by inclining toward the tail end of the machine, will gradually convey the material along the reel at the same time that it throws it against the cloth. By altering the degree of the inclination of the ribs *d′* the material may be thus conveyed along at a faster or slower speed, as may be desired. If the nature of the material is such that it only requires to be subjected to slight degree of attrition, then the beater-strips *d′* will be set at an increased angle to the shaft B′, so that the material will be conveyed more rapidly through the machine. If, however, the nature of the material is such that it requires an increased degree of attrition, then the beater-strips will be set at a line nearly parallel to the shaft B′, so that the material will be moved very slowly along through the reel and subjected for a longer time to the action of the beaters. The bolting-cloth on these machines usually decreases in fineness from the head end toward the tail end of the machine, the numbers being varied to correspond to the material being acted upon.

It is sometimes found very advantageous with certain qualities of material to hold it for a longer period of time in contact with a certain number or numbers of cloth than the remainder, to more thoroughly separate the particles—or, in other words, to cause the material to pass more slowly through certain parts of the machine than through other parts. This can be very easily accomplished by adjusting the beaters *d′* where it is desired to "hold" the material more nearly parallel with the shaft B′. Thus the passage of the material through the machine may be easily and perfectly controlled, and caused to move fast or slow, as required, and the machine adapted to all grades and conditions of material, and to all the purposes for which such machines are intended to be used.

In Figs. 8 and 9 a slight modification of the manner of adjusting the beater-strips is shown, consisting in connecting each end of each row around the cylinder to a ring or hoop, H′, and providing each hoop with means H^2 for clamping it to the cylinder. By this arrangement it will be readily seen that if one of the clamps H^2 be loosened, the hoop H′ may be moved around the cylinder and carry with it all its row of attached beaters, thus very quickly adjusting all the beaters in that row at once and equally. Then by again clamping the hoops the beaters may be secured at any desired point. This is a very simple and effective means of adjusting the beaters. The beaters may be perforated, if preferred, as shown in Fig. 6. The beaters consist of sheet-iron or steel plates properly braced and supported, and attached by rivets or bolts to the beater-cylinder, and are set in a backwardly-slanting position, so as to throw the material more effectually against the cloth. In Figs. 1 and 5 these beaters are shown formed simply of an L shape; but under some circumstances they might be formed with their ends bent into corrugations *e*, so as to form springs at the ends, as shown in Figs. 8 and 11, so that they will "give" slightly when adjusted by the hoops and not strain the rivets by which they are secured to the hoops. This machine may thus be adapted to all the uses which appertain to the ordinary centrifugal separators, bolts, bran-dusters, detachers, and all machines requiring a separation by bolting-cloth either of wire, silk, or cotton. The doors N will also be provided with cloth panels, which will be secured to the frames by the same means as the cloth is secured to the reel-frame—viz., by being held in grooves by rubber or other strips *a*.

Having described our invention and set forth its merits, what we claim is—

1. In a centrifugal separator, the combination of a main shaft, a beater-cylinder, a bolting-reel outside of said beater-cylinder, and provided with sleeves E^2 E^2 and collars E′ E′, surrounding the main shaft near its ends, bearings having anti-friction rollers and supporting said sleeves, means for revolving said beater-cylinder, and means for revolving said reel in the same direction, but at a less speed than said beater-cylinder, substantially as and for the purpose set forth.

2. In a centrifugal separator, the combination of a main shaft, a beater-cylinder, a bolting-reel outside of said beater-cylinder, and provided with sleeves E^2 E^2 and collars E′ E′, surrounding the main shaft near its ends, bridge-trees D′ D^2, attached to the frame of said machine, bearing-casings formed in two parts, F′ F^2, and provided with anti-friction rollers b' b^2 b^3, and resting upon said bridge-trees, substantially as set forth.

3. In a centrifugal separator, the ribs E″ E″ and sides E^9 E^9, having, respectively, grooves provided with holding-strips *a a*, substantially as and for the purpose herein specified.

4. In a centrifugal separator, the combination of an external bolting-reel, an internal beater-cylinder mounted on a shaft, clamping-hoops surrounding said cylinder, and sectional beater-ribs pivoted thereto, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

LOUIS WOMMER.
JOSEPH BUCK.

Witnesses:
LOUIS FEESER, Jr.,
W. J. RODGERS.