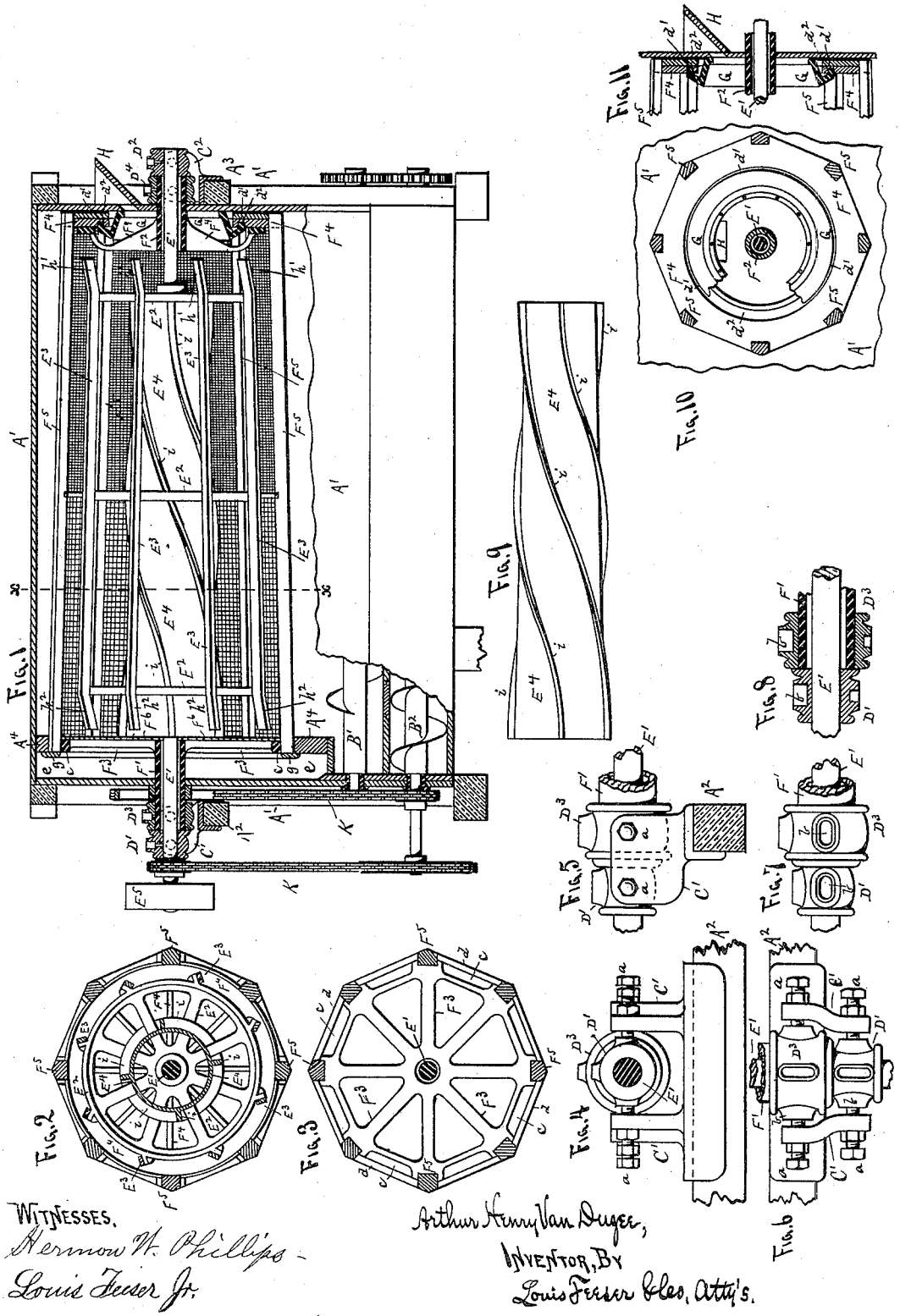
(No Model.)

A. H. VAN DUZEE.

CENTRIFUGAL REEL.

No. 302,693. Patented July 29, 1884.



WITNESSES.
Hermon W. Phillips
Louis Fesser Jr.

Arthur Henry Van Duzee,
INVENTOR, BY
Louis Fesser & Co. Atty's.

UNITED STATES PATENT OFFICE.

ARTHUR HENRY VAN DUZEE, OF MINNEAPOLIS, MINNESOTA.

CENTRIFUGAL REEL.

SPECIFICATION forming part of Letters Patent No. 302,693, dated July 29, 1884.

Application filed November 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR HENRY VAN DUZEE, a citizen of the United States, and a resident of Minneapolis, in the county of Hennepin, in the State of Minnesota, have invented certain new and useful Improvements in Centrifugal 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 a cross-section of the reel and beater-drums on the line *x x* of Fig. 1; Fig. 3, a front view of the "tail-spider," with the sheet-metal covering removed. Fig. 4 is an end view, Fig. 5 is a side view, and Fig. 6 is a plan view, enlarged, of one set of the adjustable bearings. Figs. 7 and 8 are details, on the same scale as Figs. 4, 5, and 6, of the adjustable bearings. Fig. 9 is a detached view of the beater-drum. Fig. 10 is a front view, and Fig. 11 is a sectional side view, of the "head-spider," illustrating the manner of constructing the packing-rings, &c.

A′ is the main frame or casing, having the usual hopper-bottom and screw-conveyers, B′ B^2, for conveying the material away from the machine.

A^2 A^3 are two cross-timbers or bearing-trees, one secured across each end of or forming part of the frame A′, upon which are secured metal standards C′ C^2, and between these standards are pivotally secured by set-screws *a*, journal-collars D′ D^2 D^3 D^4, the outer collars, D′ D^2, supporting the main central beater-shaft, E′, and the collars D^3 D^4, supporting hollow sleeves F′ F^2 to which the reel-frame is secured, as hereinafter shown. The sleeves F′ F^2 are made larger than the shaft E′, so that no friction occurs between their surfaces, and the collars are loose upon the shaft and sleeves, so that they may revolve freely therein. The collars D^3 D^4 are arranged upon the extreme outer ends of the sleeves F′ F^2, and both the sleeves and the collars D^3 D^4 abut closely against the collars D′ D^2, so that no air can pass in through the space between the sleeves and shaft. By this arrangement both the beater-cylinder and reel are suspended upon the pivots *a*, thereby rendering them easily and quickly adjustable to counteract any irregularity or unequal shrinking, swelling, or twisting of the parts. Upon one side of the cavities in the collars D′ D^2 D^3 D^4, in which the inner ends of the pivots *a* sit, are longitudinal slots *b*, as shown in Figs. 7 and 8, so that when the shaft E′ vibrates in its rapid revolution, the slots *b* will permit the collars to move back and forth with the shaft, and thereby prevent cramping and straining the parts. This is a very important feature of my invention, as heretofore in machines of this kind the shaft is frequently bent out of line by the great strains brought to bear upon it by the uneven pressure of the material passing through the machine.

The inner ends of the sleeves F′ F^2 are formed into spiders or frames F^3 F^4, the head-spider being merely an open-armed wheel having a wooden ring, F^4, attached to its rim, with sockets for the ends of the ribs F^5 of the reel, while the tail-spider is formed with sockets for the opposite ends of the same ribs F^5. A sheet-metal plate, F^6, is secured to the inner face of the tail-spider F^3, fitting the shaft E′ closely, and projecting outward nearly to the ribs F^5, leaving small spaces *c* for the escape of the tailings from the reel between each pair of the ribs F^5. Small wooden bars *d* (see Fig. 3) will be arranged to connect the ribs F^5 upon the spider F^3, to which the ends of the webs of bolting-cloth will be tacked, while the other ends of the cloth will be tacked directly to the ring F^4, which will be made six, eight, or ten sided, according to the number of the ribs F^5 used in the reel. The head end of the reel is smaller than the tail end, so that a downward slope is imparted to the lower section of the reel, to cause the material to be carried from the head to the tail end of the machine as the parts are revolved.

G is a doubly-angular circular ring, attached to the inside of the head end of the frame A′, around the sleeve F^2, and having a backwardly-projecting rib or flange, *d′*, fitting into a corresponding circular cavity or channel, d^2, in the ring F^4, so that a packing-ring is formed to prevent the material from escaping or being driven backward by the action of the beaters, &c.

H is the feed-spout, through which the material is fed to the machine through the head of the frame A′, and also through the packing-ring G. This packing-ring, as will be seen, is formed slanting on both sides, so that no material will lodge upon it.

The ribs F^5 do not reach quite to the tail end of the frame A′, but stop short of it and revolve in a bulk-head or partition, A^4, leaving a space, *e*, into which the tailings are discharged. The joint between the bulk-head A^4 and reel is covered by a flat ring or shield, *g*, to prevent the passage of air-currents back and forth.

Attached to the shaft E′, at suitable intervals, are spiders or frames E^2, across whose outer rims inclined or tangentially-arranged beaters E^3 are secured, the beaters being parallel with each other and also parallel with the reel-ribs F^5—in other words, the outward tapers of the reel and the beater-cylinder from the head to the tail are equal, leaving the space between the ribs and beaters of the same width throughout. For a short distance the beaters at the head end are bent off at a slight angle, as shown at *h′*, toward the direction in which the beater-cylinder is revolved, while the ends at the tail end are bent off at a similar angle in the opposite direction, as shown at h^2. By this simple means the material as it enters the machine is caught by the bent ends *h′* of the beaters, and carried along the reel and started on its course toward the tail, thereby preventing any clogging at the feed end, while the bent ends h^2 catch the material and force it out through the discharge-ports *c*, thereby preventing any clogging at the tail end of the machine.

Attached to the shaft E′, inside the beaters E^3, is a sheet-metal or other drum, E^4, tapered in the same proportion as the beaters and reel, and armed upon its exterior with spiral ribs *i*, as shown more clearly in Fig. 9. The rapid revolution of the beater-shaft and beaters confines the air between the beaters and beater-shaft, and would, were it not prevented, cause a large percentage of fine material to pass through this air-space and be carried off with the tailings; but by using the ribbed cylinder or drum E^4 all such loss is prevented, as all the material is thrown outward beyond the beaters and kept outward; hence no portion escapes the action of the beaters and the cloth. The ends of the drum E^4 are made air-tight, so that no material can get inside of it. The ribs *i* on the drum E^4, being spirally arranged, not only serve to throw the material outward, but also serve as a conveyer to feed it along toward the tail end of the machine.

The shaft E′ will be revolved by any suitable means, (preferably by a belt acting on a pulley, E^5,) at a speed of about two hundred revolutions per minute, while the reel will be revolved in the same direction, but at a speed of only about eighteen revolutions per minute. This difference of speed may be obtained by any suitable means, but I have shown the usual arrangement of chains and sprocket-wheels K.

Having described my invention and set forth its merits, what I claim is—

1. In a centrifugal separator, the combination of a revolving bolting-reel tapering from the tail end toward the head end, longitudinal ribs on the interior surface of the reel, a series of beaters parallel with said ribs at their central parts and having oppositely-bent ends *h′* h^2, and revolving within said reel in the same direction as and at a greater speed than said reel, and means for rotating the reel and beaters at different speeds, substantially as and for the purpose set forth.

2. In a centrifugal separator, the combination of a bolting-cloth-covered revolving reel, a series of beaters revolving within said reel, and a drum revolving within said series of beaters and armed with spiral ribs *i*, substantially as set forth.

3. In a centrifugal separator, the combination of a revolving bolting-reel tapering from the tail end toward the head end, longitudinal ribs on the interior surface of the reel, a series of beaters parallel with said ribs at their central parts, and having oppositely-bent ends *h′* h^2, and revolving within said reel in the same direction as and at a greater speed than said reel, a drum, E^4, inside of said series of beaters and armed with spiral ribs *i*, and means for rotating the reel-beaters and drum, substantially as described.

4. In combination with the bolting-reel, channeled ring F^4, and feed-spout H, the doubly-angular packing-ring G, fitting in the said ring F^4, substantially as shown and described.

5. In a centrifugal separator, the combination of a revolving bolting-reel, sleeves F′ F^2 upon the ends of the reel, beater-shaft E′, extending through the said sleeves, and pivoted collars D′ D^2 D^3 D^4, substantially as and for the purpose herein specified.

6. The combination of the bolting-reel, sleeves F′ F^2, beater-shaft E′, extending through the said sleeves, pivoted and longitudinally-slotted collars D^3 D^4, supporting the sleeves, and pivoted and longitudinally-slotted sleeves D′ D^2, supporting the shaft, substantially as and for the purpose herein specified.

7. In a centrifugal separator, the combination of the beaters E^3, the bolting-reel constructed with the tail-spider, having discharge-openings *c c* located between adjacent ribs F^5 F^5 thereof, near its periphery, and the plate F^6, covering the tail-spider between the shaft E′ and the said ribs, substantially as and for the purpose herein specified.

8. The combination of a revolving bolting-reel, means for feeding the material into the reel, means for discharging material from the same, and beaters E^3 E^3, having forwardly-bent portions *h′* h^2 at their two ends, sub-

stantially as and for the purpose herein specified.

9. In a centrifugal separator, the combination, with the revolving bolting-reel and revolving beater, of a ribbed cylinder, E^4, within the beater and reel, substantially as shown and described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR HENRY VAN DUZEE.

Witnesses:

C. N. WOODWARD,

LOUIS FEESER, Sr.