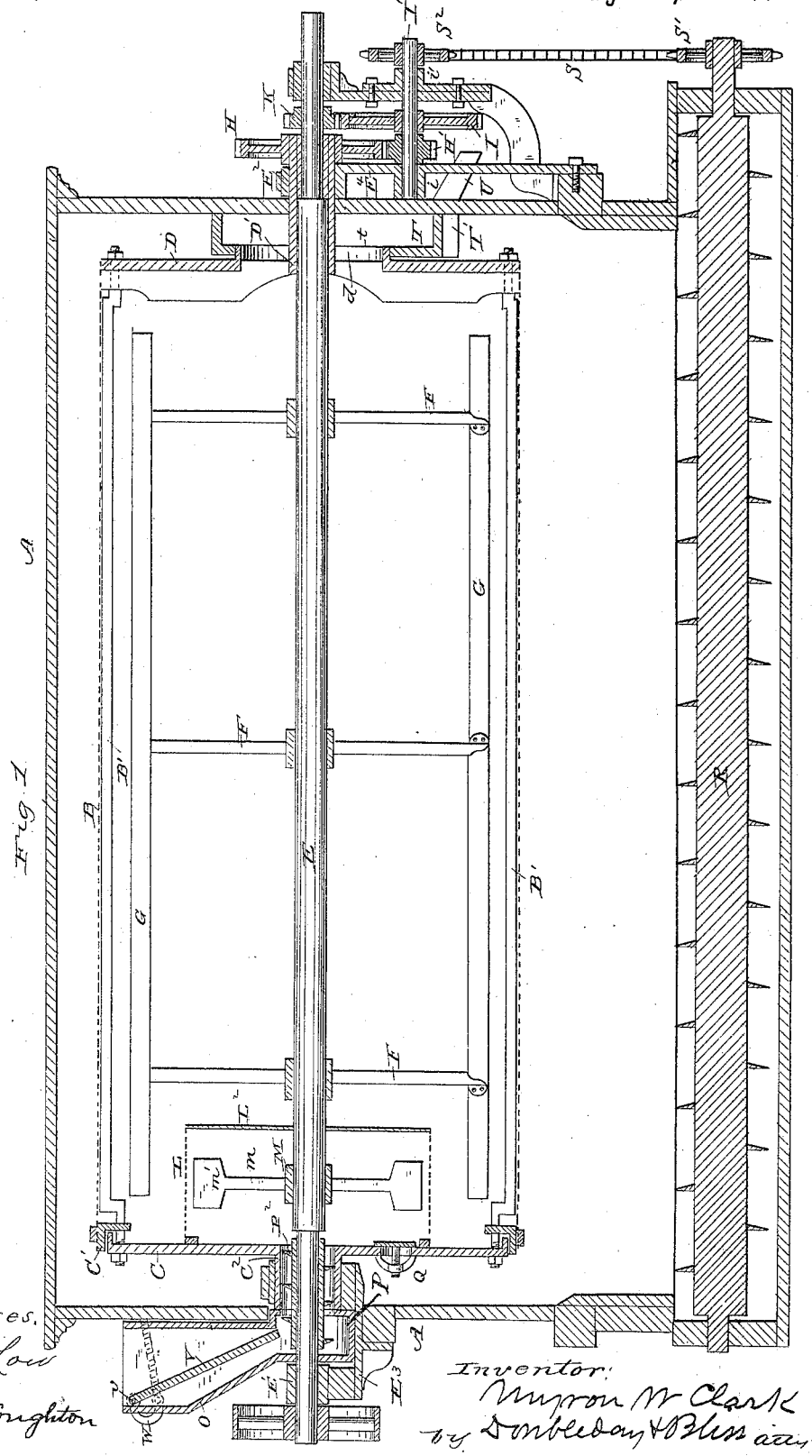
(No Model.) 2 Sheets—Sheet 1.

M. W. CLARK.

FLOUR BOLT.

No. 341,880. Patented May 18, 1886.



Witnesses.
N. N. Low
A. J. Houghton

Inventor:
Myron W. Clark
by Dowlesday & Bliss attys.

N. PETERS. Photo-Lithographer, Washington, D. C.

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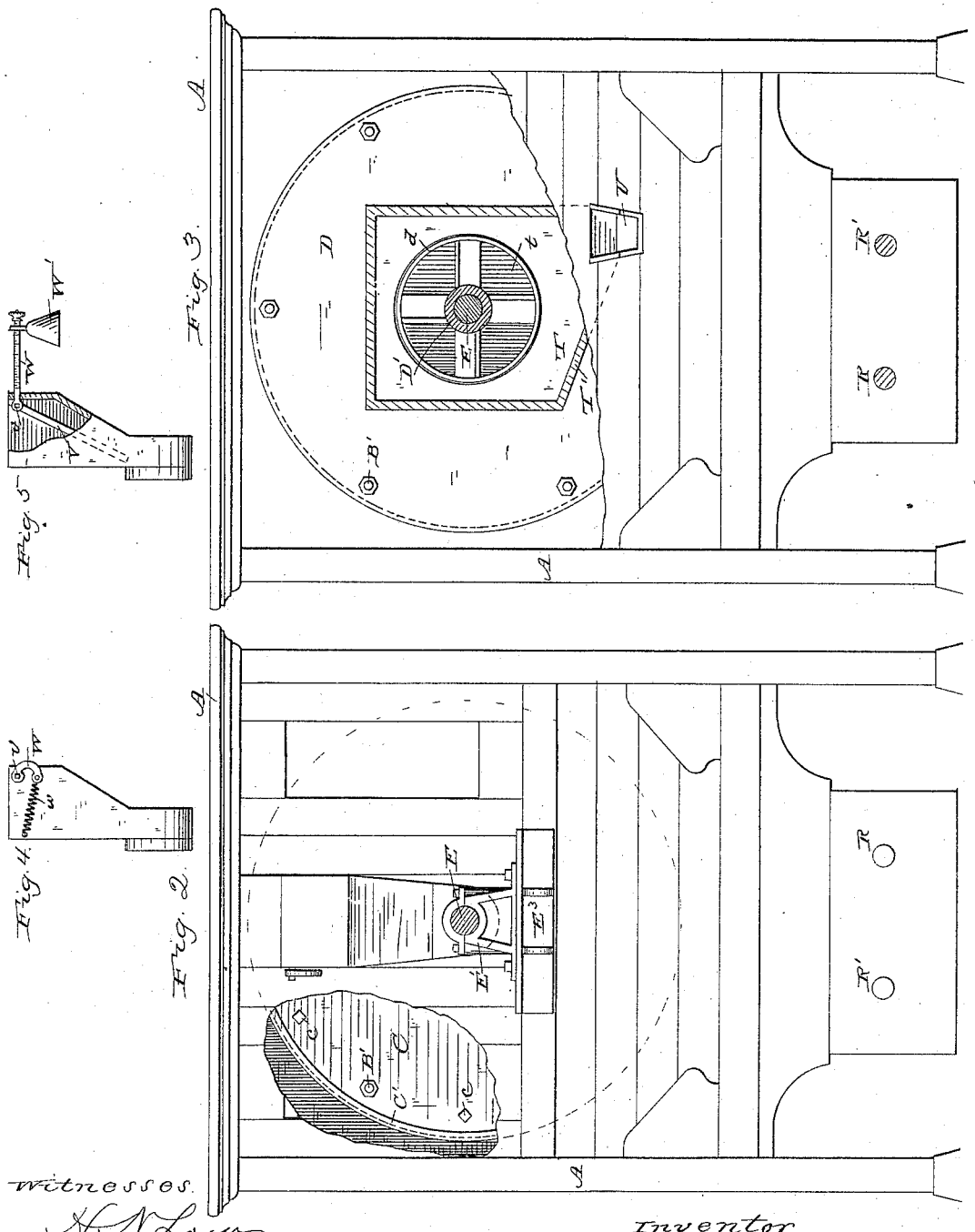

Witnesses.
H. P. Law
A. J. Houghton

Inventor.
Myron W. Clark
by Doubleday & Russ
attys.

UNITED STATES PATENT OFFICE.

MYRON W. CLARK, OF PARMA, MICHIGAN.

FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 341,880, dated May 18, 1886.

Application filed April 14, 1883. Serial No. 91,698. (No model.)

To all whom it may concern:

Be it known that I, MYRON W. CLARK, a citizen of the United States, residing at Parma, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Flour-Bolts, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a longitudinal vertical section of a reel containing my invention. Fig. 2 is an elevation of the head or receiving end, part of the casing being broken away. Fig. 3 is an elevation of the tail or discharging end, the gearing and part of the casing being removed. Fig. 4 is a side elevation of the feed-hopper shown in Fig. 1. Fig. 5 is a side elevation, partly in section, of a modification of the invention.

In the drawings, A represents the frame-work and casing of a centrifugal reel, substantially like that shown in Patent No. 266,781, to William B. Dell, October 31, 1882, with certain exceptions, to be hereinafter noted.

B is the bolting-cloth, which is rigidly attached to one head, D, and at the opposite end to a cloth-tightening ring, C′, which has inwardly-projecting flanges provided with holes, through which pass the rods B′, which connect the reel-head D with the reel-head C, as is customary in this class of reels.

c c, Fig. 2, are bolts passing through the reel-head and into or through the inwardly-projecting flange of the cloth-tightening ring C′, by means of which said ring may be drawn toward the reel-head C, and the cloth thereby tightened.

C^2 D′ are trunnions attached, respectively, to the reel-heads C and D, and supported in suitable bearings on the frame-work, so that the reel can rotate independently of the through-shaft E, which latter is mounted in bearings E′ E^2, the bearing E′ being attached to a bracket-plate, E^3, while the bearing E^2 is supported by a standard or upright, E^4.

F F are spiders keyed to the through-shaft E, the beaters G being attached to the outer ends of the spider-arms F^3. The through-shaft and beaters are driven at a much higher speed than is the reel by means of the following train of gearing:

K is a spur-pinion mounted on shaft E, and meshing with spur-gear I on a short shaft, I′, which is supported in bearings *i i′*, connected with the casing by the upright E^4, above referred to.

H′ is a spur-pinion on shaft I′, meshing with spur-gear H, secured to the outer end of the hollow trunnion D′ at the tail of the reel. At the head end of the reel there is a disintegrator, consisting, in this instance, of a cage or basket, L, of wire-cloth or perforated sheet metal, secured to and carried by the head C of the reel. The inner end of the cage is closed by means of a preferably imperforate disk or head-piece, L^2. The beater of the disintegrator consists of a hub, M, secured to shaft E and provided with two or more arms, *m*, each of which carries at its outer end an expanded head or beater-plate, *m′*.

O is a feed-hopper, which communicates at its lower end with a conduit, P, through which the meal or flour is moved by means of a conveyer, P^2, carried by the through-shaft E.

Q represents a hand-hole through the reel-head C into the disintegrator, for the purpose of removing therefrom any foreign material which it is not desired to have pass into the reel, and which is caught and retained by the basket or cage.

The conveyers R R′ may be of any usual or desired construction, and the reel may be provided with appliances by which the delivery of the bolted product to these conveyers and from the conveyers to discharge-spouts may be effected in any usual or approved method.

The conveyer-shafts are operated by means of a chain, S, which passes over sprocket-wheels S′ on the ends of the conveyer-shafts, and over a corresponding sprocket-wheel, S^2, on the end of shaft I′.

T is a refuse-box placed within the casing at the tail-end of the reel, and between the casing and the reel-head D. This box has a circular opening, *t*, which is concentric to the beater-shaft E, and is provided with an inclined bottom, T′, which communicates at its lowest point with a discharge-spout, U. (See Figs. 1 and 3.) The reel-head D is also provided with a circular discharge-opening of substantially the same size as the corresponding opening through the refuse-box T, and is provided with an outwardly-projecting flange, *d*, which overlaps the adjacent vertical wall of the refuse-box, so as to make a compara-

tively-tight joint at this point. Of course, radial arms project from the tubular bearing or trunnion D′ and connect the trunnion with the reel-head.

Referring to Figs. 1, 4, and 5, V is a valve, partition, or gate, hinged at its upper end by means of a shaft, *v*, which is rigidly attached to the valve, and is seated at its ends in the side walls of the hopper O.

W is a crank-arm keyed to one projecting end of the shaft *v*.

w is a spring connected at one end to the hopper or casing, and at its opposite end to the free end of the crank-arm, the tension of the spring serving to press the lower end of the valve V toward the inner front wall of the hopper. (See Fig. 4.)

In Fig. 5 the crank-arm W is straight, and projects substantially horizontally from the pivot-shaft *v* when the lower end of the valve V is in contact with the front wall of the hopper, and W′ is a weight adjustably suspended upon the arm. Thus in both constructions the lower end of the valve is forced toward the front wall of the hopper with a yielding pressure, which may be adjusted by either moving the weight upon the crank-arm or by increasing the tension of the spring, which latter may be done in various ways—that is to say, by increasing the size of the spring, changing its point of attachment to the crank-arm or the stationary part of the machine, or otherwise. By arranging this valve within the feeding-conduit and closing it automatically I am enabled to effectually prevent any inward flow of air at that point, it being apparent that the upper end and both sides of the valve may fit closely to three walls of the conduit, and that when the valve is opened a throat or inlet is formed only between the lower end of the valve and the adjacent parallel wall of the conduit, so that whether there be a small amount of material passing through the conduit, or whether the conduit be entirely empty, the inflow of air-currents will be effectually prevented. It will be readily seen that the arrangement of this valve within this conduit is much more desirable than would be the arrangement of it in some other positions—for instance, at the inner end of the conduit, which projects into and through the reel-head—because, among other reasons, this latter construction would be an exceedingly difficult one, from the fact that the valve would necessarily have to surround the beater-shaft. Again, if it were arranged at the inner end of the conduit, within the reel, it would be opened to such an extent as to admit air whenever material was being forced into the reel by the feeding-screw, even though the tube surrounding the feeding-screw were only partially filled.

It is known that in operating this class of reels the revolution of the beater-blades tends to force a current of air out through the bolting-cloth, the air-current thus put in motion entering the reel through the openings in the reel-heads—that is to say, through one or both of them, as the case may be; and it has been found desirable that such air-current should enter only through the head at the tail or discharging end of the reel, which result is attained by the use of this invention, it being apparent that the pressure upon the valve V can be so regulated as to insure that it shall remain in the position indicated in the drawings, except when there is a sufficient weight of meal or flour above it to effectually prevent air from passing through the hopper and the conduit P, while at the same time the valve will yield to permit the required passage of material into said conduit, and thence into the interior of the disintegrator or directly into the reel when the disintegrator is omitted.

I am aware that automatic swinging valves have been employed in feed-hoppers, through which material was passed to separators, and also that such valves have been used in combination with feed-slides, the valves being connected with the feed-slides in such manner that such an increase in the weight of the material above the valve as should operate to open the valve wider would also raise the feed-slide higher; but it is apparent that in such construction it would be practically impossible to insure a uniform rate of feed to the separator under a varying accumulation of material above the swinging valve, whereas in my construction the feed mechanism and the swinging slide are separate and independent of each other, and therefore under ordinary circumstances the extent to which the swinging valve is opened will be governed by the operation of the feeding mechanism.

I am also aware that an automatic swinging valve in feed-hoppers has been provided with a through-shaft which projected beyond the wall of the hopper, and had applied thereto an elastic arm, the upper end of which was secured at various points in such manner as to insure an open feeding-throat between the lower end of the swinging valve and the opposing wall of the hopper, the width of the throat being adjusted to regulate the amount of feed delivered to the mechanism below; but my invention is essentially different in both its construction and operation, in that, among other things, the valve cannot be so fixed in position as to leave a feeding-throat at its lower end, but, on the contrary, the returning spring or weight always presses the lower end of the valve toward or against the opposing wall of the hopper, so as to prevent air from passing, which is not the case with the earlier constructions last referred to. Neither can my valve be adjusted to regulate the amount of material which passes it, that function of regulating the feed being effected wholly by the feeding mechanism below it, while in the earlier construction the end of the arm on the rock-shaft could be fixed in different positions to determine the amount of feed. Again, in my device the rocking arm on the outer end of the shaft is an inflexible one, while in the

earlier construction the arm was necessarily a flexible one, in order to perform its functions properly.

What I claim is—

1. In a flour-bolt, the combination of the following elements: a rotating central beater-shaft, beater-blades revolving with the central shaft, an inclosing bolting-surface, a chest surrounding the bolting-surface, a feeding-conduit through which material is delivered to the reel, and a yielding pivoted valve arranged in the conduit and adapted to intercept air-currents, substantially as set forth.

2. In a flour-bolt, the combination of the following elements, namely: a rotating central beater-shaft, beater-blades revolving with the central shaft, a rotating bolting-surface surrounding the beater-blades, a chest inclosing the bolting-surface, a feeding-conduit through which material is delivered to the reel, and a yielding pivoted valve arranged in the conduit and adapted to intercept air-currents, substantially as set forth.

3. In a flour-bolt, the combination of the following elements, namely: a rotating central beater-shaft, beater-blades revolving with the central shaft, a bolting-surface surrounding the beater-blades, a chest inclosing the bolting-surface, a feeding-conduit attached to the outer face of an end wall of the chest, and having its lower end projecting through said end wall, a closing-head forming a substantially air-tight connection between the conduit and the periphery of the bolting-surface, the valve within the conduit, the shaft attached to the upper end of the valve and arranged in a plane parallel with the plane of the end casing of the bolting-chest, and having one end projecting through said casing, an arm attached to the projecting end of the valve-shaft, and a spring attached to the arm and acting to press the lower end of the valve against the wall of the conduit.

4. In a flour-bolt, the combination of the following elements, namely: a rotating central beater-shaft, beater-blades revolving with the central shaft, a bolting-surface surrounding the beater-blades, a yielding valve arranged in the conduit, and a feeder adapted to receive material from the yielding valve and deliver it to the reel, said valve and feeder moving independently of each other, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MYRON W. CLARK.

Witnesses:
WM. K. GIBSON,
B. S. ASHLEY.