(No Model.) 2 Sheets—Sheet 1.

B. T. TRIMMER.

MACHINE FOR BOLTING FLOUR AND CLEANING MIDDLINGS.

No. 287,890. Patented Nov. 6, 1883.

Fig. 2.

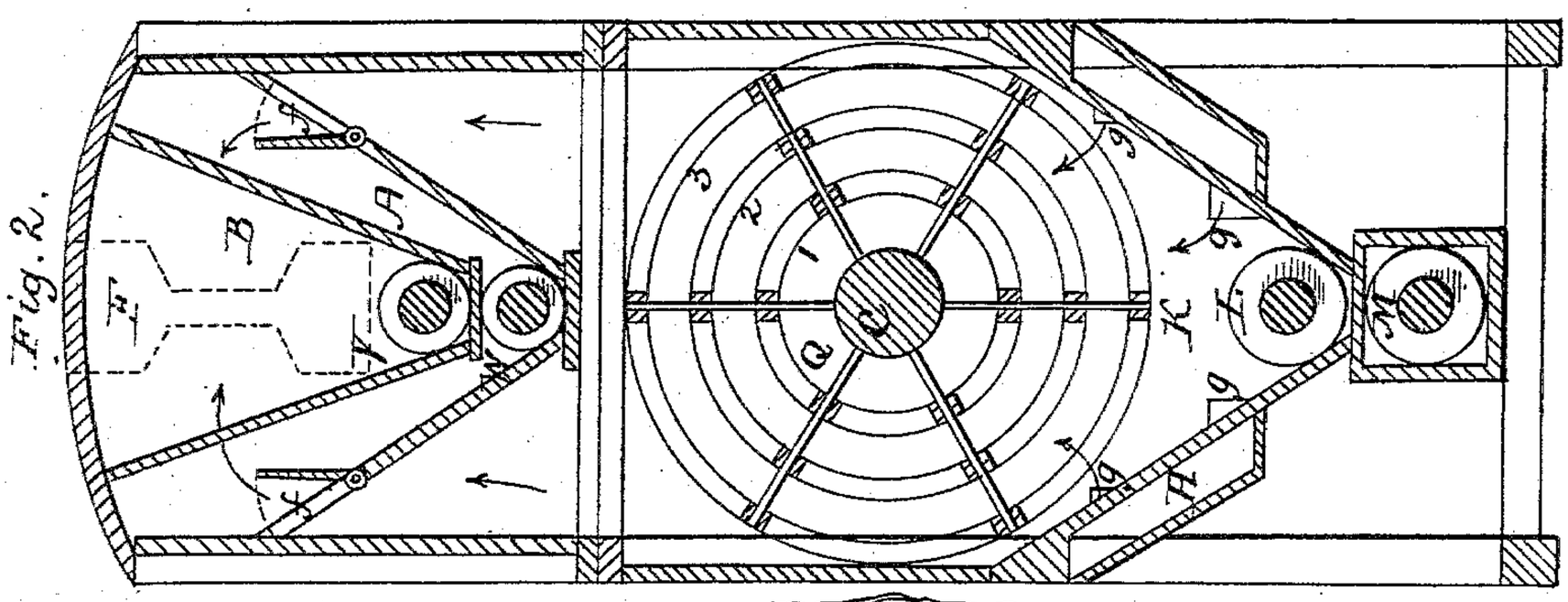
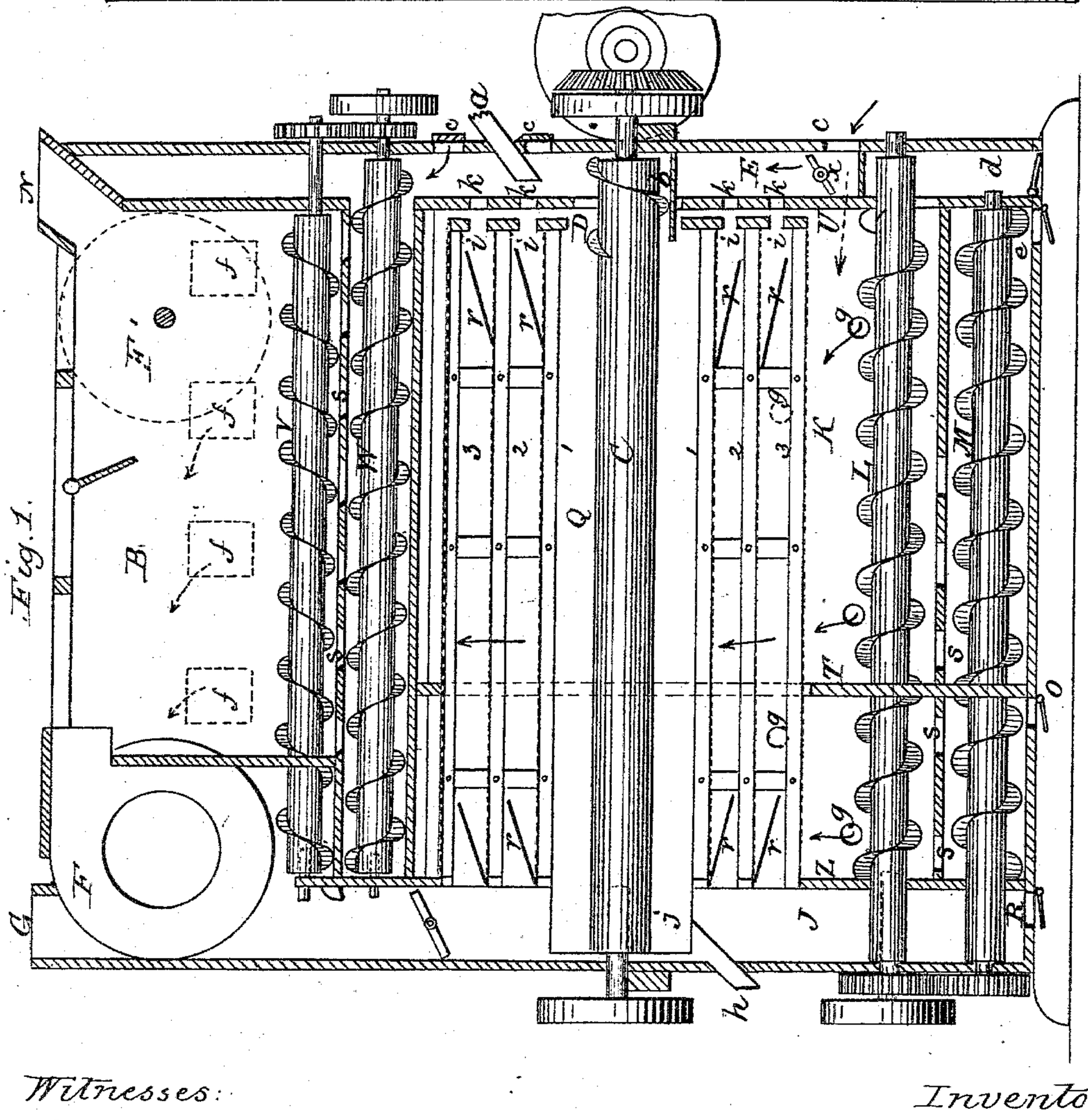


Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

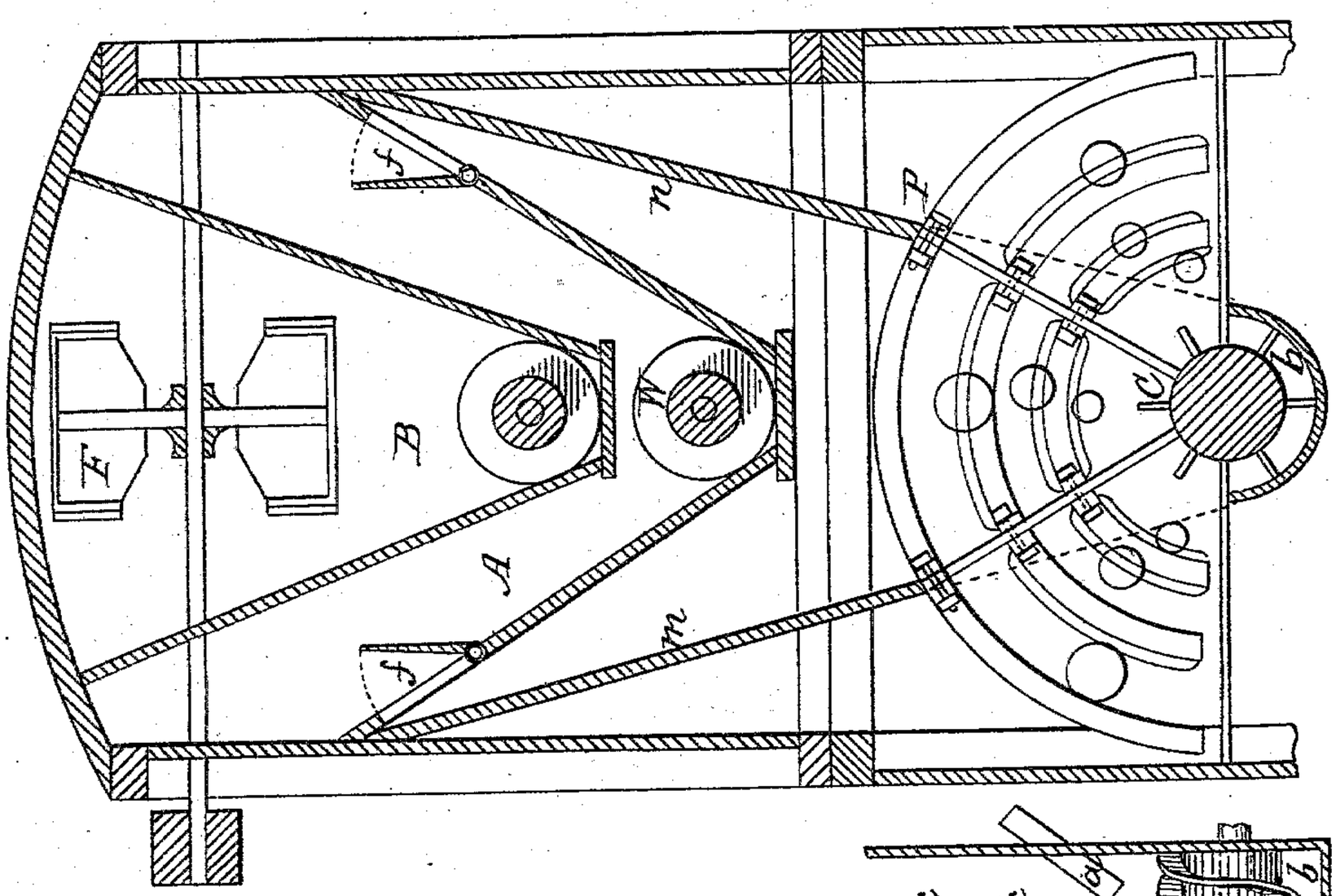


Fig. 5.

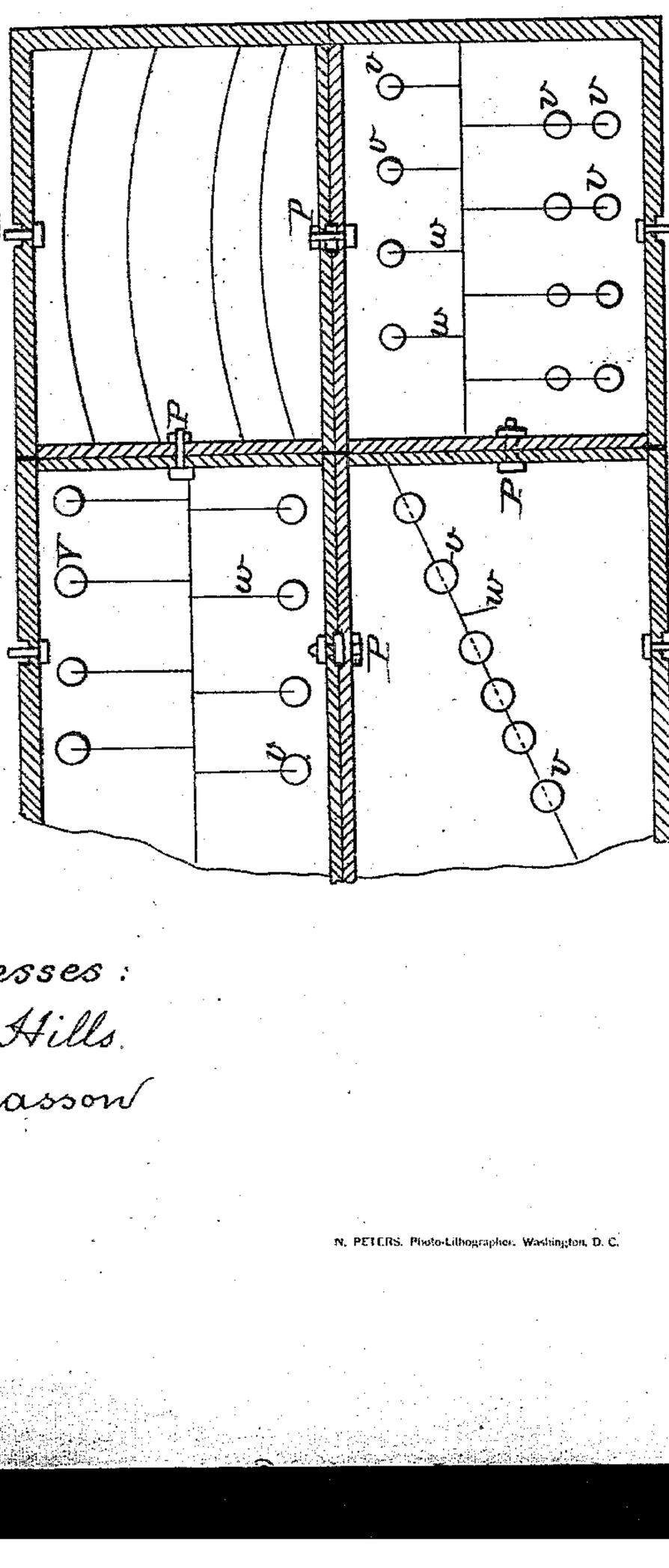
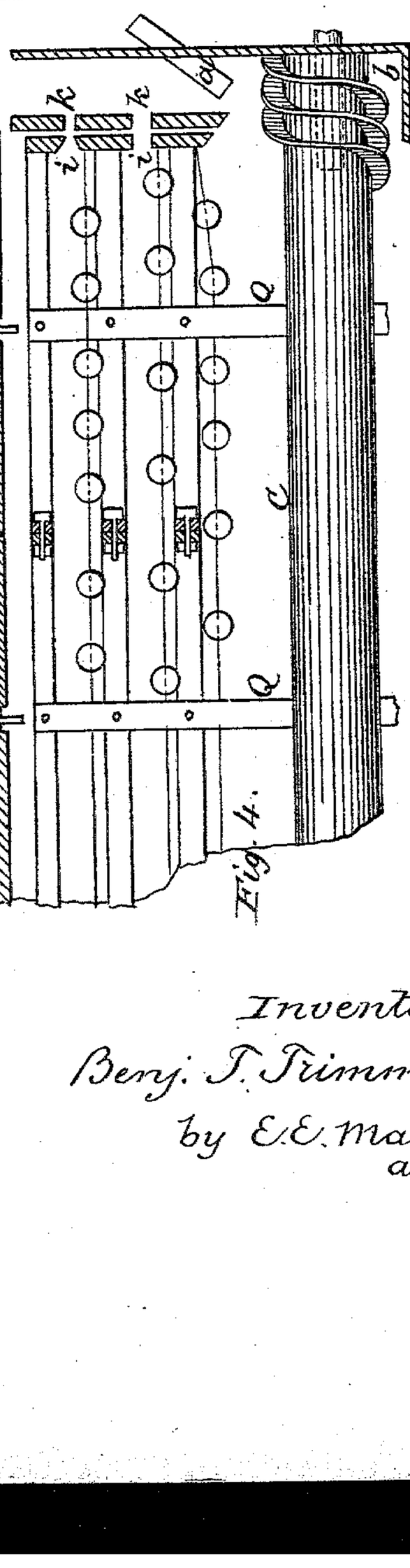


Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN T. TRIMMER, OF ROCHESTER, NEW YORK.

MACHINE FOR BOLTING FLOUR AND CLEANING MIDDLINGS.

SPECIFICATION forming part of Letters Patent No. 287,890, dated November 6, 1883.

Application filed February 2, 1881. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN T. TRIMMER, a citizen of the United States, and residing in the city of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Machines for Bolting Flour and Cleaning Middlings in one Operation, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, and to the letters and figures marked thereon.

Figure 1 is a longitudinal vertical section of the machine, cut through the center thereof. Fig. 2 is a transverse vertical section of the machine, showing the ends of the reels and conveyers, side spouts, and air-receptacles above the reels. Fig. 3 is a transverse vertical section of the upper portion of the machine from the center of the reels to the top, showing the construction of the reels in sections and the mode of fastening them together with bolts and screws; also the upper air-receptacles, A and B, and the conveying-spout *m n* for conveying the good flour from the upper conveyers to the head of the reels. Fig. 4 is a view of a portion of the reels, showing the balls and cords for cleaning the cloths, the air-openings at the head of the reel for the same purpose. Fig. 5 is a top view of a portion of the reels, showing two sections of the same, their mode of fastening by means of bolts and screws, and also the balls and cords for cleaning the cloths.

My invention consists in a certain new construction and arrangement of bolting-reels and means for creating air-currents, as hereinafter described, and particularly pointed out in the claims, whereby flour and middlings can be cleaned more effectually from bran, specks, and all impurities in a much better manner and with greater ease, and without the waste attending other methods heretofore used in such operations.

To enable others skilled in the art to construct and use my invention, I will now proceed to describe its construction and operation, which may best be done by detailing the various operations through which the flour and middlings go from their entrance into the machine to their exit therefrom.

The bolting apparatus consists of three reels, Nos. 1, 2, and 3, of uniform length, placed one inside of the other around one central shaft, C, and revolving together. They are all inclined at the same angle, having the tail the lowest, as in an ordinary reel. While three reels are here shown and described, any number of reels of uniform length, so as to have the largest possible bolting capacity, may be used. Around these reels, and inclosed by the sides of the chest and the V-shaped boards below, and extending to the air-chambers above the reels, and from the partition U to Z, is a compartment or hopper, designated by the letter K. At either end of this compartment or hopper K are air-chambers E and J, extending the width of the chest and from top to bottom.

Above the reel-chest are two receptacles, marked A and B, with conveyers W and V in the bottom of each, respectively. Into these receptacles light particles of flour and impurities are carried from the reels by the currents of air first admitted in the end of the side spouts, H. At either end of the receptacle B that may be desired is placed a suction-fan. (Shown at F or by the dotted lines at F′.) All the air-currents in the various parts of the machine are produced by this fan F, air being drawn from the outside of the machine through the openings *c* in the air-chamber E at the end of the machine. From this air-chamber E currents of air are drawn into the inner reel, No. 1, at the central opening, D, around the shaft C, also through the side spouts, H and H, which run the entire length of the chest, and communicate with the air-chamber E through the side openings, marked *g*. These openings *g* are provided with valves to regulate the amount of air introduced. Openings can also be made in the side spouts, H and H, leading directly to the outside of the building by tubes, from whence pure air can be drawn, thus preventing the introduction into the chest of impure air laden with particles of fine flour and dust from the mill, the prevalent source of so many flour-mill explosions. The amount of air introduced to the reels can be regulated by the valve at *x* in the chamber at E.

The conveyers V and W, L and M are so situated and arranged as to best suit the conveyance of the materials to the points desired, as will hereinafter be described.

The flour, middlings, &c., enter the ma-

chine from the burrs, conveyers, or bins by the spout *a*, dropping upon the short conveyer *b* on the central shaft, C, which conveyer carries the material into the inner reel, No. 1. Here it meets the air drawn in through the opening D, as described, which carries off the bran and other impurities to the lower end of the reel and out through the bran-tube at *h* to the outside of the machine. The cylinder *j* forms a continuation of the inner reel, the end of the chest where it empties the bran, &c., into the tube *h*. The bran passing out this tube will not be disturbed by the air in the chamber J, as the air will pass around this tube and cylinder *j*. The good middlings and flour pass through the cloth into the second reel, No. 2, where they are met by another current of air, when still lighter particles of bran and specks are carried off along the reel and by the suction of air up into the receptacle A and out through the fan F and spout G or N into a dust-room. The good flour and middlings will pass through the cloth of the reel into the third reel, No. 3, covered with still finer cloth, and where the material sifted through No. 3 is subjected to a current of air applied to the outer sides of the cloth and coming from the openings *g* in the side spouts, H. This current of air carries all specks and fuzzy substances down to the lower end of the reel onto the coarse cloth where the middlings are purified, as hereinafter described. All the flour that passes through the cloths of the reels on that portion between the partitions U and T falls into the conveyer L, where the first grade is carried out to the opening at *d* and discharged. The second-grade flour is allowed to drop through the slides *s* into the conveyer M, which carries it to the opening *e*. Of the bran, specks, and impurities carried to the ends of the reels Nos. 2 and 3 the heavier ones will fall to the bottom of the chamber J and out of the opening at R, while the lighter ones are carried by the air-current up to the fan F and out of the openings G or N into the dust-room.

The side openings, *f*, in the air-receptacle A are provided with valves to regulate the air to suit the different grades of flour and middlings treated. Whatever light impurities come through the cloths of the different reels will, if these valves at *f* are open, be carried up by the force of the air and will enter through these openings *f* into the receptacle A. Here the light impurities will be carried off, as before described, through the fan F, and whatever good flour or middlings there may be will fall into the conveyer W and be carried back to the head of the reels, falling through the spout shown by *m n* in Fig. 3 and into the short conveyer *b* and into the inner reel and rebolted.

Whatever light impurities may be drawn up into the receptacle B will be carried by the conveyer V back to the end and dropped into the chamber J, where they will fall with the others into the bottom and out at the opening at R.

To prevent the flour and middlings from passing down the inclined reels too quickly there can be inclined return-boards placed on the different sections of the reels, as shown at *r*, Fig. 1, made of tin or any suitable material, to return the middlings or flour to the reel below, thus keeping them longer under the action of the air-currents. These return-boards can be put on the whole length of each section of the reel or only on each end, as may be required.

In the head of the reels and between the cloths forming the different reels are circular openings, (shown at *i*, Fig. 1.) In the partition U of the chest are similar openings, *k*, into the air-chamber E. When, by the revolution of the reels, these openings *i* and *k* come opposite each other a current of air is drawn through and upon the cloths of the different reels, blowing the dust from the meshes of the cloth, and serving to keep them clean, in addition to the device of the balls and cords, hereinafter to be described.

By the construction of these reels, as shown in Fig. 3, 4, and 5, they are made in different sections, large and small, and fastened together by bolts at P, and also by similar bolts, P, to the arms Q radiating from the central shaft, C. Each section is thus made independent of every other one. If it is desired to remove the cloth on any part of any reel it can be done by unscrewing and removing the section or sections required without disturbing any of the others. As it is frequently desired to change the grade of bolting-cloth to suit different kinds of flour and middlings, this is a very desirable arrangement.

Any number of reels can be placed on one set of arms, and the reels can be made circular, or with six or any number of sides desired.

Attached to each section of the different reels Nos. 1, 2, and 3, is a cord or rope marked *w*, resting on the different cloths of all the different reels, as shown in Figs. 4 and 5. On these cords *w* are placed balls marked *v*, made of any suitable material. Attached to the main lines and at right angles with them are similar cords and balls, as shown in Fig. 5. When the reels revolve, these balls and cords will slide and fall over the cloths in each section of the different reels, and will bound from one side to the other, and from the cloth of one reel to that of another in such a manner as to keep the cloths clean and free them from the particles of flour and dust that may adhere. The lines or cords *w* can be used to clean the cloths without using the balls.

If it is deemed necessary cylindrical or sliding brushes can be put in between the different sections of cloth, so that when the reels revolve these brushes will turn and slide from one rib to the other of the different reels, and will brush both sides of the cloths and keep them clean.

Near the lower part of the reel-chest is a partition marked T, extending from one side of

the chest to the other, and from the conveyer L to the bottom of the receptacle A, thus forming a division in the hopper K, before described. The space contained between this partition T and the partition Z forming the end of the chest is where the middlings are purified, and is called the "purifying-chamber." There are circular openings in these partitions T and Z to allow the free turning of the reels, and between the edges of these openings and the outer circumference of the reels are placed strips or coverings of cloth ticking or any suitable material, which serve to prevent the passage of air around the outside of the reels, and also to prevent the passage of good flour into the purifying-chamber from the flour-chamber, or middlings from passing into the air-chamber J. Those portions of the reels embraced between the partitions T and Z are covered with coarser cloths than the remaining portions. By the action of the air-currents passing from the spouts H up through the reels upon the middlings, when they reach this coarse cloth the said middlings are purified. When purified the good middlings drop through the cloth into the conveyer L, and by drawing the slides *s* into the conveyer M, which carries them to the opening O where they are discharged.

The reels Nos. 1, 2, and 3, hopper K, side spouts, H H, conveyers V and W, L and M, and air-receptacles A and B, and air-chambers E and J, are all mounted in a suitable frame or chest, as shown in the drawings.

There can be two or more sets of rules placed in one chest or frame, if desired, all arranged as described, and driven by shafts, gearing, and pulleys, to give them the proper speed for their work. Air-spouts, as at H, and provided with the proper openings and valves, can be made at the side of each set of reels, and supplied with air from the air-chamber E by the suction of fan F, as described.

The air-receptacles A and B, with the fan F, will be mounted in a separate frame independent from the bolting-chest proper, and will be screwed on top of the bolting-chest, as shown in Figs. 2 and 3, or they can be made entirely separate and placed in any convenient location to best receive the dust by spouts.

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

1. In a machine for purifying middlings and flour, the combination of two or more reels of uniform length placed one inside of the other and constructed of detachable transverse sections, and fastening-bolts for securing said sections together, and air-passages F and J at the ends of the reels, substantially as and for the purpose described.

2. The combination of two or more reels of uniform lengths, one inside of the other, different numbers of bolting-cloth upon detachable transverse sections, and fastening-bolts, as shown, with air-passages F and J at the ends of the reels, and suction-fan, for the purpose of purifying flour and middlings, as described.

3. In combination with two or more reels of uniform length, located one within the other and having parallel sides, the inclined return-boards *r* at the ends of said reels, substantially as and for the purpose described.

4. The combination of the fan F, two or more reels of uniform length, one inside of the other, and the side spouts, H, having closed outer sides and open ends, with air-chambers E and J at the ends of said reels, to supply air to any number of reels in one bolting-chest, the air being exhausted by the fan, substantially as shown and described.

5. In combination with a fan, two or more reels of uniform length, one inside of the other, and two conveyers under said reels, the purifier-chamber between the two stationary partitions T and Z, extending to the bottom of said conveyers, substantially as and for the purpose described.

6. In combination with the reels of uniform length, the fan and the air-passage J at one end of said reels, the air and dust receptacle B above said reels, a conveyer in it, the perforated passage E, and sides pouts, H, substantially as and for the purpose described.

7. In combination with the reels, the casing, and the fan F, the air and dust receptacle A, directly above said reels, constructed with the side openings, *f*, and valves fitted to said openings to regulate the amount of air admitted, and a conveyer arranged in said receptacle, substantially as described.

8. In combination with a fan, the air and dust receptacles A and B, placed one within the other, and conveyers in the bottom of each receptacle, substantially as and for the purpose set forth.

9. In combination with the reels placed one within the other, one or more slack cords, fastened to the frames of the reels and adapted to rest on the cloth of two screens alternately, substantially as and for the purpose described.

10. In combination with two or more reels, placed one within the other, one or more slack cords fastened to the frame of the reels, and one or more balls secured to said cords and adapted to rest on the cloth of the screens alternately, substantially as shown and described.

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