

(No Model.)

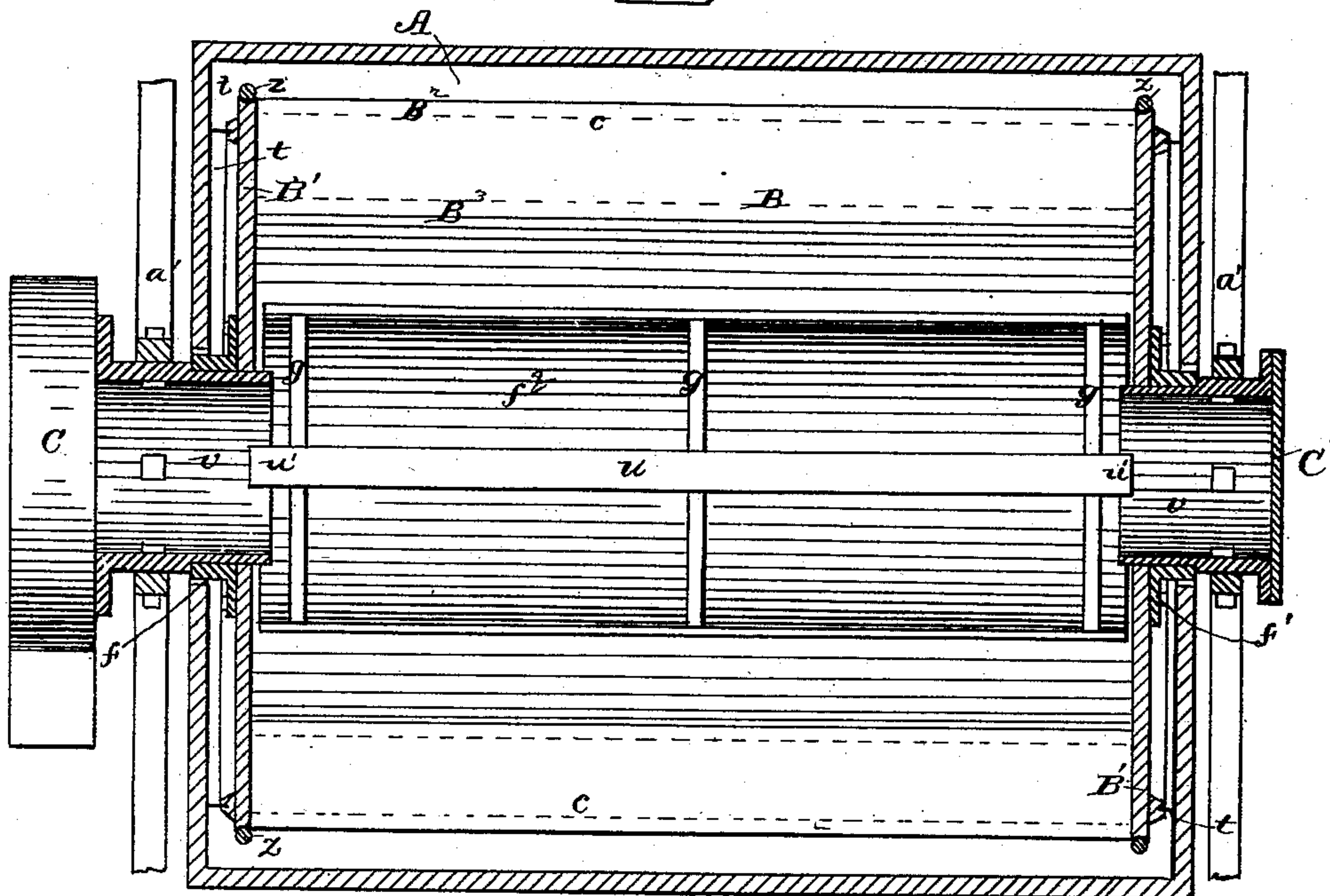
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N. W. HOLT.  
DUST COLLECTOR.

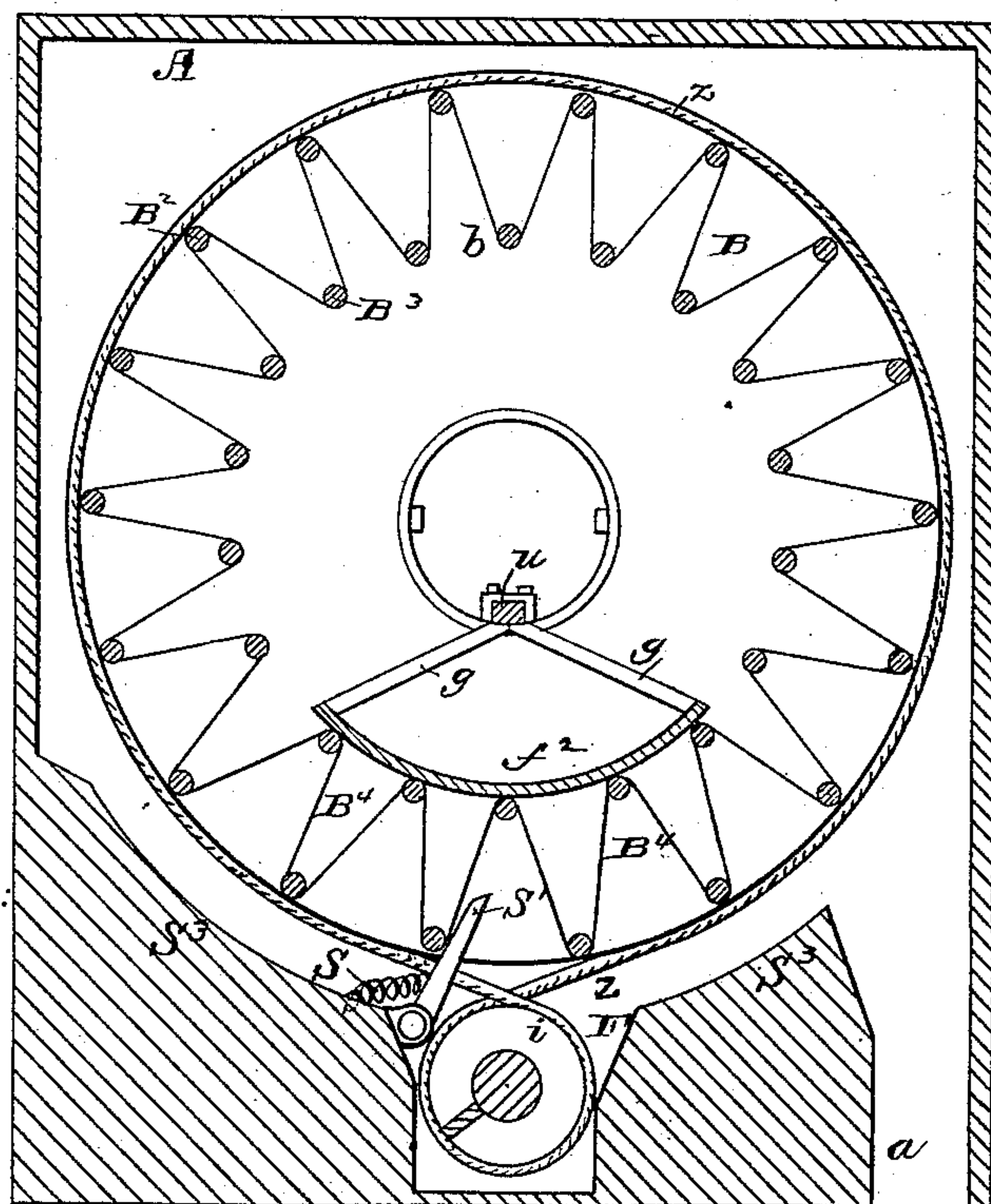
No. 273,533.

Patented Mar. 6, 1883.

*Fig. 1.*



*Fig. 6.*



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(No Model.)

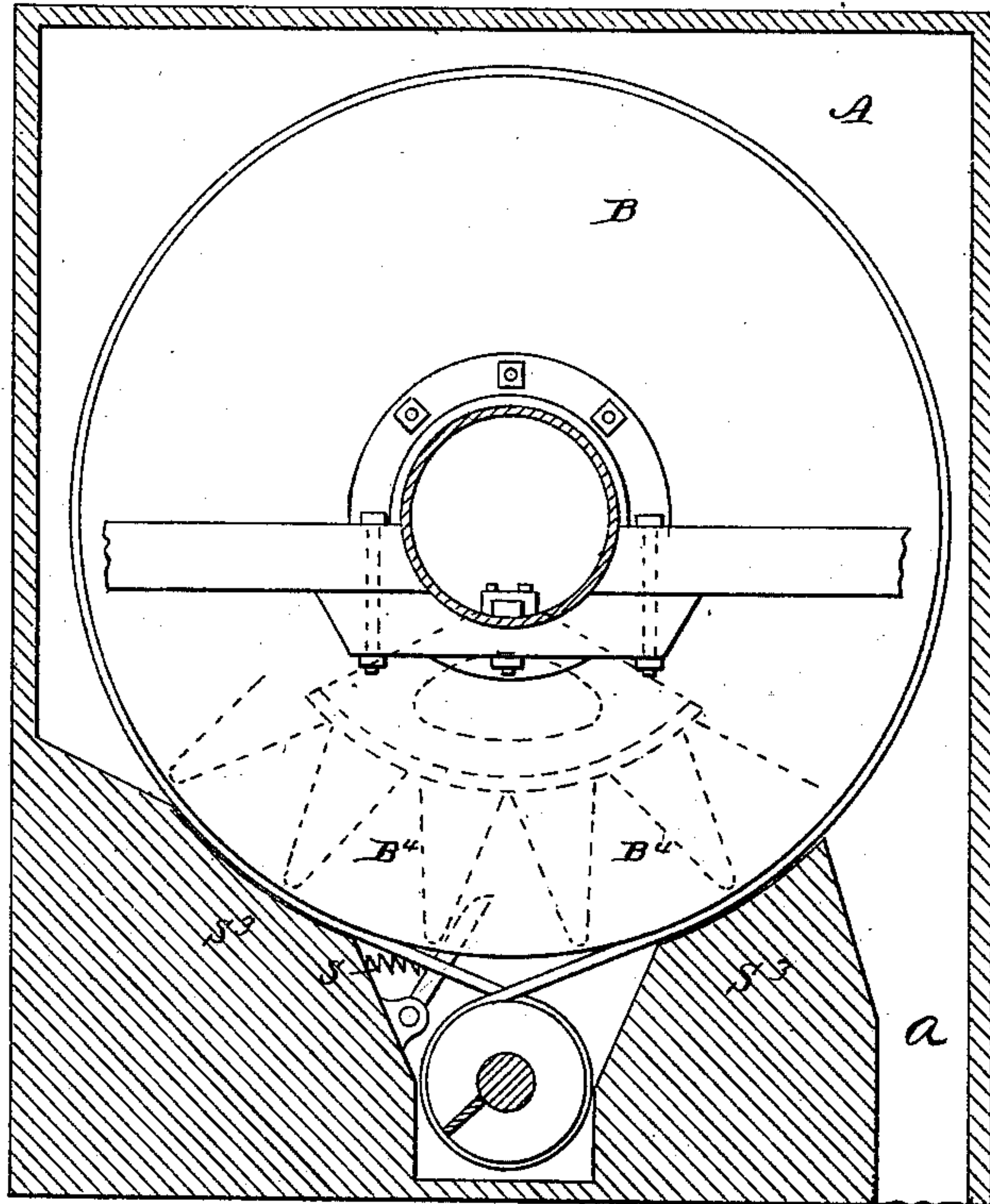
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N. W. HOLT.  
DUST COLLECTOR.

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Fig. 2



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(No Model.)

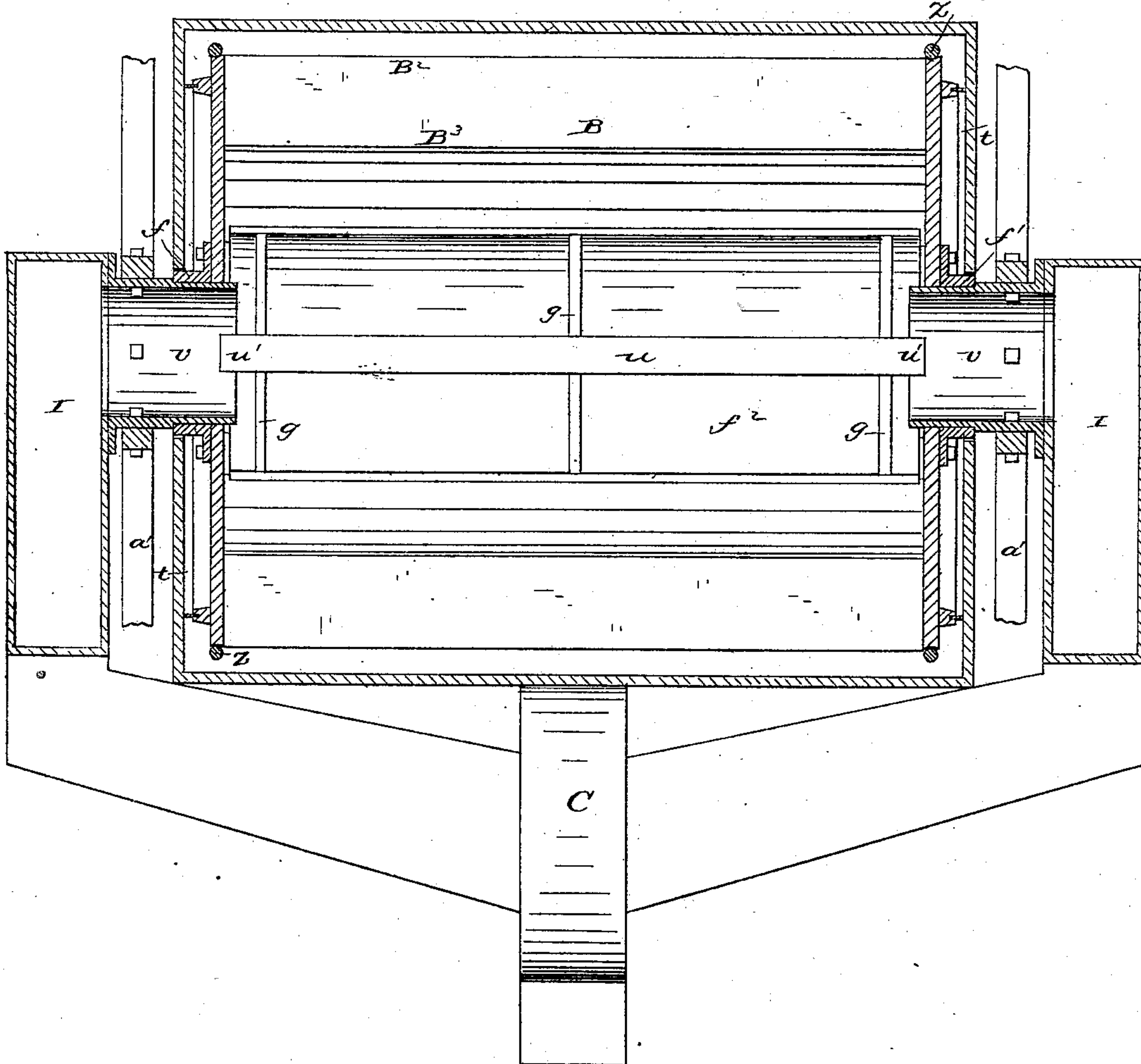
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Fig. 3

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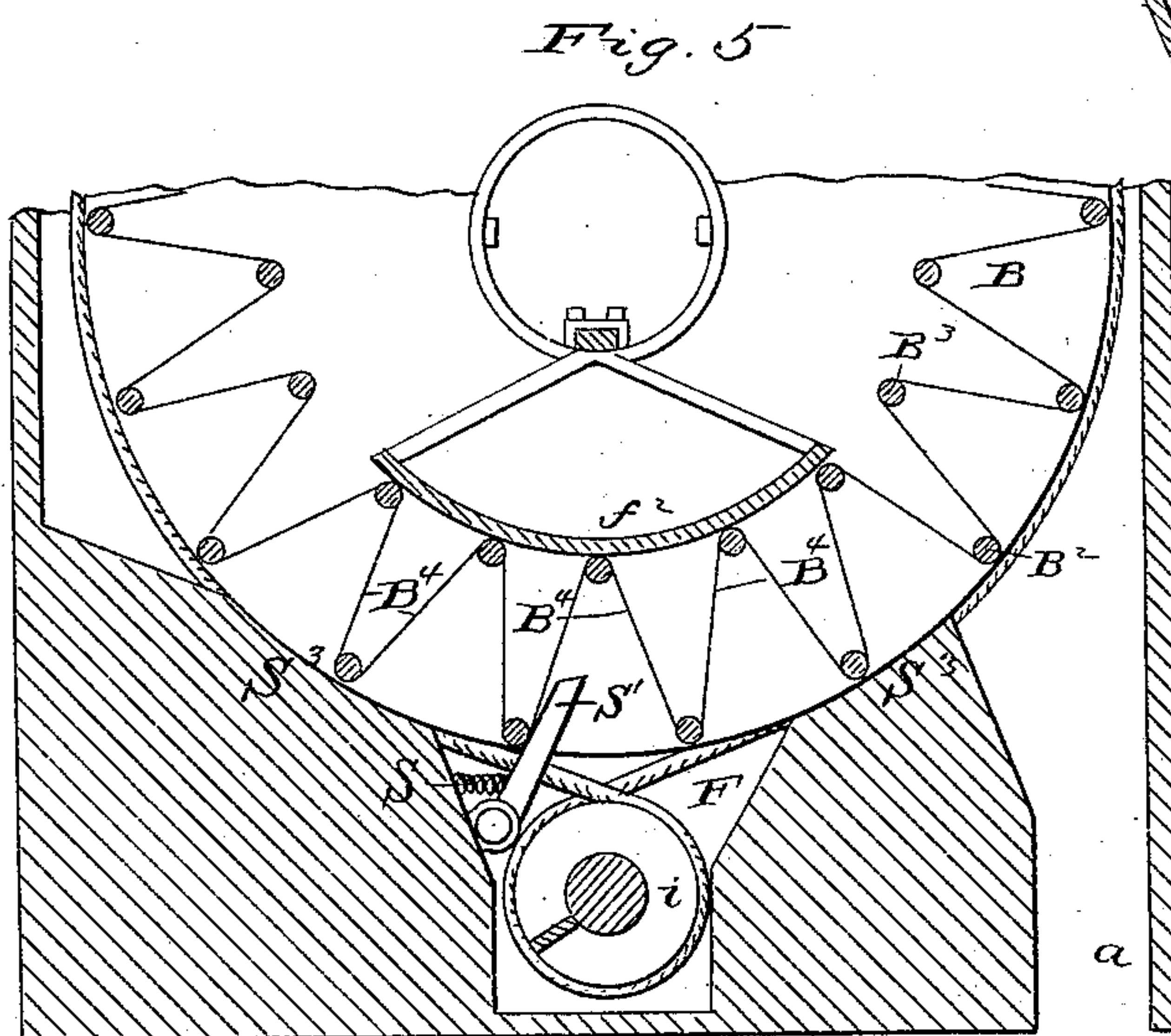
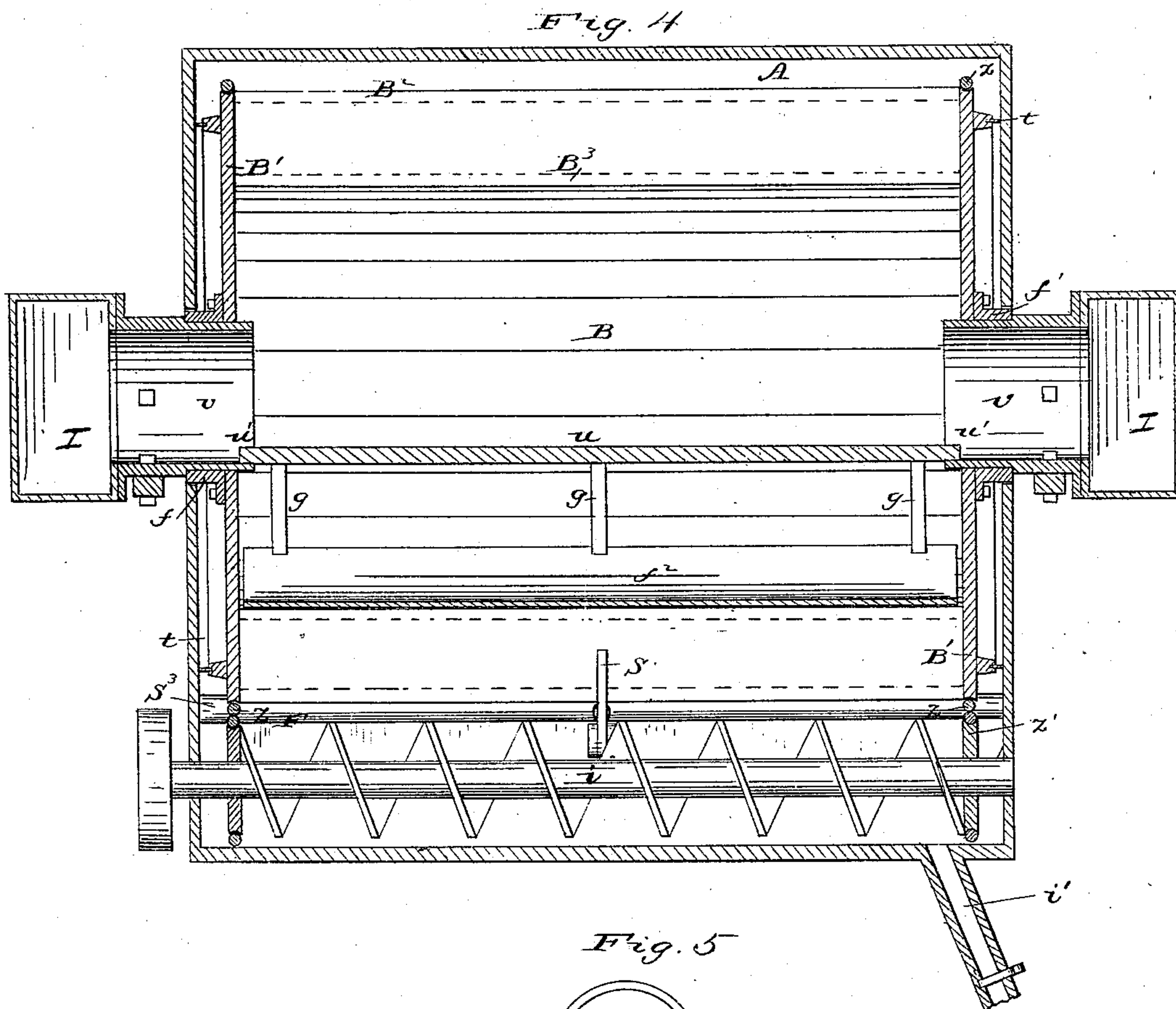
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N. W. HOLT.  
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No. 273,533.

Patented Mar. 6, 1883.



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# UNITED STATES PATENT OFFICE.

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## DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 273,533, dated March 6, 1883.

Application filed July 19, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, NOAH W. HOLT, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a horizontal section of a collecting mechanism embodying my improvements. Fig. 2 is an end view of the reel, showing the casing in section. Fig. 3 is a horizontal section of a machine similar to that in Figs. 1 and 2, except that two air-trunks are employed, one at each end of the reel, both communicating with the interior thereof. Fig. 4 is a central longitudinal vertical section of Fig. 3. Fig. 5 is a transverse section through the lower part of the reel. Fig. 6 is a transverse section of a modified form of the collecting mechanism.

In the drawings the dust-collecting reel is represented generally by B. It has a filtering-cloth attached thereto, the cloth consisting either of a continuous sheet or of a sufficient number of pieces arranged continuously to form a filtering-surface around the reel.

A represents a chamber communicating with a middlings-purifier or other dust-producing mechanism through one or more conduits, *a*. The dust-laden air-current is caused to pass through the filtering-cloth, the cloth operating to arrest and catch the dust, while the air passes through freed therefrom.

The reel is constructed with heads B' B' and with two concentric series of cloth-supporting bars or ribs, B<sup>2</sup> B<sup>3</sup>. The cloth is arranged upon these supports in zigzag planes, running toward and from the center. One or both of the reel-heads are provided with apertures, by means of which the air, after passing through the cloth, can be allowed to escape.

Within the reel there is arranged a stationary cut-off, *f*<sup>2</sup>, consisting preferably of a curved diaphragm or plate arranged to be in close proximity to the inner series of cloth-supports, B<sup>3</sup>. It is supported upon the stationary parts of the machine, as shown at *u'*, there being a bar, *u*, for carrying it, together with downwardly-inclined arms *g g*.

The cut-off *f*<sup>2</sup> interrupts the passage of the dust-laden air through those portions of the

cloth which are adjacent to it, and thus facilitates the dislodging of the dust. It will be seen that those sections of the cloth lettered B<sup>4</sup> are those thus cut off from the air current. By suspending the cut-off from the stationary parts of the machine all of the wear ordinarily incident to the supporting devices commonly used in those machines employing a through rotary shaft is obviated. Hence after the cut-off is once adjusted relatively to the inner cloth-supporting bars, B<sup>3</sup>, no further adjustment will be needed.

It will be seen that the reel is not supported by a central through-shaft in the way generally followed. Such shaft necessitates the use of arms, which would interfere with the stationary cut-off, and hence this means of supporting the reel could not be advantageously used with the cut-off mounted entirely independently of the reel and inside thereof. Therefore I mount the reel in such manner that the heads thereof constitute the bearings for the whole reel, and combine therewith devices inside of the casing for engaging with the reel and imparting motion thereto. The heads, as shown, rest upon tubular bearings *v*, and preferably I attach hollow trunnions *f' f'* to the heads around the apertures, said trunnions being made of metal and giving a stronger bearing. The reel-bearings *v* are also utilized to support the cut-off inside of the reel, the bar *u* resting upon them. They may be supported directly in the walls of the chamber, or upon supplemental outside supports in any suitable way, as indicated at *a'*. The dust which is dislodged from the cloth drops into a receptacle or hopper, which has a tight bottom, upon which the dust is caught after it has been dislodged. From this receptacle or hopper the dust is withdrawn by a positively-acting mechanism, consisting preferably of a worm-conveyer, *i*, which carries it to an orifice, *i'*.

By having an air-aperture at each end of the reel and each end of the casing I can distribute the dust-laden air-current much more evenly over the reel from one end to the other than if one aperture be used, in which case the air tends to pass through the cloth at one end more than at the other. In the larger machine it is a matter of great advantage to thus take the air out at both ends of the reel.



• The reel not being attached to a through central shaft, power is imparted to it from the inside of the tight casing by devices which engage with one or both of the reel-heads at or near the periphery thereof. If a belt or similar mechanism were passed into the casing to rotate the reel, there would be more or less lack of tightness in said casing to interfere with the proper distribution of the air. I transmit the power to the reel from the conveyer shaft by means of intervening mechanism, which engages with the head or heads, said means to consist of belts  $z$ , or chains or other suitable devices, there being one or more wheels,  $z'$ , on the conveyer-shaft adapted to transmit power through them to the reel head or heads.

Preferably packing-strips  $t$ , of rubber, leather, or other suitable material, are arranged between the heads of the reel and the walls of the surrounding casing, so as to entirely prevent the outward passage of any unpurified air, even though the volume of air delivered from the orifice to the dust-collector be greater than the suction-fan of the collector can draw through the filter-cloth under some exigencies. The dust that is collected upon the cloth is dislodged by means of a knocker or hammer,  $S'$ , arranged to impart blows to the cloth-support, the force of the blows being determined or regulated by the strength of a spring,  $S$ , having one end secured to the hammer or knocker and the other to the stationary part of the machine. The knocker is mounted upon a pivot which is stationary relatively to the reel, and it vibrates about said pivot to impart blows to the section of the cloth-supports successively.

I am aware that various means have been employed for dislodging the dust from the filtering-surface in dust-collectors, such as knockers, brushes, and devices for jarring the cloth in various ways. It has also been customary to reverse the direction of the blast through portions of the cloth successively for this purpose, and various mechanisms have been employed for shaking the cloth by alternately slackening and tightening it, and I am aware of the fact that use has been made of rolling balls in reels whose collecting-surfaces have been arranged as true cylinders; but I believe myself to be the first to have mounted a moving collecting-cloth upon supporting frame-pieces adapted to be struck at points between the ends of the reel, and to have combined therewith a knocker or hammer which is mounted upon a support independent of the cloth-frame, and arranged to strike said frame with comparatively severe blows.

The inside cut-off operates in the manner above set forth to interrupt the passage of the dust-laden sections of the collecting-cloth alternately; but as there is, under some circumstances, a tendency for the dust-laden air to pass between the dust receptacle or hopper and the bottom of the reel, I combine with the parts above described an abutment or wall outside of the reel and arranged in close proximity to the collecting-cloth. As shown, the abut-

ment consists of upward extensions,  $S^3 S^3$ , of the dust hopper or receptacle, and in order to have them more effectually perform their office I prefer to extend them laterally concentrically with the reel and the inside cut-off,  $f^2$ . This outer abutment, so far as preventing the air from passing through any section or sections of the collecting-cloth is concerned, is merely additional to or cumulative relative to the inside cut-off,  $f^2$ ; but to provide a safeguard against the aforesaid passing of air below the bottom of the reel, I prefer to use them both.

In Fig. 6 I have shown a form of collecting-reels by which many of the objects at which I aim can be attained, but in which the outside abutment is dispensed with. The inside cut-off  $f^2$  operates substantially in the same manner as in the construction above described, as do also the air-exits, the trunk, the devices for driving the reel, the knocker, &c.

I am aware that use has been made of a rotating reel, cylindrically arranged, to collect material from a current of air and deposit said material in conduits, which carry them back to the chamber through which the laden current of air is brought to the reel, said devices being shown, for instance, in the patent to Burdick and Fuller, No. 149,434, April 7, 1874, and I do not claim the devices which have been thus used.

In mechanism of the kind above disclaimed the part which has been used to stop the air-current has been suspended from a rotating shaft in a manner which I desire to avoid.

I do not herein claim any of the features other than those specifically set forth in the claim, reserving to myself, however, the right to claim the other generic and specific patentable matter which I have shown in another application which I have filed, Serial No. 1,428, filed January 26, 1880, of which this is a division.

I do not limit myself to all the parts in detail which I have shown, as it is apparent that some of the novel features illustrated and described may be separated from the others and combined with other devices without departing from the spirit of my invention so far as it relates to the portions that are separable. Thus it will be seen that the knocking or hammering devices for dislodging the dust will operate more advantageously than the devices used heretofore, whether or not they be combined with these specific forms of devices for cutting off the air which I have shown, or combined with this specific form of cloth-support. So, also, the advantages incident to supporting the inside cut-off stationarily relatively to the revolving parts are attained irrespective of employment therewith of the outside abutment.

The means for evenly distributing the air by suction over the collecting-surface from end to end of the reel can be applied advantageously to reels bearing somewhat from the specific character shown.

As revolving reels without central shafts



and radial arms have been mounted in many ways now well known by constructing them with heads adapted to rest and rotate directly upon the bearings of the reel, I wish it understood that I do not limit myself to the specific form of reel-mounting of this class which I have shown, for, when combined with an airtight casing and the other devices set forth, a mounting of a modified form could be employed to similar advantage.

One feature which distinguishes my invention from those which have preceded it is the method of supporting the reel-heads, which have central openings, directly upon the stationary bearings, instead of upon a central reel-shaft which rotates with the reel, and wherever in this case I refer to a reel having heads at its ends resting upon bearings I mean reel-heads which engage directly with the reel-supports and rotate relatively thereto.

I have shown in the drawings the machine constructed with one of its tubular bearings communicating with the fan, also another organization in which both the hollow trunnions are connected with the fan-case. I therefore desire to be understood that in claiming the hollow trunnions I wish to cover as well the structure shown where both trunnions are hollow as the one where only one of the trunnions connects with the fan. In the latter case it of course is not important that the other trunnion should be open.

What I claim is—

1. In a dust-collector, the combination of the following elements, namely: an inclosing-casing, a rotating filtering-reel arranged therein to move around a horizontal axis, and a stationary cut-off arranged within the reel and supported independently of the reel upon a stationary support, substantially as set forth.

2. In a dust-collector, the combination of the following elements, namely: an inclosing-casing, a filtering-reel having a zigzag surface inclosed within the casing, and a cut-off arranged within the reel and below the center of the reel, a suction-fan, and air-trunk connecting the fan with openings in the reel-heads, substantially as set forth.

3. In a dust-collector, the combination of the following elements, namely: an inclosing-cas-

ing, a filtering-reel, mechanism acting upon the reel-heads within the casing to rotate the reel, a cut-off for isolating portions of the filtering-surfaces alternately, and a jarring mechanism for dislodging the dust from the isolated portion of the filtering-reel, substantially as set forth.

4. In a dust-collector, the combination of the following elements, namely: an inclosing-casing, a rotating filtering-reel having zigzag surfaces, mechanism acting upon the reel-heads within the casing to rotate the reel, a cut-off arranged inside of said reel for isolating portions of the filtering-surfaces alternately, and a jarring mechanism for removing the dust from the isolated portion of the filtering-reel, substantially as set forth.

5. In a dust-collector, the combination of the following elements, namely: an inclosing-casing, a rotary reel inside of the casing, the tubular bearings for the ends of the reel, whereby it may be mounted without a through-shaft, and a cut-off inside and supported independently of the reel, substantially as set forth.

6. In a dust-collector, the combination of the following elements, namely: an inclosing-casing, a rotating filtering-reel in said casing, hollow trunnions for mounting said reel, communicating with the interior of the reel, and a suction-fan adapted to draw air from the casing into the interior of the reel through the filtering material and out of said reel, substantially as set forth.

7. In a dust-collector, the combination of an inclosing-casing, a zigzagged shaftless rotating reel, a fan moving air into the reel through the cloth and outward axially, a fixed cut-off placed on the inside of the reel, so as to intercept the inflow of air through a part of the zigzagged sections, and a trough placed under the isolated sections to receive the dust dislodged from such sections, substantially as set forth.

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

NOAH W. HOLT.

Witnesses:

A. B. KELLOGG,  
RICH'D. K. NOYE.