

(No Model.)

C. S. FULLER.
FLOUR BOLT.

2 Sheets—Sheet 1.

No. 479,775.

Patented July 26, 1892.

Fig. 1.

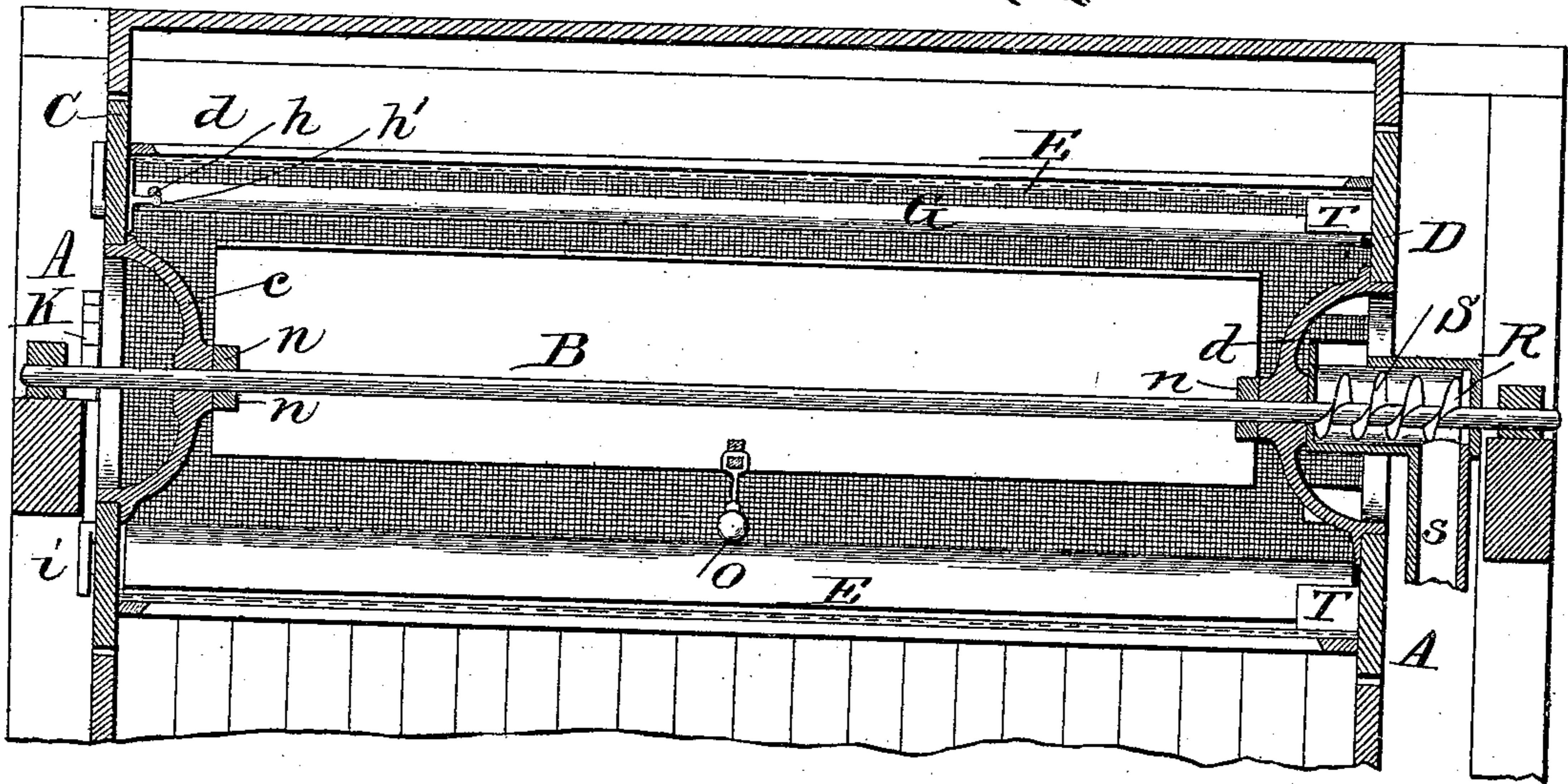


Fig. 3

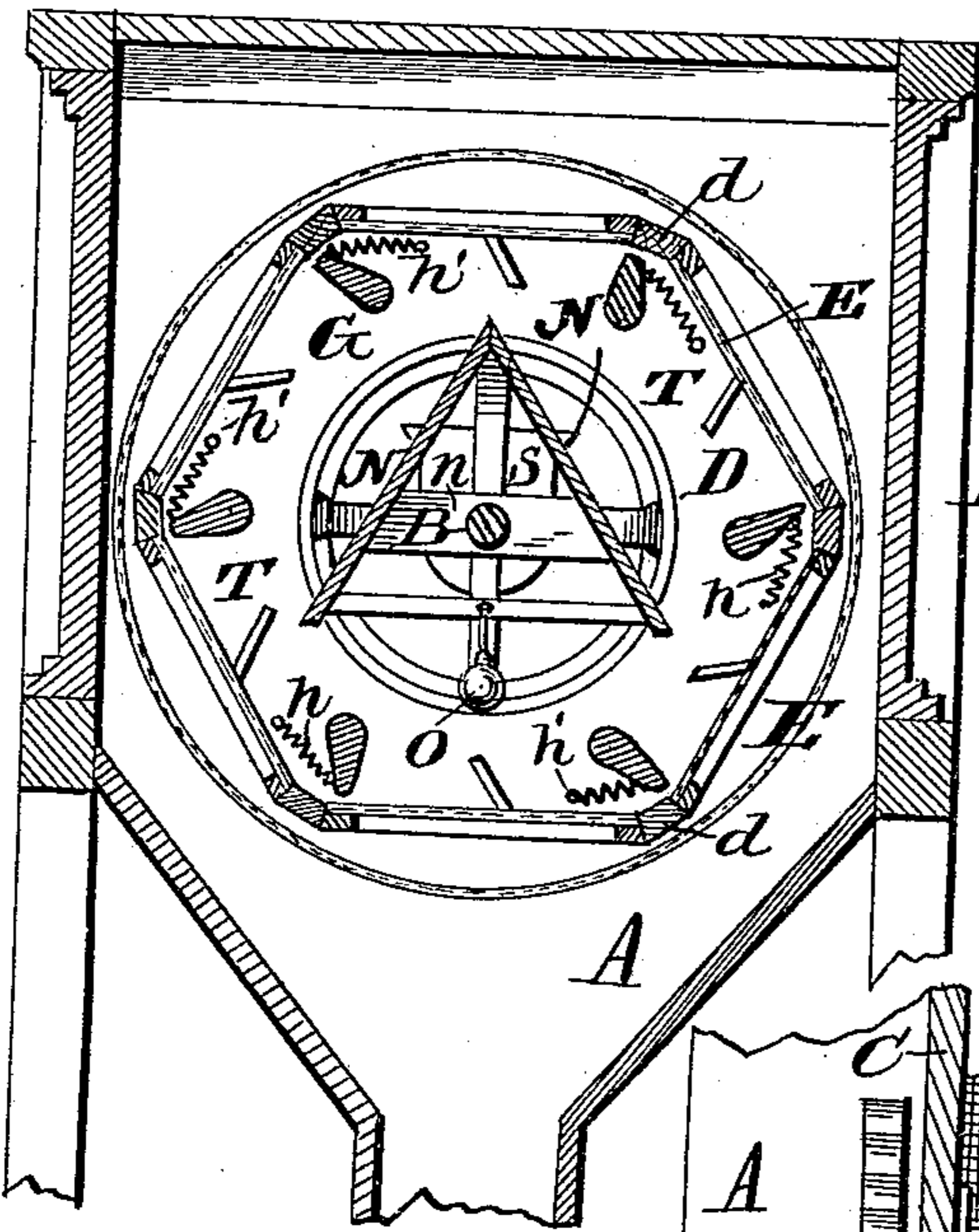


Fig. 2.

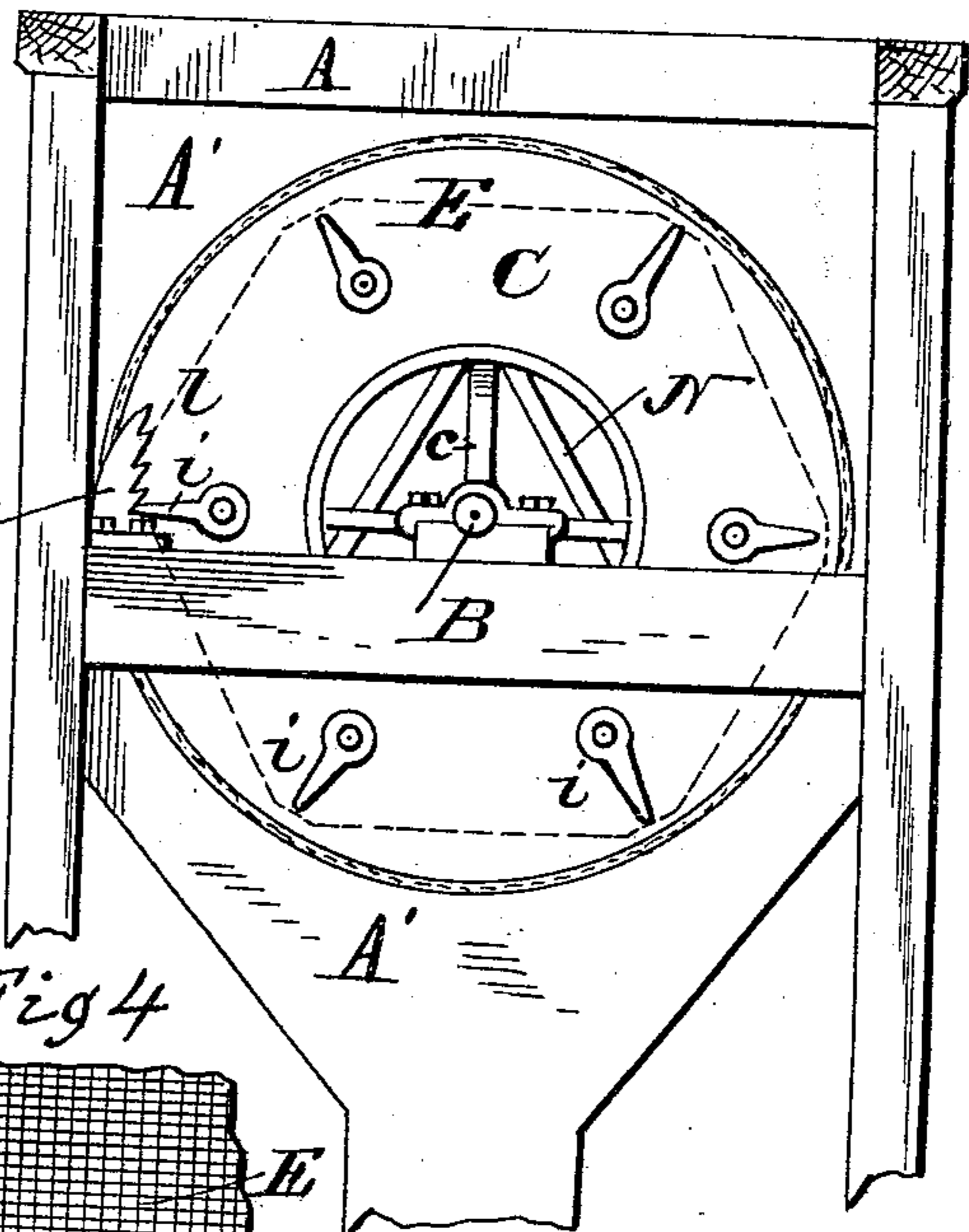
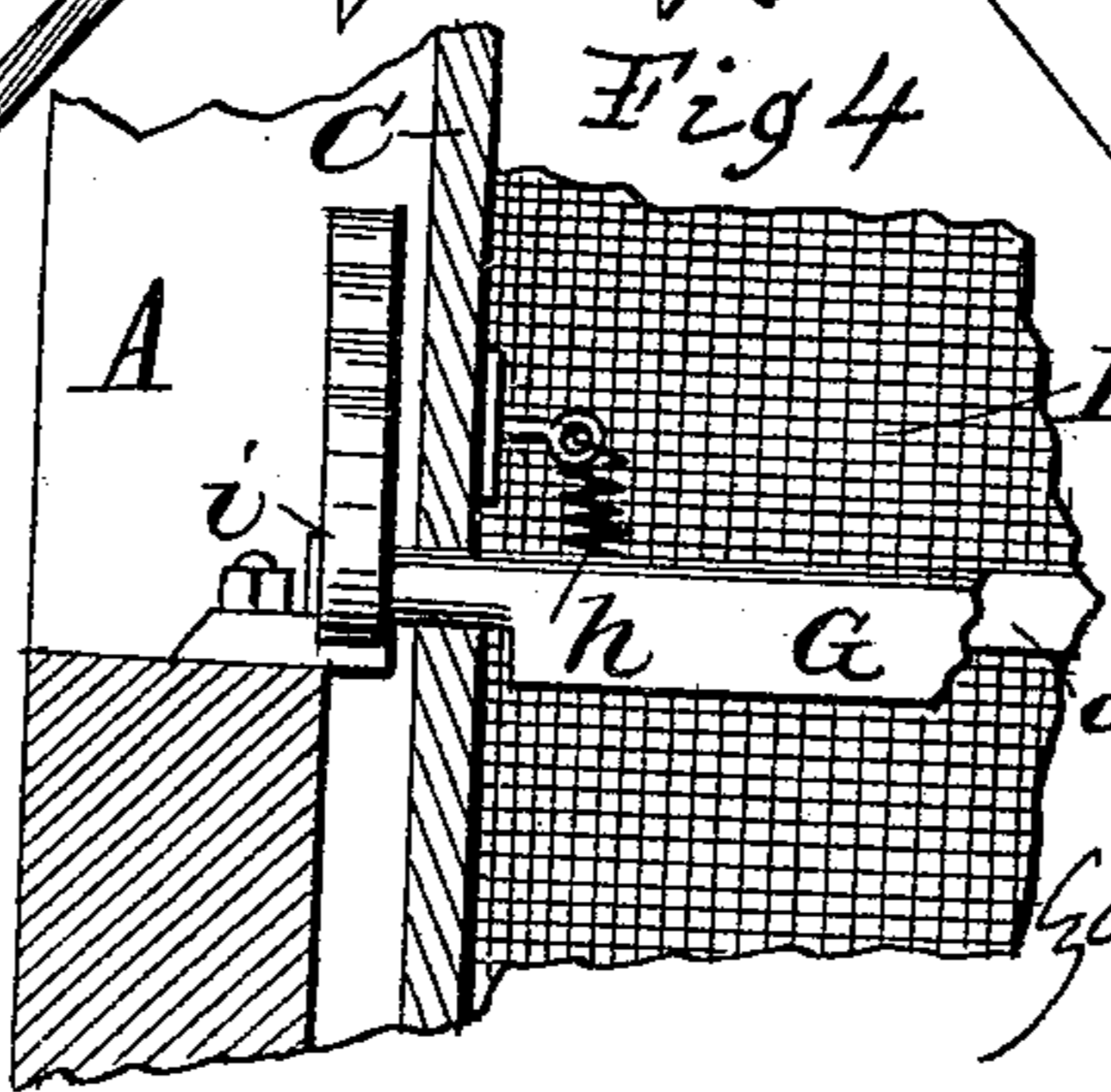


Fig. 4



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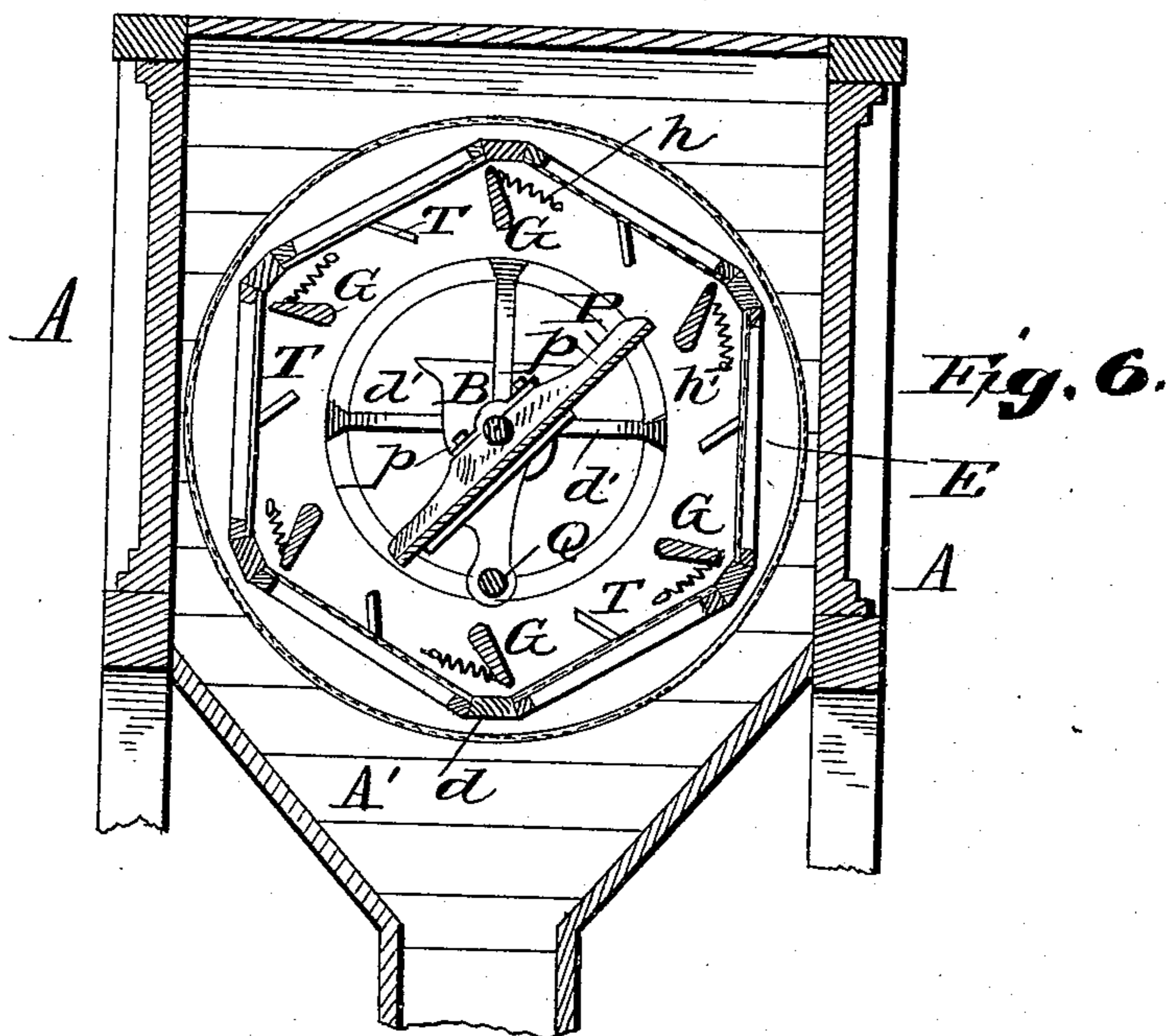
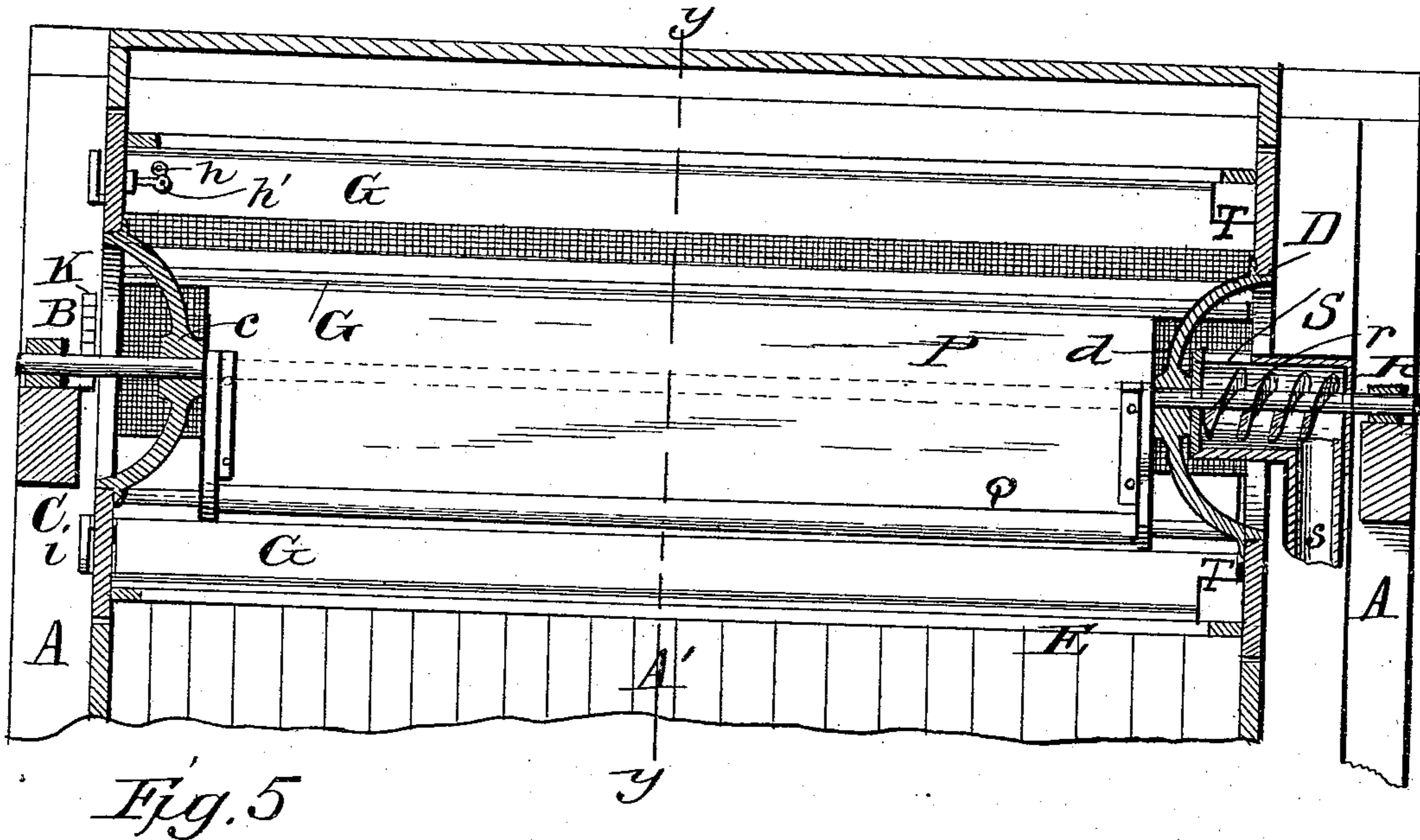
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WITNESSES

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UNITED STATES PATENT OFFICE.

CLARK S. FULLER, OF LAFAYETTE, INDIANA, ASSIGNOR TO RUFUS H. EMERSON AND ZENAS C. ELDRED, OF JACKSON, MICHIGAN, RECEIVERS OF THE G. T. SMITH MIDDINGS PURIFIER COMPANY.

FLOUR-BOLT.

SPECIFICATION forming part of Letters Patent No. 479,775, dated July 26, 1892.

Application filed June 16, 1891. Serial No. 396,421. (No model.)

To all whom it may concern:

Be it known that I, CLARK S. FULLER, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, 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.

The invention relates to flouring-bolts which have a revolving screen or reel. In this class of bolts as ordinarily constructed there is great liability that the material to be sifted will accumulate in the lower part of the bolt to an objectionable extent.

The object of my invention is to obviate that objection and insure a better distribution of the material over a greater extent or area of bolting-cloth than has hitherto been accomplished.

I desire to limit this case to the inventions specifically referred to in the claims, many others which are illustrated herein constituting the subject-matter of concurrent application, Serial No. 102,042, of mine filed June 27, 1883.

Figure 1 is a longitudinal section of a bolt containing my improvements. Fig. 2 is an elevation of the head end or receiving end. Fig. 3 is a vertical transverse section on line $x x$, Fig. 1, looking in the direction of the arrow 1. Fig. 4 is an enlarged sectional view of the mechanism, whereby the elevators are moved into different positions relative to the adjacent bolting-cloth. Fig. 5 is a vertical section showing a modification; and Fig. 6 is a transverse vertical section on line $y y$, Fig. 5, looking in the direction of the arrow 2.

A A' represent generally the framework and casing, which may be of any ordinary or approved construction.

B is the central shaft mounted in bearings upon the frame.

C is the head of the reel at its receiving end.

D is the head of the reel at its discharge end.

$d d$ are longitudinal ribs connecting the

heads C D, six such ribs being shown in the drawings; but a greater or less number may be employed, as preferred.

E is the bolting-cloth, which is secured to the inner sides of the ribs d . As these ribs do not project inward beyond the cloth, it will be seen that the bolting-surface is practically unbroken and that the angles at the ribs offer little or no obstruction to the sliding of material.

c is a spider, whereby the head C is secured to the shaft B, and d' is a similar spider connecting the head D with the shaft.

G G are longitudinal plates or buckets adapted to operate as elevators. These elevators are arranged in the reel near the ribs d , and in this instance are pivoted to the heads C D. The elevators are pivoted at or near their inner edges, so that by turning them on their pivots the outer edges can be moved away from the bolting-cloth or made to approach it. They are held in their elevated or normal positions by springs h , which are attached at their inner ends to the plates and at their opposite ends to supports h' , attached to the adjacent heads of the reel, the outer edges of the elevator being arranged at short distances from the inner surface of the bolting-cloth. The pivot at one end of each elevator projects through one of the heads of the reel, as shown in the drawings, and is provided at the outer side of the head with a rocking arm i .

K is a stop or cam secured to the frame near the head C in such position that as the reel revolves these arms successively engage with the cam and turn, tilt, or depress the buckets or elevators relatively to the bolting-cloth, so as to discharge from the elevators material which has been by them carried up from the lower part of the bolt. It will be seen that as the reel rotates in the direction indicated by the arrow 3 in Fig. 3 the mechanism which connects the elevators with the end of the bolt operates to automatically tilt or oscillate said elevators when they have reached suitable positions during the rotation of the reel.

The stop K is preferably constructed on its face with a number of shoulders or ratchets

l, over which the arm *i* travels as the reel rotates, and whereby the elevator is jarred, oscillated, or tilted a little at a time, thereby causing the material to be discharged from the elevator in small quantities, successively. Of course the position of the stop and the distance between its ratchet-teeth may be varied to secure the best results, according to the circumstances of each case and the position which it is desired the elevator shall occupy relative to the bolting-cloth and the deflectors. By means of such changes the character of the oscillations of the elevators may be so varied as to regulate the proportion of the elevated material which is delivered to various parts of the bolting-cloth. When the arm *i* has passed the stop *k*, the springs return the elevator to its normal position.

N N indicates the deflector, which, in this instance, is supported on the shaft by means of cross-girts *nn*, which have bearings adapted to rest upon the shaft. These parts constitute a double deflector in which the opposite sides incline in opposite directions from the vertical plane of the axis of the reel, with its lower edges in close proximity to the elevators on the upward-moving side of the reel and on the downward-moving side, respectively, and both located at some distance below the axis of the reel.

O is a weight attached to a cross-girt *o*, attached at its ends to the sides of the deflector, and serving to keep said deflector in suitable position upon the shaft.

It will be readily understood from an examination of the drawings and the foregoing description that material can be carried by the elevators on the upward-moving side of the bolt, (the reel running in the direction indicated by arrow 1, Fig. 2,) and that as each elevator in its turn passes stop *k* the engagement of the arm *i* therewith will tilt the elevator and discharge more or less of its contents upon the bolt-cloth below. Such material, however, as is not discharged over the outer edges of the elevators and against the bolt-cloth below will as the reel revolves be discharged over the inner edges of the elevators and, falling upon the deflector, will pass thence to the bolting-cloth upon the upward-moving side of the bolt or upon the downward-moving side, as the case may be, depending somewhat upon the character of the material being sifted and the speed of rotation of the bolt. It is well known that particularly in the ordinary construction of bolts which have no revolving beaters material is frequently carried up some distance above the shaft or axis of the reel and dropped down upon the material in the bottom, which has been found to be objectionable, because it drives specks through the cloth. This objectionable mode of operation is entirely obviated by my invention, a further advantage of my bolt being the increased amount of bolting-surface through which material is sifted.

It will be seen that by reason of the deflector being shorter than the reel and supported between the ends of the reel and upon the reel-supports I am enabled to connect both heads of the reel to a common through-shaft, so that both ends of the longitudinal ribs and of the elevators can be positively driven from that shaft, and the fine impurities will be collected in the eddy-chamber within the deflector and discharged at the same outlet with the tailings, as will be explained. Of course if from any cause the stop *K* is omitted or becomes inoperative, a very much larger proportion of the material will be discharged upon the deflector and pass thence to the bolting-surface. An air-current sufficient to remove the light impurities is caused by the revolution of the reel and its feeding devices. The material which falls from the elevators upon the deflector is deflected by the latter partly against the bolting-cloth and partly against the elevators, and by this dashing action the material is loosened and the light impurities are caused to become suspended in the air, while the other valuable particles are caused to pass through the bolting-cloth. The two parts of the deflector diverge downward and form a bridge resembling an arch with its lower ends distended and separated by a wide opening, which permits all the heavy and valuable particles which may enter the space under the machine to drop upon the mass of material below, while it allows at the same time the free entrance of the floating material into the quiet space or chamber *N* under the arch. This floating material finally escapes from the chamber *N* through the spaces above the cross-girt *n* at the tail end of the machine, and thence out through the devices for discharging the tailings, which I will soon describe. It will be understood that by reason of the bearings for the reel-shafts being made about midway between the ends of the girts *nn* and the deflector sides *N N* being arranged at about equal distances from the axis of the reel and upon opposite sides thereof they will be supported in the proper working position by comparatively small counterbalancing-weight *O*, and that the spiders *c d'* of the reel-heads are adapted to engage with the cross-girts *nn* to prevent longitudinal movement of the deflector upon the shaft *B*, which constitutes the reel-support.

In Figs. 5 and 6 the construction is substantially the same as in the preceding figures, except that the deflector, instead of having two deflecting-surfaces adapted to deliver material both to the upward-moving cloth and to the downward-moving cloth, consists simply of an inclined board *P*, which is hung upon the shaft *B* by means of bearings *p p* and is retained in its proper inclined position by a depending weight *Q*.

In all the figures the construction of parts is such that material which is discharged from the elevators is delivered to the bolting-cloth

and sifts through it, portions of such material sliding over the inner face of the cloth. In Figs. 5 and 6 a single board, thus hung upon the reel-shafts with its upper and lower edges projecting above and below the reel-axis and also upon opposite sides of the vertical plane of the axis, serves to collect all or practically all of such material as may be carried above the reel-axis by the elevators and prevent it from falling upon material in the bottom of the bolt, thus attaining some of the advantages of the two deflectors of the other figures with a very much more simple and cheap construction and one which is very much more easily applied, especially to reels already in position in mills in such situations as to make it difficult to take the reel apart, as might be found necessary in order to put in the other form of deflector. In both constructions R represents a screw-conveyer which is secured to the shaft B at the tail end of the reel, and *r* is the trough of the conveyer provided on the inner side of the reel-head D with a receiving-hopper S and at the outer end of said head with a discharging-spout *s*. T T represent short buckets or flights which are secured to the inner side of the head D, near the bolting-cloth, and operate to elevate the material which has passed through the meshes of the bolting-cloth and deliver the same in and to the receiving-hopper of the discharge-conveyers.

The material to be bolted is introduced into the reel through a central opening of the head C by a spout or other suitable feed device.

In another concurrently-pending application of mine, Serial No. 102,042, filed June 27, 1883, I have illustrated some of the inventions which are claimed herein; but in that case I have shown the elevators as being supported with their outer edges at short distances from the bolting-cloth and do not in this case desire to claim any inventions into which such last-referred-to construction enters. In that case, No. 102,042, I have illustrated the elevating blades or buckets as having combined with them pivotal connections, crank-arms, and a stop or cam attached to the frame of the bolt; but I do not in that case claim protection for any of those inventions whereby the elevating blades or buckets are made movable or capable of oscillating relatively to the bolting-cloth, such features being the subject-matter of part of the claims herein.

What I claim is—

1. The combination, with a bolting-reel, of elevating buckets or plates movable independent of the reel and arranged on the inner side of the bolting-surface and means whereby said buckets or plates are automatically caused to discharge the material resting therein, substantially as set forth.

2. In a flour-bolt, the combination, with the bolting-reel, of a series of internal oscillating elevators hung thereon and mechanism connecting each elevator with the end of the

bolt, whereby the rotation of the reel causes a positive oscillation of the elevators to discharge the material, substantially as set forth.

3. In a flour-bolt, the combination, with the bolting-reel, of a series of elevators journaled therein and each provided at one end with a crank-arm and a cam engaging with the crank-arm, whereby the revolution of the reel causes the oscillation of the elevators to discharge the material, substantially as set forth.

4. The combination, with a bolting-reel, of buckets *g*, provided with springs *h* and arms *i*, and a stop whereby the buckets are turned or depressed, substantially as set forth.

5. The combination, with a bolting-reel, of buckets or plates *g*, provided with a spring *h* and arms *i*, and a stop having a face constructed with a series of shoulders or ratchets, substantially as set forth.

6. The combination, with a bolting-reel, of buckets or plates arranged on the inner side of the bolting-surface, mechanism whereby the buckets are automatically depressed, turned for discharging the material thereon, fixed buckets secured to the discharge of the reel, and a discharge-trough which receives tailings elevated by the buckets at the discharge end of the reel, substantially as set forth.

7. The combination, with a bolting-reel, of buckets or plates arranged on the inner side of the bolting-surface, mechanism whereby said buckets or plates are automatically depressed or turned to discharge the material resting thereon, and a deflecting-plate whereby the material which has not been discharged over the outer edges of the buckets is collected and returned to the working side of the reel, substantially as set forth.

8. In a flour-bolt, the combination, with a bolting-reel provided with a shaft *b*, of elevators movable independently of the reel and arranged on the inner side of the bolting-surface and a deflecting-plate hung loosely on the shaft and provided with a weight whereby it is held in position, substantially as set forth.

9. In a flour-bolt, the combination, with the shaft *b*, of the deflector provided upon its upper surface with bearings, the upper and lower edges of the deflector being arranged upon opposite sides of the axis of the reel, and a weight attached to the under side of the deflector at both ends by the brackets, substantially as set forth.

10. In a flour-bolt, the combination of a reel-frame and elevator arranged within the reel and adapted to be automatically tilted into different positions as the reel rotates, substantially as set forth.

11. In a flour-bolt, the combination, with a bolting-reel, of an eddy-chamber having its lower side open and having one inclined side facing and adjacent to the downward-moving side of the reel, substantially as set forth.

12. In a flour-bolt, the combination, with a bolting-reel provided upon its inner surface

with a series of elevators, of a deflector having the lower edge of one of its sides in close proximity to the elevators on the upward-moving side of the reel and having the opposite edge in close proximity to the elevators on the downward-moving side of the reel, substantially as set forth.

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

CLARK S. FULLER.

Witnesses:

WILLIAM H. DOTY,
S. T. STALLARD.