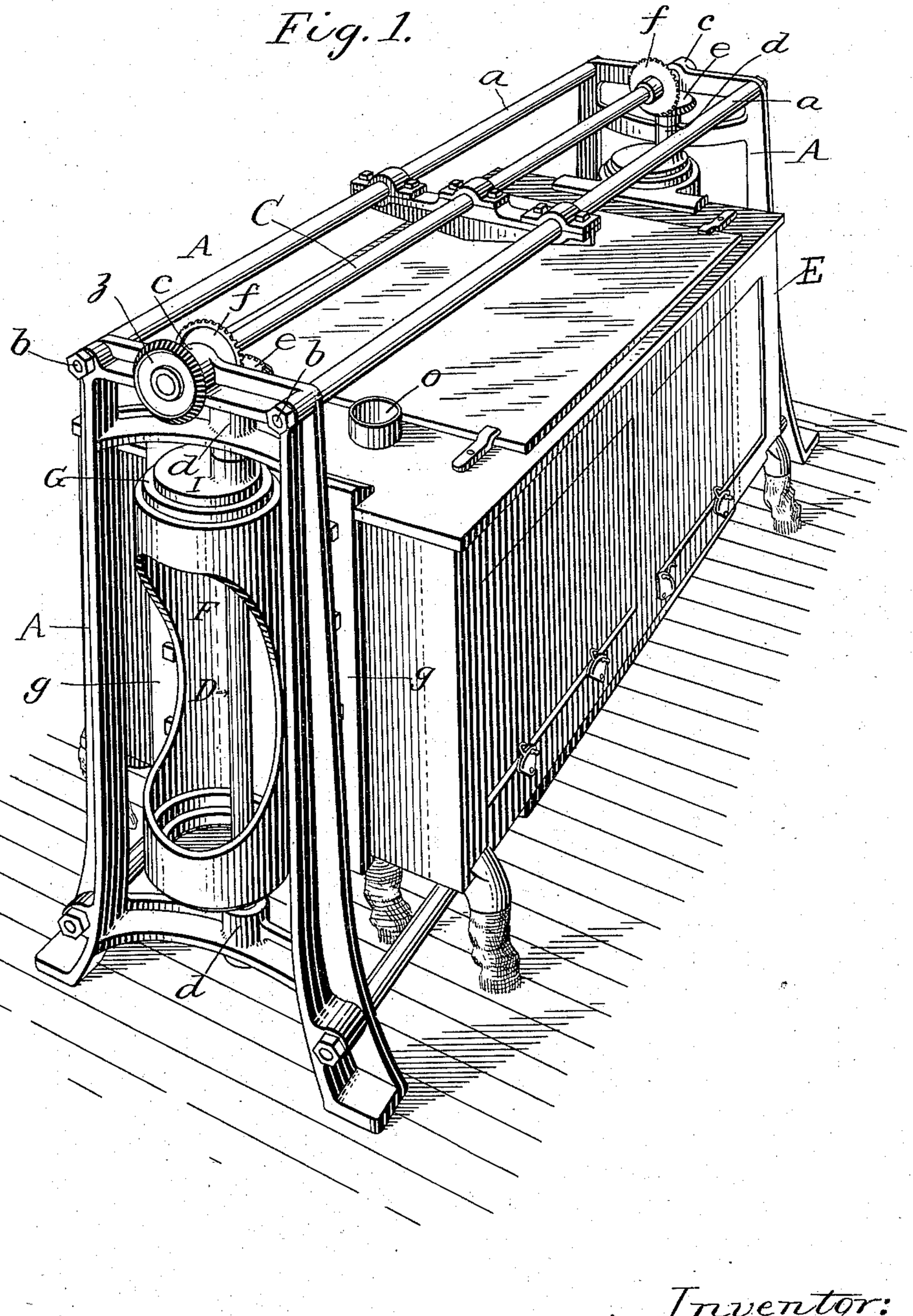
(No Model.) 4 Sheets—Sheet 1.

J. H. DAWSON.

FLOUR DRESSING MACHINE.

No. 567,963. Patented Sept. 22, 1896.

Fig. 1.



Attest;
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C. B. Bull.

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(No Model.) 4 Sheets—Sheet 2.

J. H. DAWSON.

FLOUR DRESSING MACHINE.

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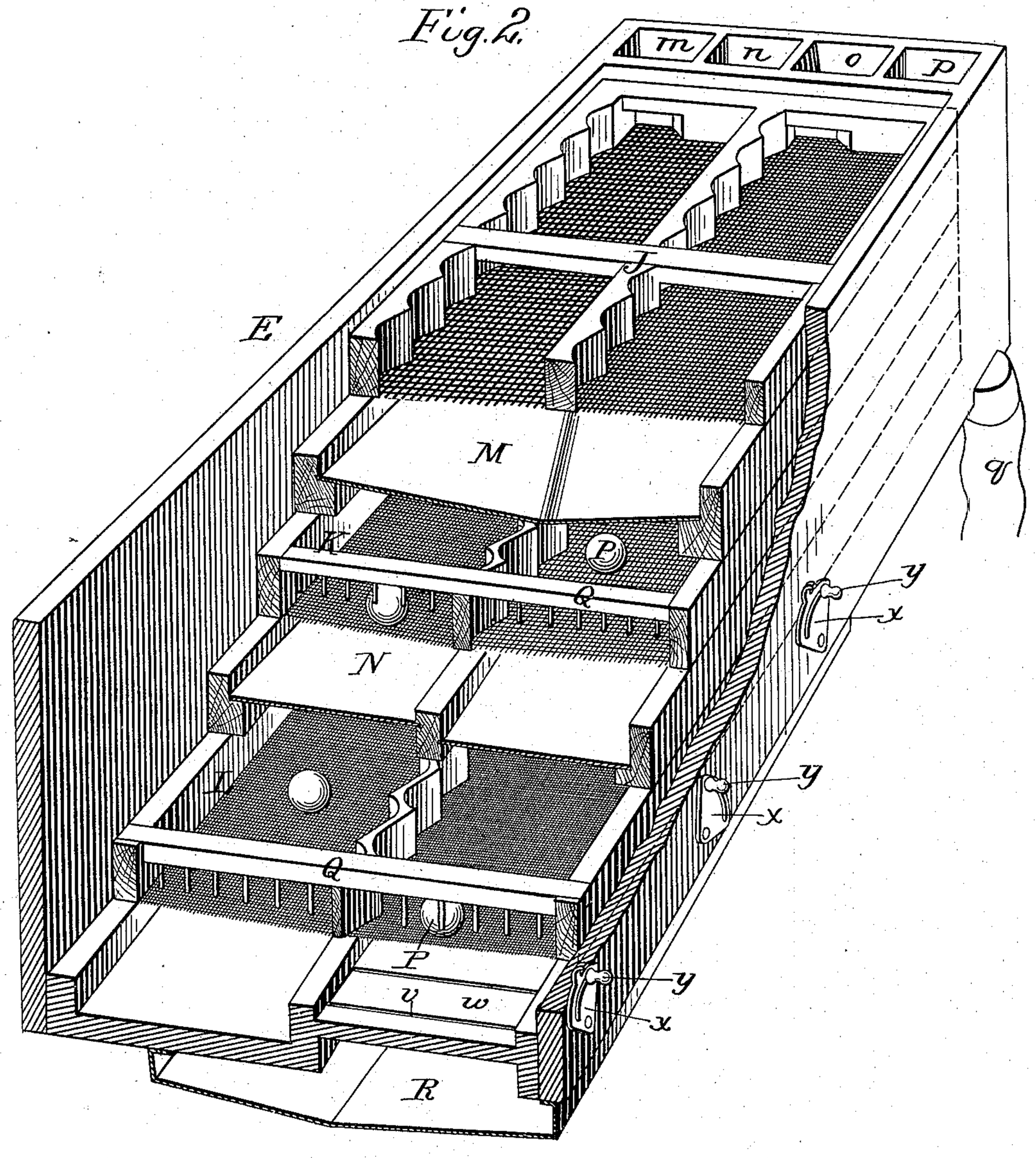
Fig. 2.



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(No Model.)

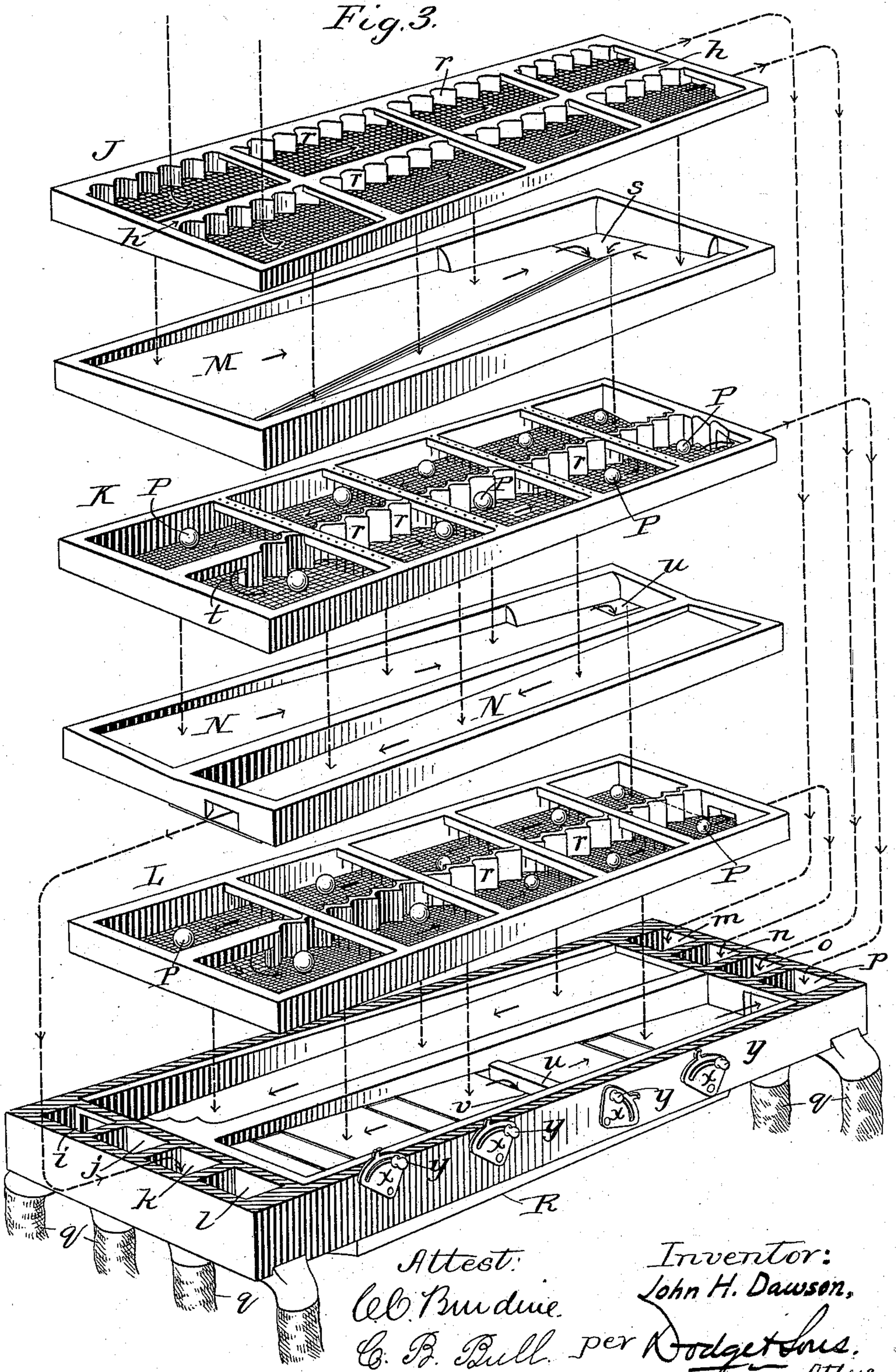
4 Sheets—Sheet 3.

J. H. DAWSON.

FLOUR DRESSING MACHINE.

No. 567,963. Patented Sept. 22, 1896.

Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

J. H. DAWSON.

FLOUR DRESSING MACHINE.

No. 567,963. Patented Sept. 22, 1896.

Fig. 4.

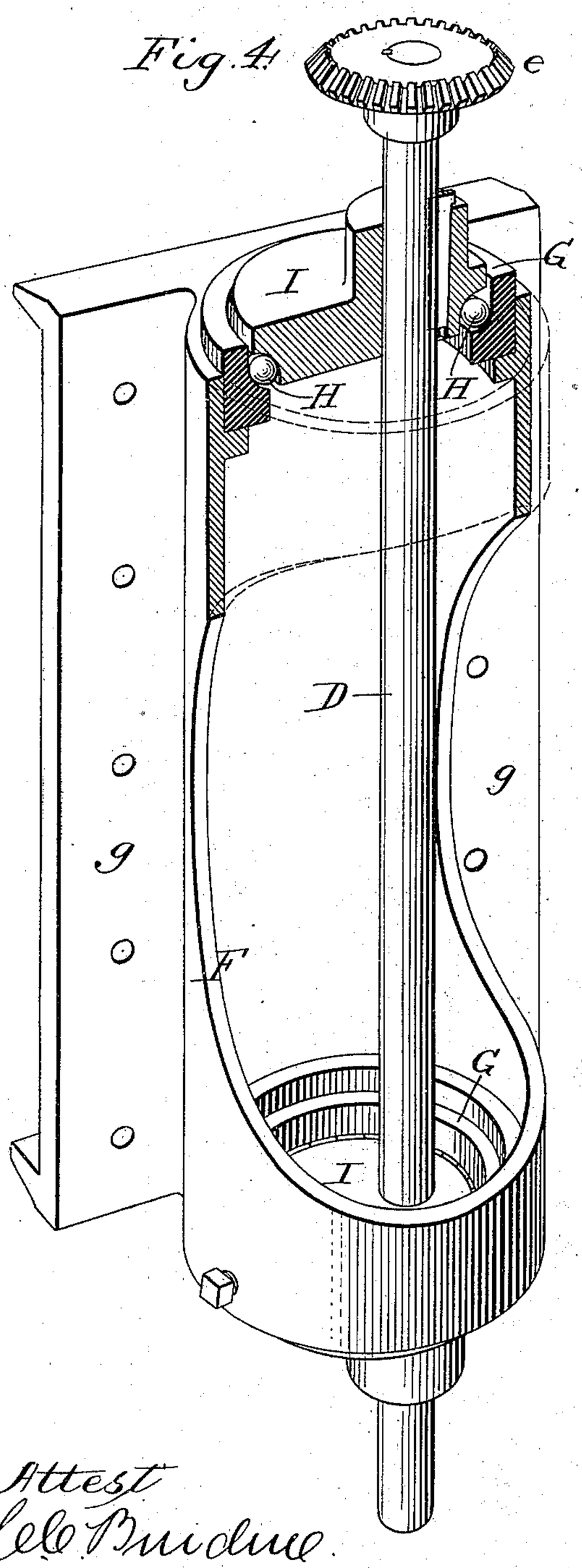


Fig. 5.

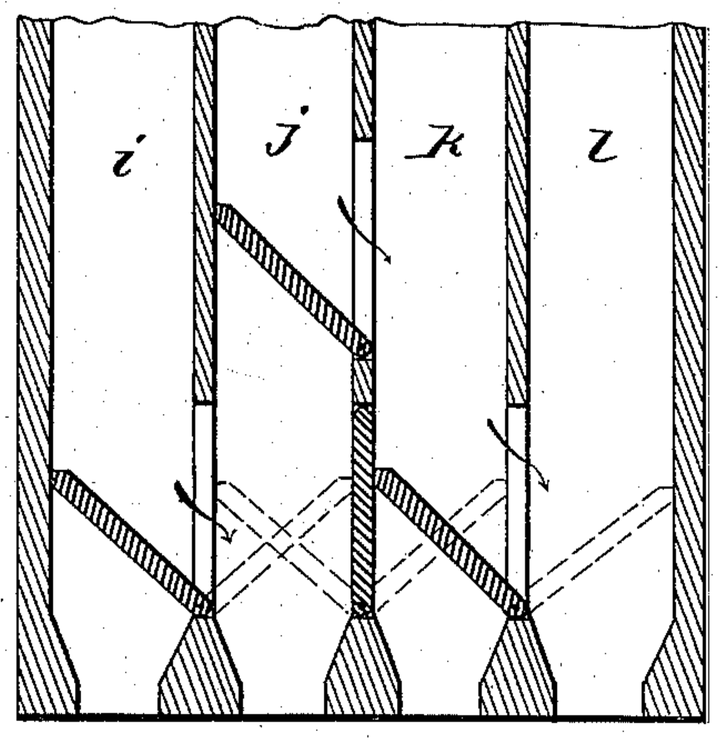
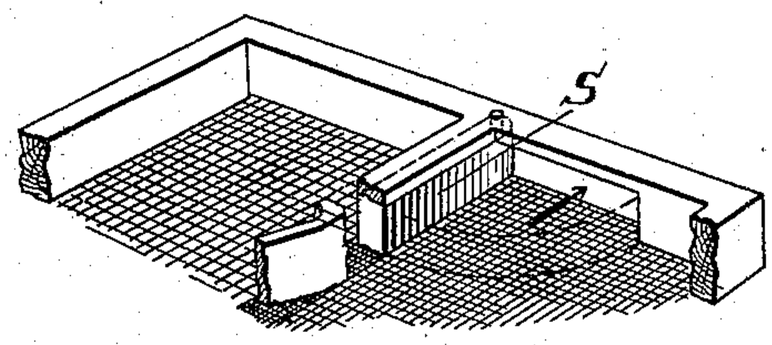


Fig. 6.



Attest
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C. B. Bull.

Inventor:
John H. Dawson,
per Dodget Sons.
Attys

UNITED STATES PATENT OFFICE.

JOHN H. DAWSON, OF OXFORD, PENNSYLVANIA, ASSIGNOR TO THE WOODSIDE MANUFACTURING COMPANY, OF SAME PLACE.

FLOUR-DRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 567,963, dated September 22, 1896.

Application filed July 3, 1895. Serial No. 554,882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. DAWSON, a citizen of the United States, residing at Oxford, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Flour-Dressing Machines, of which the following is a specification.

My invention pertains to machines for sifting, grading, and separating the meal or chop produced by the grinding, crushing, or reduction of grain, and more particularly to that class of machines in which the sieves or screens are given a bodily circular movement in a horizontal plane, after the manner of hand sifting or screening.

The invention consists in various novel features, details, and combinations hereinafter set forth, whereby the machine is rendered simple, compact, and efficient, and the power required to operate it is reduced to the minimum.

In the accompanying drawings, Figure 1 is a perspective view of the complete machine. Fig. 2 is a sectional perspective designed to give a general idea of the construction and relative arrangement of the sieves or screens; Fig. 3, a perspective view of the several screens or sieves arranged in their proper order but separated from one another, the travel of the materials being diagrammatically indicated; Fig. 4, a sectional perspective view illustrating the construction of the eccentric boxes or shells and showing the antifriction-spheres employed therein; and Figs. 5 and 6, detail views of valves for directing the materials to different points, as desired.

In the treatment of meal and chop the liveliness of the product and the completeness of the separation depend very greatly upon the motion imparted to the sieves or screens by which it is handled. In the opinion of many experienced millers the peculiar bodily movement of the sieve or screen in a circular path in a substantially horizontal plane produced in hand-sifting is best adapted to produce the effects desired, and hence many efforts have been made to reproduce this motion mechanically. To effect such motion, the sieve is sustained or supported in some convenient manner, and an eccentric or crank, or two or more such eccentrics or cranks, is or are employed to move the sieve thus sustained or supported.

It is usual in machines of the character mentioned to suspend the sieves or screens by links or to support them from below by posts or standards capable of swinging in a circular path from or about the point of support. Such arrangement causes the sieve to exert a constant lateral pressure against the cranks or eccentrics, owing to the tendency of the links to assume a vertical position or to the tendency of the supporting-posts to fall over in the direction of their inclination. This lateral pressure produces a very considerable and undesirable degree of friction, which necessitates an undue expenditure of power in the operation of the machine. The bearings of the links or of the posts also offer friction, and the aggregate is very considerable. I obviate these difficulties and dispense entirely with links, hangers, and posts by carrying the sieves or the frame containing them directly and solely upon and by the eccentrics which impart motion to them. The weight of the body thus supported and moved is considerable, and friction between the eccentrics and their encompassing rings or shells would be very great if said parts were of ordinary construction. Hence I interpose antifriction balls or rollers between them, and thus so greatly reduce the friction as to render the apparatus easily operable and relieve it of undue or excessive wear.

The character and arrangement of the screens may vary according to the work to be performed, the system of milling carried on, or the views of the miller.

Referring again to the drawings, A indicates a framework which may be of any convenient construction and design, but which is here represented as consisting of two upright end frames or castings, spaced by tubular bars or pipes *a*, and held together by tie-rods *b*, passing through the spacing-bars.

C indicates a horizontal shaft carried in boxes or bearings *c*, formed upon or secured to the tops of the end frames or uprights, the shaft extending lengthwise of the frame midway between its sides. An intermediate support for the shaft is shown, and this will be

used where the machine is long to prevent springing and binding of the shaft. Each upright or end frame is also provided with boxes or bearings *d*, in which is carried a vertical shaft D, the two shafts at opposite ends of the machine receiving rotary motion from the shaft C through the medium of bevel-gears *e* and *f*.

E indicates a chest, within which are mounted the sieves or screens and gather boards or floors, and in which are formed the spouts or chutes by which the different products are carried to their proper trunks or receptacles, as hereinafter more fully explained.

The chest is made quite strong and rigid, and has bolted or otherwise secured to each end a bracket or casting F, the form of which may be considerably varied, or which may be separated into an upper and a lower member, but which is preferably made in the form of a hollow cylindrical casting, cut away between its ends to lighten it and provided with flanges *g*, through which the fastening-bolts are passed.

The casting F is provided at or near its upper and lower ends with removable rings or bushings G of steel or other durable material, each formed with a concave inner wall or face, as shown in Fig. 4, to constitute a seat or bearing for a series of antifriction-balls H, which are retained between said seat and the corresponding concave face of an eccentric I, carried by shaft D.

The upper ring or bushing G rests upon a ledge or shoulder of the casting F, and the upper eccentric is represented as placed above and resting upon the interposed balls H. This arrangement may, however, be reversed, so that the weight of the casting F and of the chest shall be placed upon the balls H.

At the lower end of the casting F such reverse arrangement of the ring or bushing and eccentric is represented, the entire weight of one end of the chest being under this arrangement brought upon the lower eccentric.

It is of course essential that one or the other eccentric at each end of the machine be below the bushing and antifriction-balls, and in practice it may be found advisable to so arrange both, since the weight of the chest will preclude its lifting from its supports in action.

The eccentrics are advisably made of good size, in order that comparatively large balls may be used.

It is obvious that any other well-known form of antifriction-roller may be used, as cones, disks, or small wheels, but spheres are preferred.

Antifriction-rollers of various forms are common and well known, and of course no claim is made broadly thereto; but in no prior instance have they been used, to my knowledge, in the relation here set forth. By applying them between the eccentric and its bushing they become not merely a means of reducing friction, but also a connection or medium of transmitting motion from the one part to the other, which function I believe has never before been given them. I therefore mean to claim the combination of the driving-eccentric, the driven part, and the interposed antifriction-rollers whereby such dual function is secured.

Referring now to Figs. 2 and 3, the interior construction and arrangement of the machine will be explained, it being observed, by way of preface, however, that the grading of the sieves or screens, their number and order, and the location of their discharges may be varied as desired. In practice gates or cut-offs may be employed to direct the materials at will to different chutes or receptacles, as circumstances require.

In the present instance I have represented three sieve or screen frames J, K, and L, the upper and middle frames being respectively provided with collecting boards or bottoms M and N, while the material passing through the lower sieve falls upon the floor or bottom of chest E.

The upper sieve or screen J is preferably clothed with two grades of wire-cloth, one on either side of a central partition *h*. This arrangement contemplates handling the product of two breaks or reductions at the same time, and two inlet-spouts O O are accordingly provided, opening through the top or cover of the chest E, one over the head of each side or division of the screen.

The chest E is formed with a series of spouts or trunks *i j k l* at the head end and with a like series of spouts or trunks *m*, *n*, *o*, and *p* at the tail end of the chest, treating as the head that end at which the inlet or feed spouts O O are located, though individual screens may have their heads and tails in the reverse order. The designation made is merely arbitrary and for convenience of reference.

Each spout or trunk of each series connects by a flexible pipe or spout *q* with a suitable receptacle, and each may be furnished with a valve or valves by which to direct the material of different sieves to any one of the spouts or trunks of a series. Such an arrangement is illustrated in Fig. 5, but no claim is made thereto, as it is common in analogous machines.

The frame J is made deeper at one side than at the other, causing the wire-cloth or screening material to slant and the chop or meal to seek the lower side. To cause the proper distribution of the material over the sieve or screen and its gradual travel from head to tail of each section, notwithstanding the fact that there is little or no longitudinal inclination of the screen, I adopt the well-known expedient of forming pockets *r* in a side wall of each section, said pockets having such curvature or inclination as to cause the material to leave them at any desired angle. This feature of construction is broadly very old, and no claim for it is specifically made.

The entire clothing of the frame J being inclined in one and the same direction, the

pockets *r* are made at the corresponding side of both divisions of the screen. As the screen moves through one part of its throw the material settles back into the pockets, and thereafter as the screen completes its circular throw or movement the material is projected from the pockets, and by reason of its momentum and the changing direction of the movement of the screen it is caused to travel across the width of the screening-surface at such angle and with such rate of forward travel as the inclination of the pockets is calculated to produce.

Both sections or divisions of screen J are provided with outlets, and through these the tailings pass off into the spouts *m* and *o*, as indicated in Fig. 3.

Beneath the screen J is the gathering bottom or board M, which receives all that passes through the meshes of both sections of screen J, which product includes coarse and fine middlings and flour.

The bottom M inclines from all points toward one corner, beneath the tail of sieve J, where it is provided with an opening *s*, through which the stock passes to the head of the first section of sieve K beneath.

Sieve K is divided by a longitudinal partition into two sections, which, however, communicate by an opening or passage-way *t* at the end farthest from the delivery opening or outlet *s* of bottom M, through which sieve K receives its supply of stock. Both divisions of sieve K are made deepest next to the central partition and the material tends toward said partition, which is consequently provided with pockets *r* in both faces, but fashioned to throw the material in reverse directions, so that there shall be a regular and progressive travel in one direction in one division of the sieve and in the opposite direction in the other division, as indicated by arrows in Fig. 3.

The first or receiving section of sieve K is clothed with finer silk than the second or delivery section and is designed to permit the passage through it of only such stock as is suitable to go to the lower or flour sieve L. The second or delivery section of sieve K is clothed with silk of proper mesh to permit coarse middlings to pass through, while taking out all larger matters, bran, and the like.

The tailings from sieve K pass to trunk *p*, as indicated by dotted line in Fig. 3. Beneath sieve K is the bottom or board N, divided by a longitudinal partition into two sections, inclining longitudinally in opposite directions. That section of bottom N which receives the matters sifting through the meshes of the finer cloth of sieve K delivers the same as stock to the head of bottom sieve L, through an outlet or opening *u*, while the other section of said bottom N delivers to spout or trunk *k*.

The bottom sieve L is designed to take out everything except the flour, and is clothed with two grades or numbers of silk, being divided, like sieve K, by a pocketed central partition into two sections, the first having the coarser and the second having the finer silk, as indicated.

The reason for using the coarser sieve first is found in the fact that certain coarse matters present in the material passing over the first section preclude elimination of the finer particles with the freedom necessary to employment of a finer sieve. On the second section these matters are not present in sufficient quantity to have a like effect. Hence the finer sieve is permissable. I do not wish, however, to bind or restrict myself to any relative grades of sieves.

The stock, falling through opening or outlet *u* of bottom N, falls, as indicated by dotted line and arrow, to the head of the coarser-clothed section of sieve L and travels over the same in the general direction indicated by arrows to the foot of said section, passing thence through or beneath the partition to the head of the final screening-section, and thence to its tail.

The fine flour of course sifts through the first section of the sieve L, and being all of high grade is collected upon the corresponding section of the floor of chest E and finally delivered to trunk or spout *i*. The tailings pass to spout N.

In passing over the final section of the flour-sieve L the stock will in many cases give up flour of good grade through a greater or less portion of its length, and it is desirable to separate this from coarser matters or impurities which may pass through the sieve beyond such point and to send the flour either to the spout *i* with the fine flour or to some other place apart from the coarser matters. To accomplish this, the floor of chest E beneath the final section of sieve L is provided with openings *v*, guarded by valves or gates *u*, controlled from outside the chest by slotted sector-plates *x*, which may be clamped at any desired adjustment by binding-screws *y*. Any equivalent form of gate or valve may of course be employed in lieu of that shown.

Beneath the floor of chest E is a gathering bottom or board R, which may be connected with and arranged to deliver into spout *i*, *j*, *k*, or *l*, as found expedient.

In Fig. 3 the third valve or gate *u* is represented as opened to permit all the screenings or flour delivered upon the floor of chest E to that point to pass to the gathering-floor R beneath. All matters passing through the meshes of the sieve L beyond the open valve will be delivered into spout *p* with the tailings from sieve K. In this way I am enabled to make a number of separations very perfectly and rapidly with a minimum handling of the stock and with the shortest practicable travel thereof, and to perform the entire work in a single machine of small compass.

It is of course understood that the arrows

merely indicate the general direction or ultimate travel of the stock, which is produced by a succession of passages of the material laterally across the screens at an angle to their length in a manner well understood. As before mentioned, such travel is very old, sieves or screens designed and adapted to effect it having been patented both in England and France many years ago and practically employed, as explained in numerous publications pertaining to flour-making.

For the purpose of keeping the meshes of the screens or sieves clear and open I provide each frame with small spheres P of rubber or like material, and to prevent them from collecting in one place I provide each sieve or screen frame with transverse combs or guards Q, Figs. 2 and 3.

By making the rings G separate and removable from the castings F, I am enabled to finish them more readily and perfectly than could otherwise be done and to renew or redress them when worn. This is quite important, owing to the heavy wear to which these parts are subjected.

Motion is imparted to the shafts D through shaft C and the bevel-gears *e f*, shaft C being driven by a gear-wheel *z* from a line-shaft common to two or more such machines. As the weight of the chest is considerable, there is a tendency to produce vibration of the building, but by so setting the chests of respective machines that they shall move simultaneously in different directions one may be made to neutralize the effects of another.

The angular adjustment of the eccentrics will or may be varied according to the number of machines in operation.

In Fig. 6 a valve S is represented as hinged at the angle or meeting point of the central partition and end board of the sieve-frame, said valve serving to open one and close the other of two passages, one through the partition and the other through the end of the sieve-frame. By setting this valve to one or the other position the material may be caused to travel from one section of the sieve to the other or to deliver from the first section directly into the spout or trunk at the end of the chest.

Having thus described my invention, what I claim is—

1. In combination with shafts D, provided with eccentrics I; gearing connecting said shafts; a chest or sieve-frame as E provided with rings to encircle the eccentrics I, and rollers H, interposed between the eccentrics and their rings, substantially as and for the purpose set forth.

2. In combination with upright shafts D D, provided with eccentrics I I; chest or frame E provided with castings F; removable rings G seated in said castings; and balls or rollers H interposed between the rings and the eccentrics, substantially as and for the purpose set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

JOHN H. DAWSON.

Witnesses:

HORACE A. DODGE,

C. C. BURDINE.