

(No Model.)

J. C. FISHER.
GRAIN CLEANING MACHINE.

No. 414,510.

Patented Nov. 5, 1889.

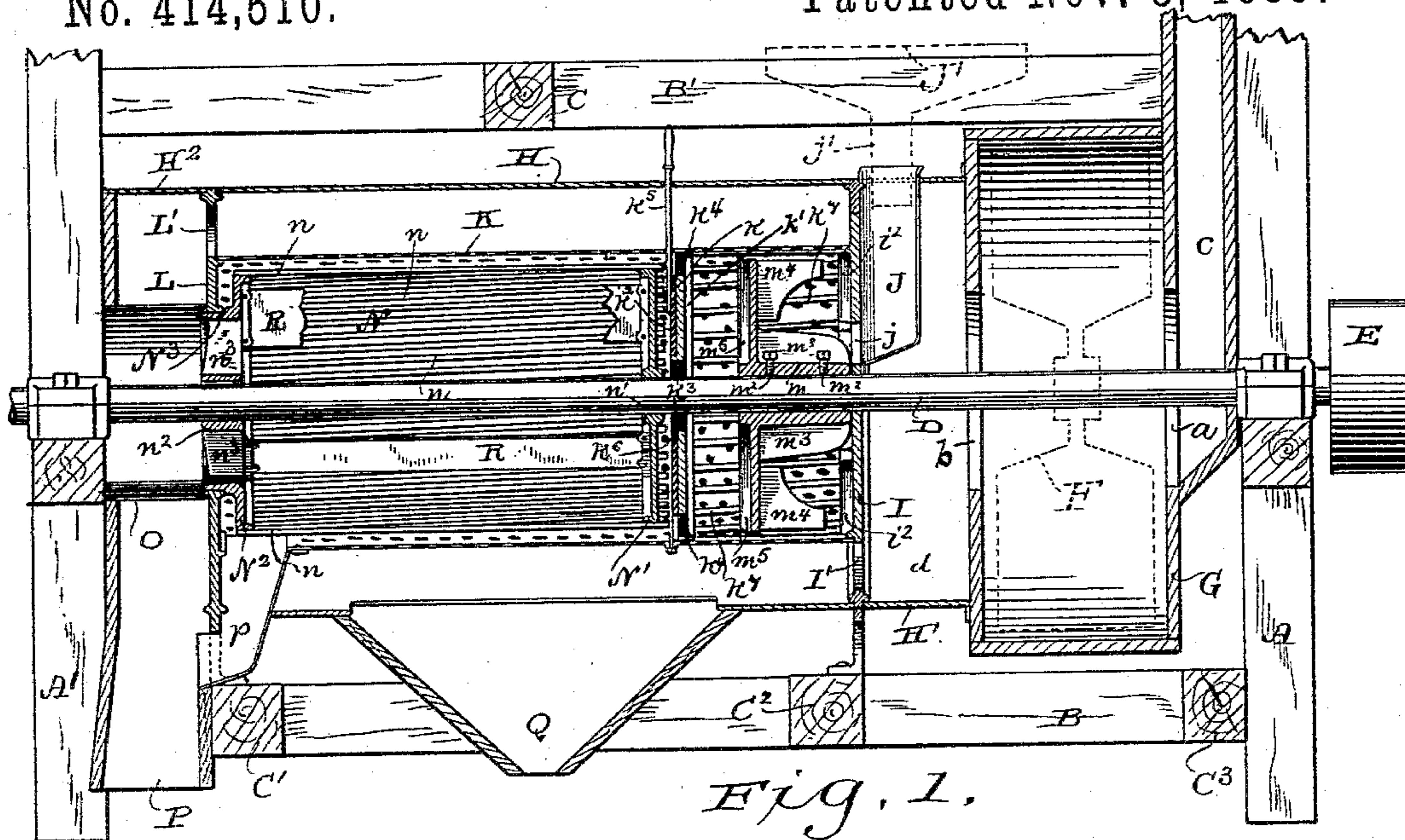


Fig. 1.

Fig. 2.

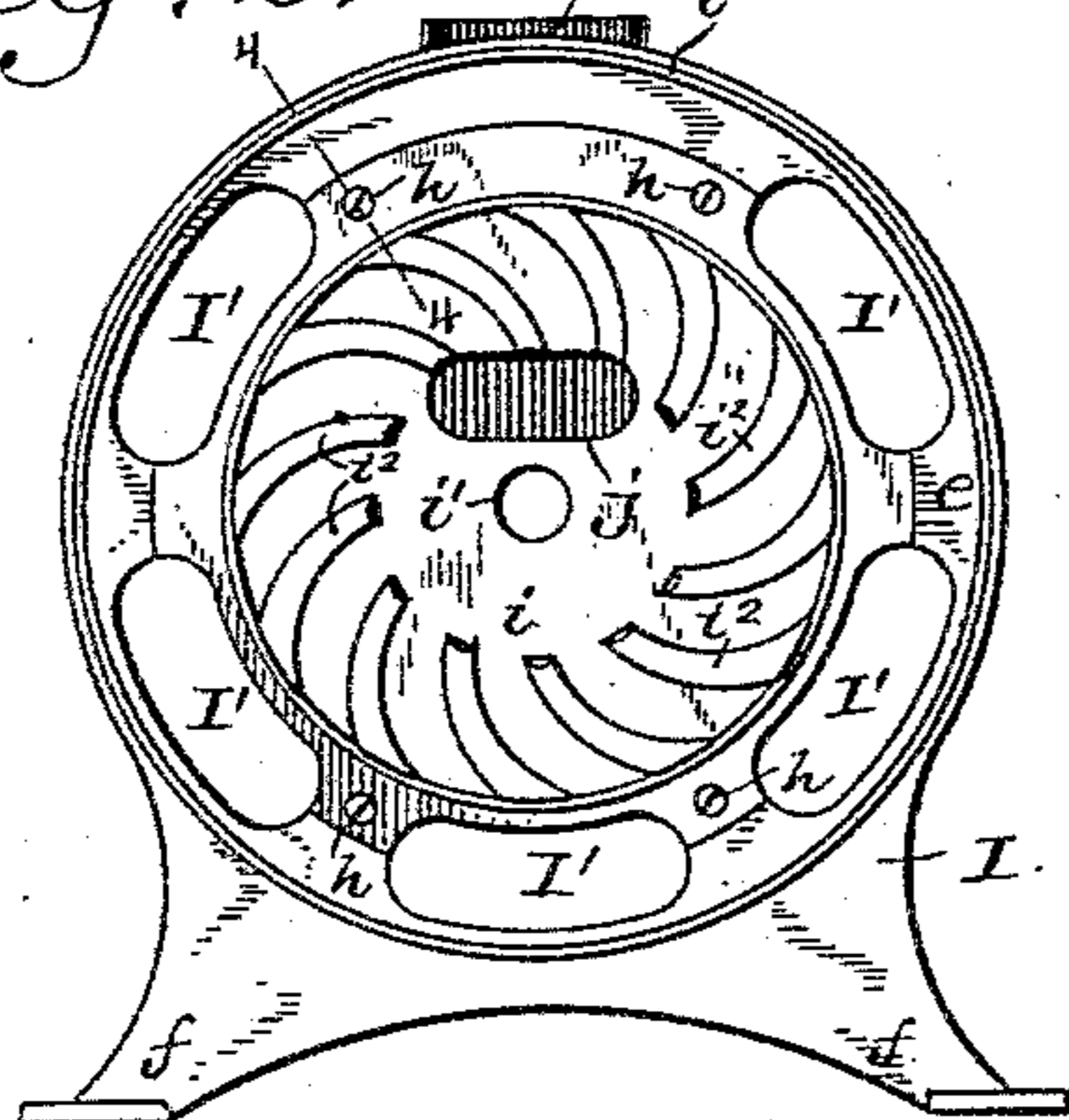


Fig. 4.

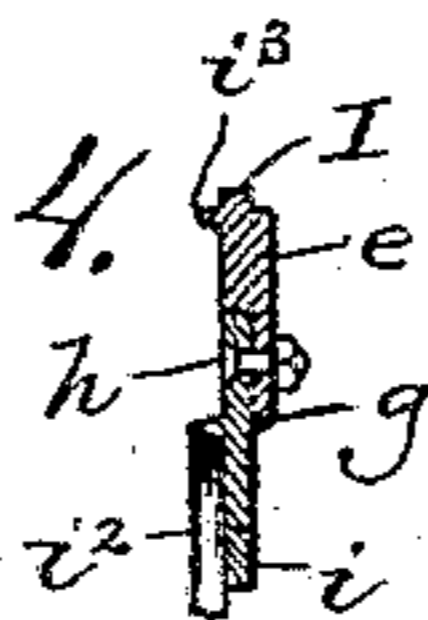


Fig. 3.

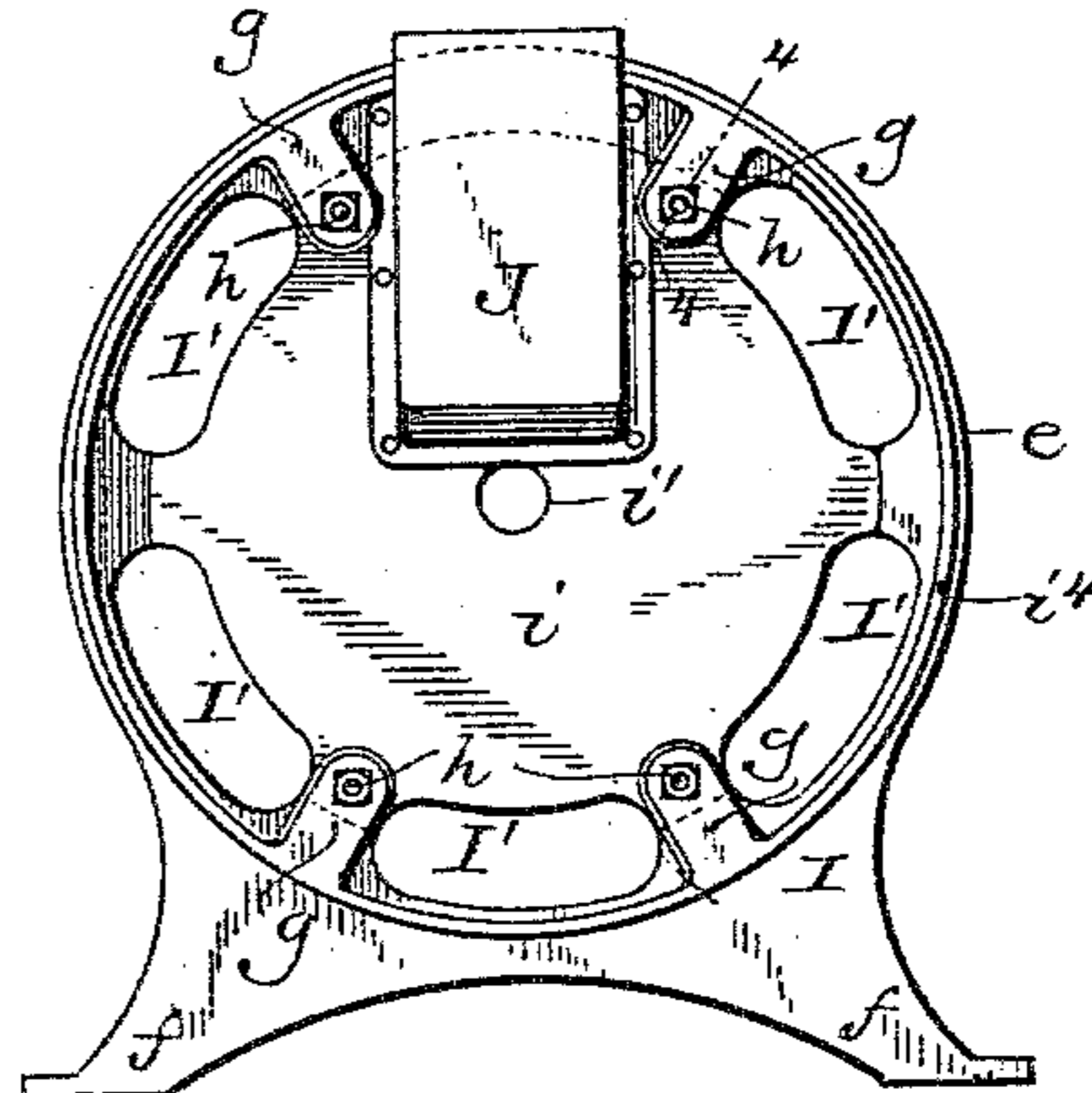


Fig. 5.

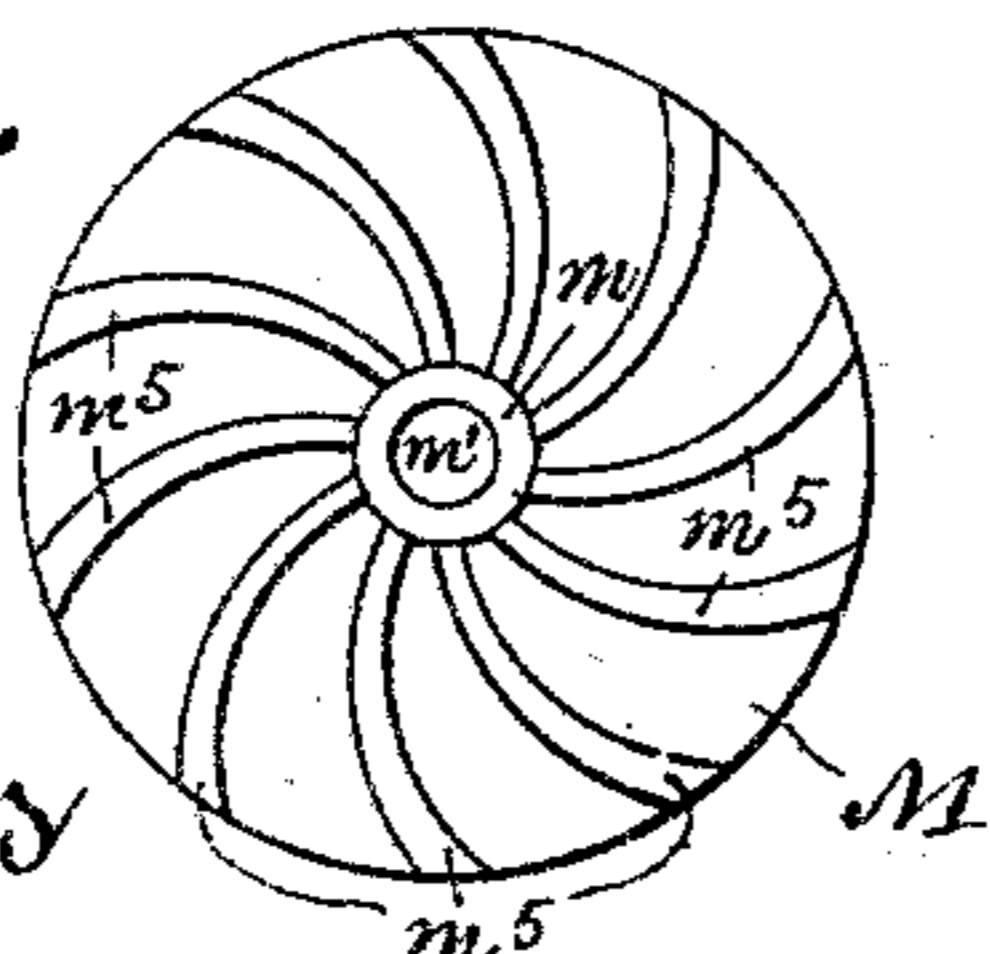
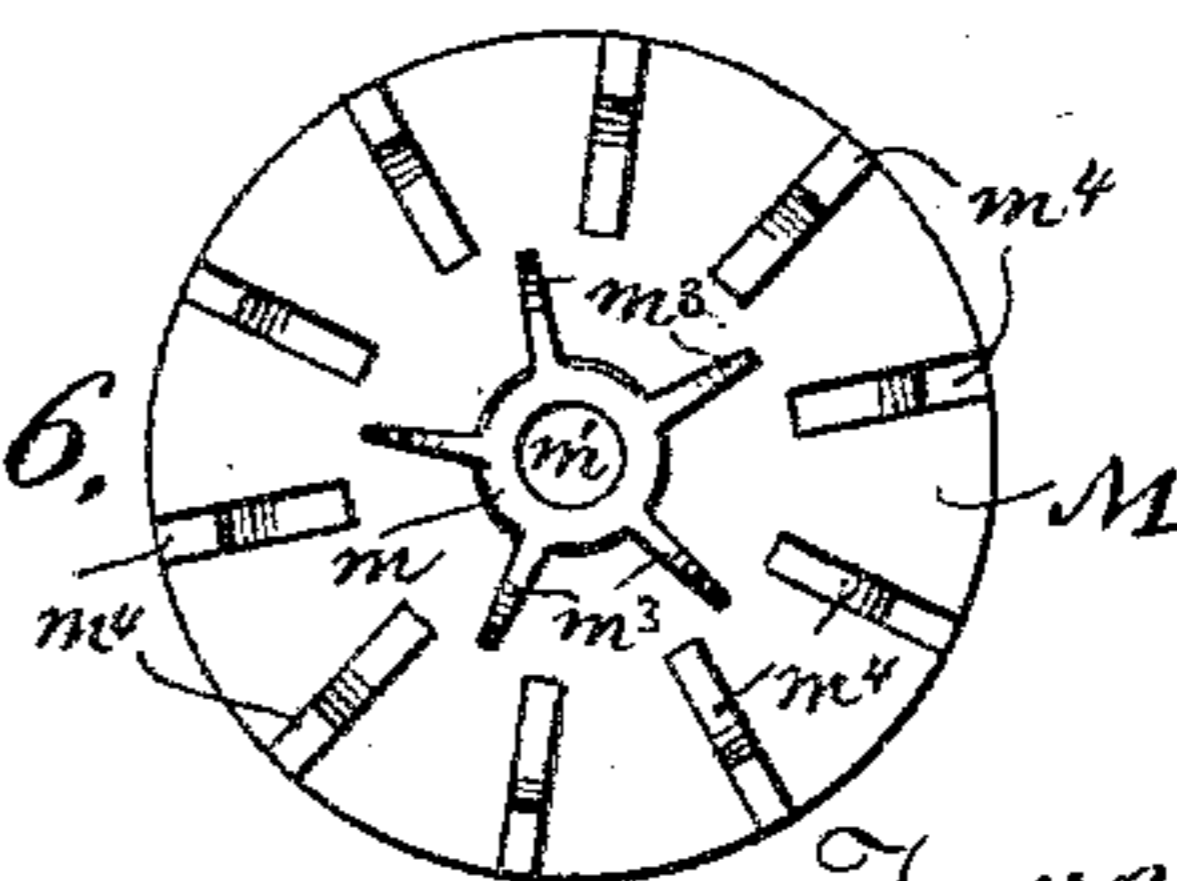


Fig. 6.



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UNITED STATES PATENT OFFICE.

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GRAIN-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 414,510, dated November 5, 1889.

Application filed July 29, 1889. Serial No. 319,107. (No model.)

To all whom it may concern:

Be it known that I, JOAB C. FISHER, of Beloit, in the county of Mitchell, and in the State of Kansas, have invented certain new and useful Improvements in Grain-Cleaning Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to grain-cleaning machines; and it consists in certain peculiarities of construction, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a longitudinal vertical sectional elevation through a machine embodying my present improvements. Fig. 2 is an inner end elevation, and Fig. 3 an outer end elevation, of the head end of the cylinder-casing. Fig. 4 is a detail sectional view on the line 4 4 of Figs. 2 and 3. Figs. 5 and 6 are elevations of the opposite sides of the agitator-disk.

My present invention is an improvement on the machine set forth in United States Letters Patent No. 393,635, granted to me November 27, 1888, the portions of the grain-cleaning machine not shown in my present drawings being substantially identical with the corresponding parts shown in my said prior patent, as hereinafter explained.

As in my prior patent just named, my present machine is mounted on a suitable frame, the main vertical timbers A A' and horizontal longitudinal timbers B B' and transverse beams C C' C² C³ of which are shown in Fig. 1.

In this application I have not deemed it necessary to show the upper part of the machine, as the feeding-hopper, sieve-frame, air-trunk, suction-spout, automatic hopper, and attachments are precisely as in said patent hereinbefore referred to; and my present improvements relate solely to the scouring-casings and communicating or adjacent parts.

D is the main shaft, extending longitudinally through the machine and having suitable bearings in the main frame, having a driving-pulley E at one end and at the other end suitable belt-and-shaft connections (not shown) with the sieve-frame, (also not shown, but precisely as in said former patent.)

F (dotted lines) represents the suction-fan in suitable casings G, having openings a b, the former communicating with a passage c, leading from the air-trunk, (not shown,) and the latter communicating with the space d next the head of the main cylinder-casing H. I represents the head of this casing, (shown in detail in Figs. 2 and 3,) consisting of an annular shell e, mounted on a base or legs f, secured to the transverse beam C², and having inwardly-projecting retaining-lugs g g, to which are secured by bolts h h and nuts circumferential projections of a disk i, having a central opening i' for the passage there-through of the main shaft D, and above this is a transverse opening j, surrounded on one side of the disk by a casing J, which rises vertically above the top of the extension H' of the main casing H and receives the depending spout j' of the automatic hopper J', (this hopper and its spout being shown in dotted lines in Fig. 1, and being identical with the said parts in my said prior patent,) while on its inner side the disk i is provided with a series of spirally-arranged ribs i² i³, extending inward about half-way from the circumference to the center. The head I is further provided with horizontally-projecting annular flanges i³ i⁴ to form seats for the end edges of the main casing H and its extension H', and the disk i has a similar annular flange i⁵ to form a seat for the end edges of the stationary perforated scouring-casing K, the other ends of the said casings H and K being supported on similar annular flanges on the tail end piece L. This stationary perforated scouring-casing is practically the same as in my said prior patent, having a stationary partition-plate k, secured to the inside of the casing by an annular flange k', and next this partition k is a rotatable valve or plate k², both the stationary plate and rotatable valve having large central openings k³, registering with each other, (shown in black in Fig. 1,) and each of these parts has a series of passages or openings k⁴ around its periphery, (also as shown in black in Fig. 1,) and the rotatable valve k² has a suitable operating handle or lever k⁵ secured thereto and projecting up out through the

scouring-casing K and main casing H, so that by rotating the plate or valve (which is mounted on an annular hub or flange k^6 , turned from the stationary plate k and forming the walls of the described central opening k^3) in one direction the openings or passages k^4 in one plate will exactly register with those in the other plate, while a movement of the lever in the opposite direction will serve to instantly close said passages k^4 , all exactly as in my said prior patent.

The agitator-disk M, the opposite sides of which are shown in detail in Figs. 5 and 6, is provided with a hub m and central perforation m' for the reception of the main shaft D, to which it is secured, as by screws m^2 m^2 , in the space inside the scouring-casing K, at the head end thereof, between the stationary plate k and the head I. The hub m is provided with a series (five, more or less) of radially-projecting agitator-wings m^3 , while all around the periphery of the disk M, on the same side, are other agitating-wings m^4 m^4 , somewhat shorter than those on the hub, and preferably of the generally triangular shape shown best in Fig. 1, extending to nearly the outer circular line of the wings m^3 , while the opposite side of the disk M is provided with a series of spirally-arranged ribs m^5 m^5 , extending the entire distance from the circumference to the hub m .

Inside the stationary casing K, in the space between the rotatable valve or plate k^2 and the end piece L, at the tail end, is located the revolving scouring-cylinder N, consisting of two disks N' N^2 , (having hubs n' n^2 properly secured to the main shaft D,) united by series of flat strips n n n , spirally disposed or at an angle from one disk to the other, but without any perforated cylinder such as was shown in my said prior patent. The tail end piece L is provided with a large central circular opening, which receives a rearwardly-projecting annular flange N^3 on the disk N^2 , and a series of wings or division-plates n^3 n^3 extend from this flange N^3 to the hub n^2 of the disk N^2 , forming air-passages to the interior of the revolving scouring-cylinder N, while a stationary cylinder O surrounds the described large central circular opening in the end piece L, extending from said end piece back to the rear vertical timber A' of the main frame, and being open at both ends, so as to form an air-passage communicating with the described divided air-passages between the wings n^3 n^3 just named.

The stationary casing K has a discharge-spout p at its tail end leading into the main discharge P of the machine, and the head end of said casing K, which receives the agitator-disk M, is provided on its inner surface with spirally-arranged ribs k^7 k^7 , while beneath the scouring apparatus is a dust-chamber Q, all as in my before-named prior patent. The head end piece I has a series of circumferential openings I' I', forming communications between the space inside the main casing H

and the space d inside the casing-extension H', and the tail end piece L has similar openings L' communicating with the discharge P.

The operation of my present device is, in general, much the same as that of my said prior patent, the cleaning of the grain in both cases being really effected by the attrition of one kernel upon another, while all the grain is being kept constantly in motion, and the dust being drawn off continuously as it is freed from the grain, together with the outer cuticle of the grain, thus ridding wheat, for instance, of a troublesome product technically called "red dog," and thereby shortening the process of milling and producing a whiter flour, especially in the lower grades, while the friction of the grain upon itself heats it, thus dispensing with the necessity in cold climates of a "wheat-heater" and putting the grain in an admirable condition for grinding.

The present construction of my agitating and scouring devices is much better adapted to accomplish the above-named result than that shown in my said prior patent. As the grain is fed from the automatic hopper J' through its spout j' into the casing J it now passes directly to the center of the head end of scouring-casing K, which contains the agitator-disk M, (and which end I term the "scouring-box,") instead of being fed in at the upper part of said "box," as before, and hence is immediately subjected to the action of the two annular series of radially-disposed agitating-wings, which serve, as the disk M revolves, to keep the grain in a constantly-changing position, and thoroughly subject every external portion of each kernel thereof to contact and attrition with every part of every adjacent kernel, the circulation of the air and suction of the fan freeing the grain continuously from dust and the particles rubbed off, as described, and the grain being guided by the spirally-arranged ribs k^7 k^7 to the space between the disk M and partition k , and then, by means of the spiral ribs m^5 m^5 on the back of said disk M, being forced through the central opening k^3 (or that and the edge openings) of the partition k and rotatable plate k^2 into the revolving scouring-cylinder N, whose action and that of its ventilating-fans R (secured within the cylinder N to its disks, as in my prior patent) completes the cleaning of the grain and the separation therefrom of the objectionable particles, the action of this scouring-cylinder and its fan being much better and the circulation of the air therethrough freer than when I employed a perforated cylinder in connection therewith, as formerly.

With my present construction my device is not only better than before, but the agitator is much more cheaply and easily constructed, as it is now all cast in one piece and can be readily drawn from the sand complete, the single disk and wings doing better work than the double disk and connecting-rods of my old agitator. Again, the casing-head as now

constructed is a great improvement, and the ribbed disk *i* (on which the greatest wear must come) can be removed therefrom if broken or worn out and replaced by another without disturbing the balance of the machine.

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

10 1. In a grain-cleaning machine, the combination, with a stationary casing and a revolving shaft passing longitudinally therethrough, of an agitator-disk secured to said shaft, having spirally-arranged ribs on one side and series of projecting agitator-wings on the other side, substantially as set forth.

20 2. In a grain-cleaning machine, the combination, with a stationary cylinder, of a head consisting of an annular shell with inwardly-projecting retaining-lugs, and a removable ribbed disk having circumferential projections secured to the projections on the annular shell, substantially as set forth.

25 3. In a grain-cleaning machine, the combination, with a stationary scouring-casing, of a revolving shaft passing longitudinally there-

through, and disks mounted on said shaft and connected together solely by series of flat strips spirally disposed, extending at an angle from the periphery of one disk to that of the other disk, and other flat strips forming a fan, substantially as set forth. 30

4. In a grain-cleaning machine, the combination, with a stationary casing, and a revolving shaft passing longitudinally therethrough, of an agitator-disk having an extended hub secured to said shaft, a series of agitating-wings projecting radially from said hub, and a series of other agitating-wings radially disposed around the periphery of said disk on the same side as the first-named series of wings and extending to about the outer circular line of the latter, but not in radial line therewith, substantially as set forth. 35 40

In testimony that I claim the foregoing I have hereunto set my hand, at Beloit, in the county of Mitchell and State of Kansas, in the presence of two witnesses. 45

JOAB C. FISHER.

Witnesses:

H. C. OWEN,

M. C. MASON.