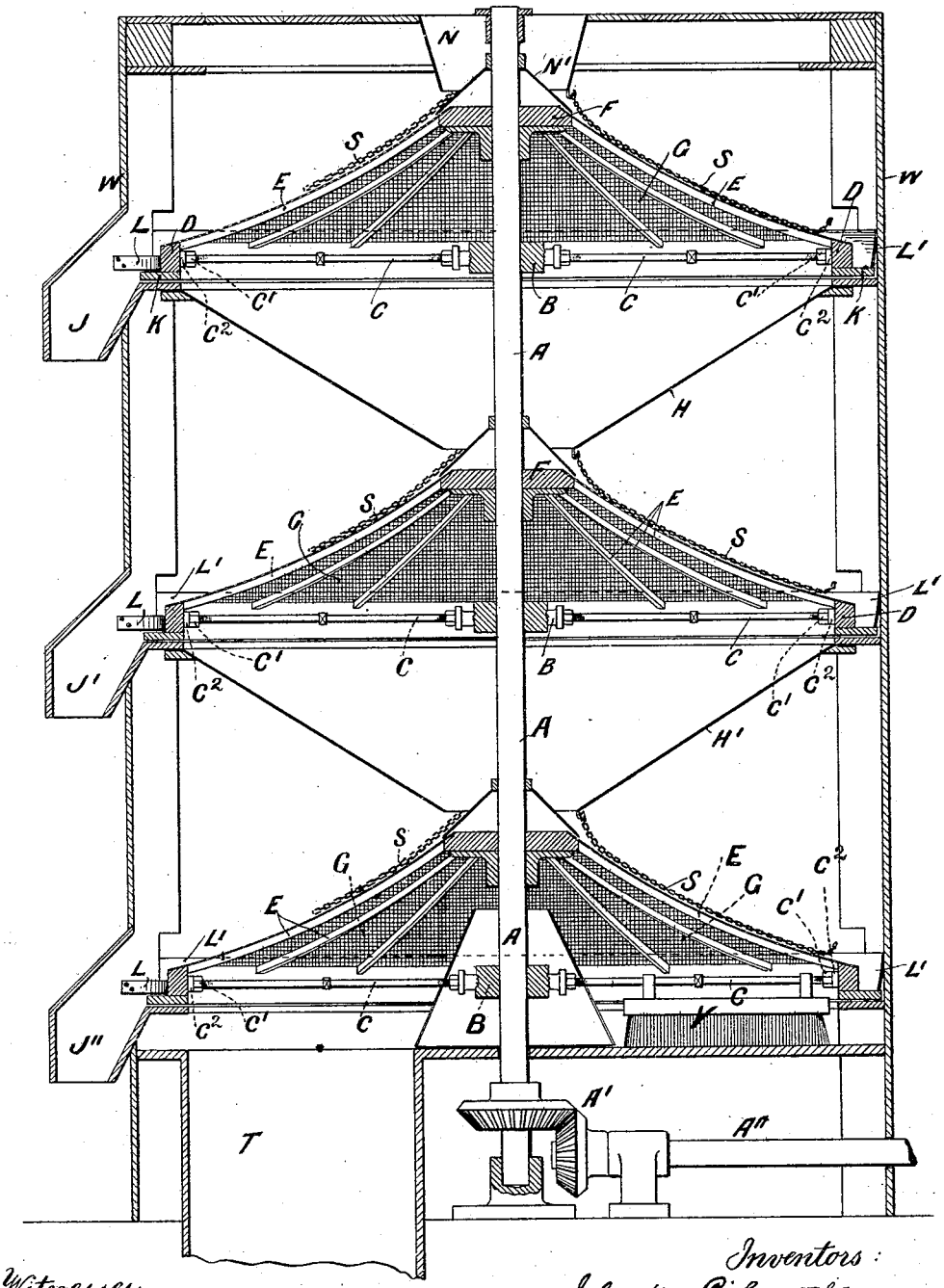
(No Model.) 2 Sheets—Sheet 1.

J. M. RISHWORTH, S. INGHAM & J. VICKERS.

MACHINERY FOR SORTING AND SEPARATING LOOSE SUBSTANCES INTO VARIOUS GRADES OF FINENESS.

No. 493,521. FIG. 1 Patented Mar. 14, 1893.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 2.

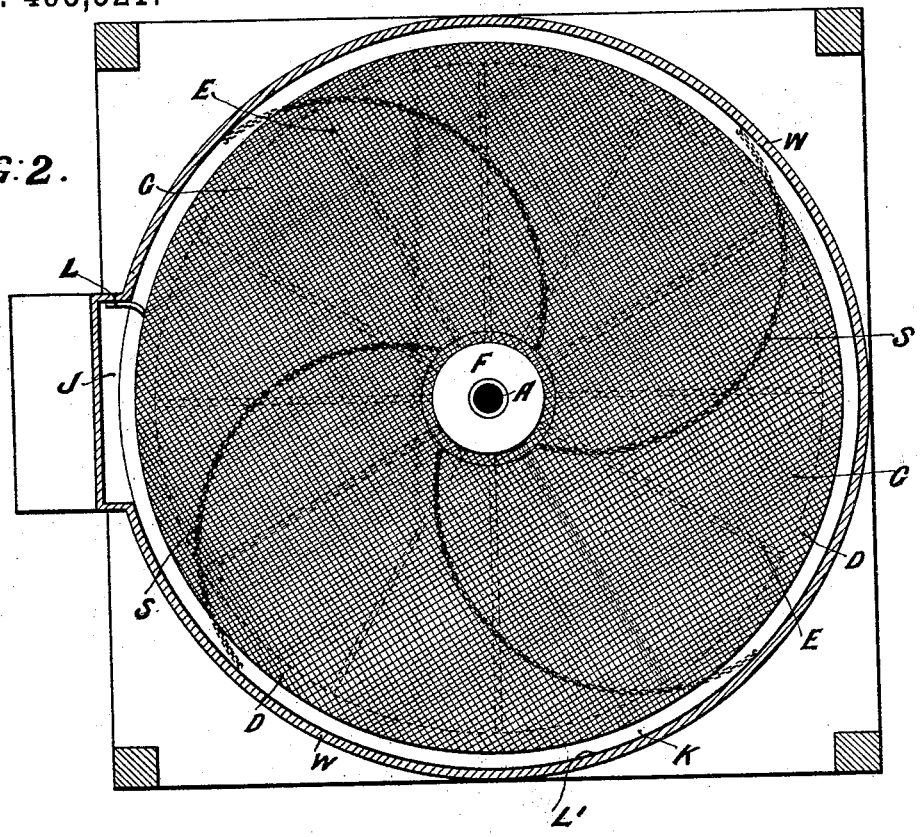


FIG. 3

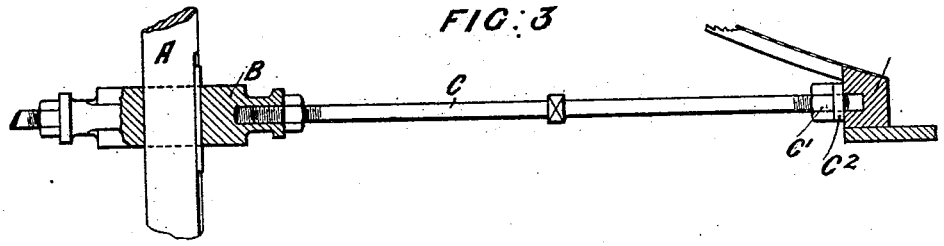
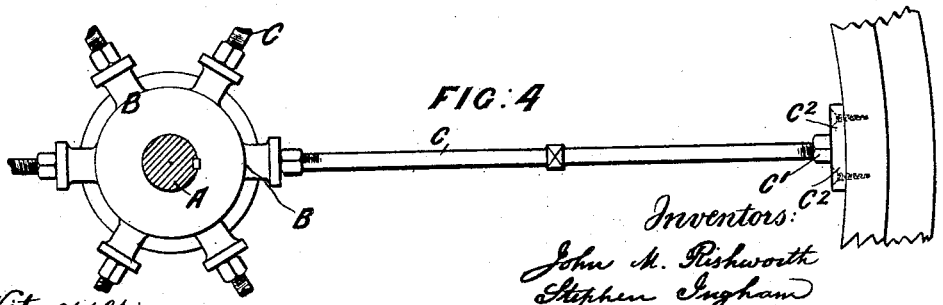


FIG. 4



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UNITED STATES PATENT OFFICE.

JOHN MIDGLEY RISHWORTH, OF HORSFORTH, NEAR LEEDS, STEPHEN INGHAM, OF LEEDS, AND JOSEPH VICKERS, OF HORSFORTH, NEAR LEEDS, ENGLAND.

MACHINERY FOR SORTING AND SEPARATING LOOSE SUBSTANCES INTO VARIOUS GRADES OF FINENESS.

SPECIFICATION forming part of Letters Patent No. 493,521, dated March 14, 1893.

Application filed May 14, 1892. Serial No. 432,967. (No model.) Patented in England February 20, 1892, No. 3,375.

To all whom it may concern:

Be it known that we, JOHN MIDGLEY RISHWORTH, residing at Horsforth, near Leeds, STEPHEN INGHAM, residing at Leeds, and JOSEPH VICKERS, residing at Horsforth, near Leeds, county of York, England, subjects of the Queen of Great Britain, have invented certain new and useful Machinery for Sorting and Separating Loose Substances into Various Grades of Fineness, (for which a patent has been granted to us in Great Britain, dated February 20, 1892, No. 3,375,) of which the following is a specification.

In machinery for sifting, sorting and separating loose substances such as for grading and sizing broken wheat, semolina, and various kinds of grain, it has been heretofore proposed to employ a sieve or succession of sieves, mounted upon a vertical shaft, such sieves being rotated when in use. Now our invention refers to improvements in and connected with this type of sifting machines, and according to our said invention we construct a compact and complete machine wherein the sieves are circular in plan, having concave or inwardly curved sifting surfaces, extending upward from the outer circular edge in somewhat cone fashion, the sieve surface forming a continuous curve gradually lessening in inclination toward the lower circular edge, the said curved sieve surface being unbroken (not formed of a series of sections or otherwise) whereby the sifting is effected in a more even and regular manner than heretofore. Devices are provided whereby the grain is delivered from the machine through chutes without damage by friction. A chain device is fitted for causing the grain to be turned, while the same device at the same time clears the meshes, and the sieves are constructed with adjustable arms for facilitating the centralization of the outer rims of the sieves with the vertical shaft.

The accompanying drawings illustrate a machine constructed according to our said invention.

Figure 1 shows in vertical section the machine provided with a series of three sieves, Fig. 2 being a horizontal section of same taken above one of the sieves. Fig. 3 is a vertical sectional view drawn to a larger scale than the previous figures and showing one of the adjustable arms of a sieve frame, and Fig. 4 is a plan of Fig. 3.

Similar letters of reference indicate like parts in the several figures.

A is the vertical shaft of the machine mounted in bearings and rotated by gearing A′ from the driving shaft A″. Keyed on the shaft A are bosses B from which adjustable arms C hereinafter described extend horizontally and support rims D. From the rims D curved spokes or ribs E extend in a radial and upward direction toward the shaft A, their inner and upper ends being supported by a plate F carried by the shaft A, and the inwardly curved ribs E form supports for the sifting web G which may be of wire, silk or other suitable material, the latter presenting an upwardly inclined but inwardly curved continuous surface.

N is a feed chute through which the material to be sifted passes, being conducted by circular coned guide N′ to the sieve G.

By making the cone-shaped surface of the sieve with a continuous inward curve, as shown at Fig. 1, the material delivered onto such sieve travels over the same at a more uniform rate of speed than can be obtained in cases as heretofore where sieves have been made of conical form with straight sifting surfaces, or if not straight, have been inclined inwardly in a series of steps, in which latter case the material falls over from step to step and the advantage of making an inward incline is lost, or at all events considerably annulled, whereas with our continuous curved surface sieves as shown, the incline decreases as the centrifugal force increases, without causing a break in the continuity of the action, and thus a more regular and even sifting of the material is effected, which is of great importance in such operations.

The rim D of the sieves has fixed thereto a circular table K projecting outwardly and extending entirely around said rim D, and L′ is a guide or guard formed, say of felt or leather, and fixed to the framework casing W which entirely surrounds the machine, the guide L′ serving to keep the material on the

revolving circular table K until the said material arrives at the exit chutes J J′, or J″, one of which is provided for each sieve. L is what we may call a plow, and is fixed to the frame W. By these devices the material, after passing as described at an even speed over the surface of the rotating sieve, falls upon the rapidly rotating table K, its tendency to be thrown outwardly off same being prevented by the fixed guard L′, but as the material carried by the table K passes the open chute J, (one of which is provided for each sieve as stated) the said material freed from the limitations of the guide L′, flies outward and falls down the chute by the centrifugal force it has obtained, the plow L simply serving as a scraper or stop to prevent particles from being carried beyond; this delivery of the material mainly by centrifugal force we have found very important, as the said material is not bruised as it would be if revolving scrapers were employed to remove it as is common in similar machines. The particles that fall through the upper sieves are conducted to the next lower by conical guides H H′ and all the sieves are similarly constructed. T is an exit chute for materials passing through the last sieve, and V is a revolving brush to gather up the materials and cause them to be carried to the said chute T.

For the purpose of keeping the meshes of the sieves clear and improving their sifting action, we provide chains S, each fixed at both ends to a stationary part or parts of the machine, as shown, so as to drag over the sifting surface as the latter is revolved (see Fig. 2). The material being carried round on the sieve surface is caught by the chain, and in passing over the same forms a wave and insures a change in the relative position of the particles composing such material as well as clearing the meshes as aforesaid. It being of great importance accurately to adjust the rims D and tables K concentrically with the shaft A, when, for example, constructing the machines, and at the same time to effect this in a ready, efficient and economical manner, we provide each of the before mentioned radial arms C with a nut C′, formed with, say, two flanges C^2 C^2, see Figs. 3 and 4. Each arm C is screwed into the boss B and provided with a central square to hold the arm C while operating the nut C′. It is obvious that if the table is too much to the right hand, the right hand arms C are shortened and the left hand arms lengthened, and thus the tables K adjusted most accurately.

We claim as our invention—

1. In machinery for sifting, sorting and separating semolina, grain, and the like, the combination with a vertical rotating shaft, a screen located on said shaft, and having a continuous unbroken concave sifting surface, extending upward from the outer circular rim in somewhat cone fashion, the inclination of the sieve surface gradually lessening toward the outer edge, and screen framework composed of a boss B keyed to said shaft, radial arms C extending from the boss *b*, winged nuts C′ C^2 rendering the arms C adjustable in length, a circular outer rim D supported by the arms C, the upper boss F on the vertical shaft, the curved spokes E extending between the rim D and boss F, and the screen mesh G covering the spokes E, of a horizontal circular table K projecting outwardly and extending entirely around said rim D, substantially as set forth.

2. The combination with a vertical rotating shaft, a circular screen located on said shaft, and having a continuous and unbroken inwardly curved sifting surface G extending upward from the outer rim D in cone fashion, a circular horizontal rotating table K affixed to said rim, of a fixed casing W surrounding the screen, chains S resting on the sieve surface and having ends carried from the fixed casing W whereby the material being sifted has to pass over the chains S disposed in wave form, a felt or leather guard L′ fixed to said casing W, and bearing edgewise on the rotating table K, whereby the material to be sifted is retained on said table, and a chute in the casing W and plow or guide L located adjacent thereto, whereby the material is delivered from the machine, substantially as set forth.

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