J. B. LOISON.

SIEVING MACHINE.

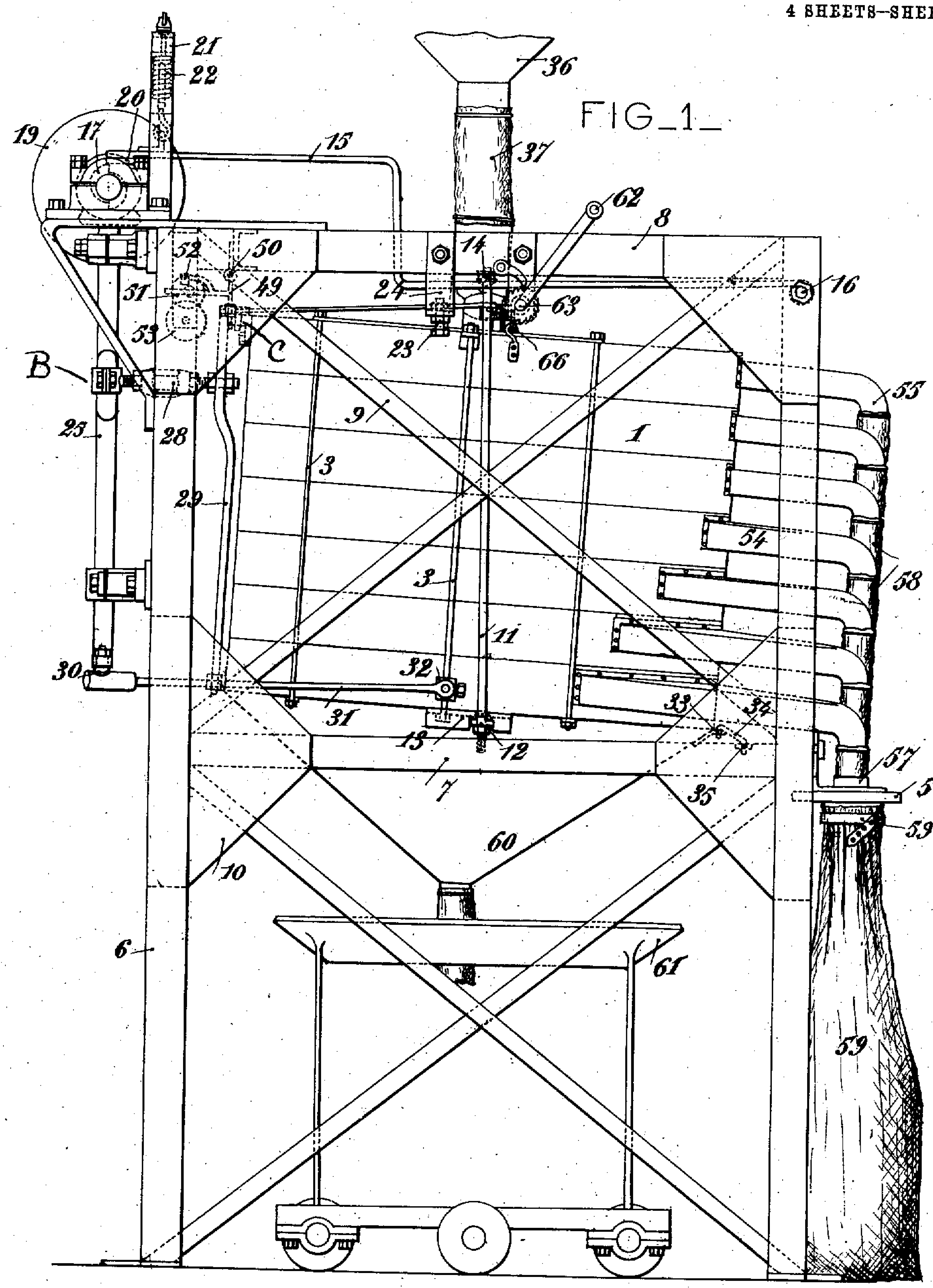
APPLICATION FILED AUG. 19, 1909.

989,167.

Patented Apr. 11, 1911.

4 SHEETS—SHEET 1.

FIG_1_



WITNESSES

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4 SHEETS—SHEET 2.

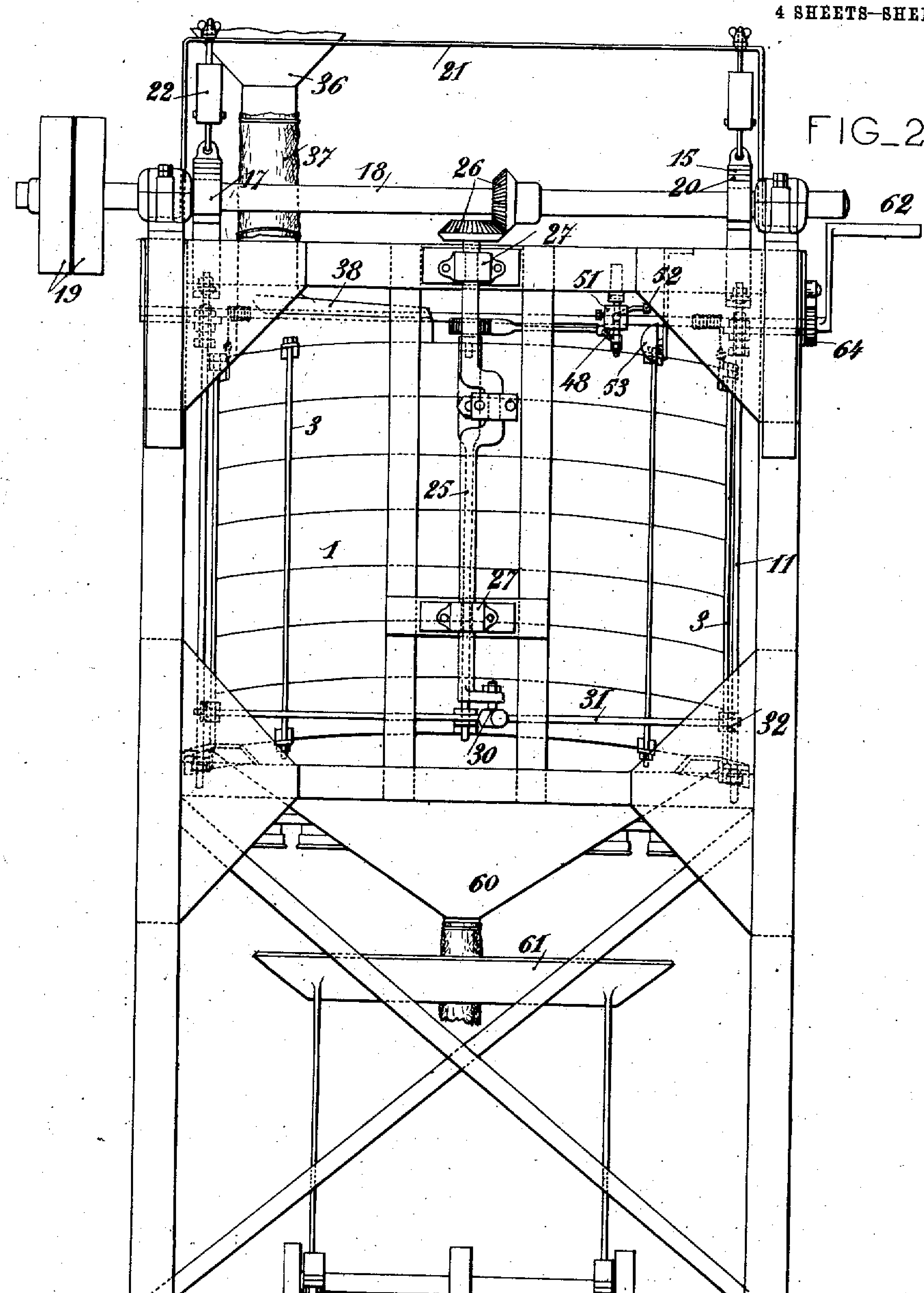

FIG_2_

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4 SHEETS—SHEET 3.

FIG_3_

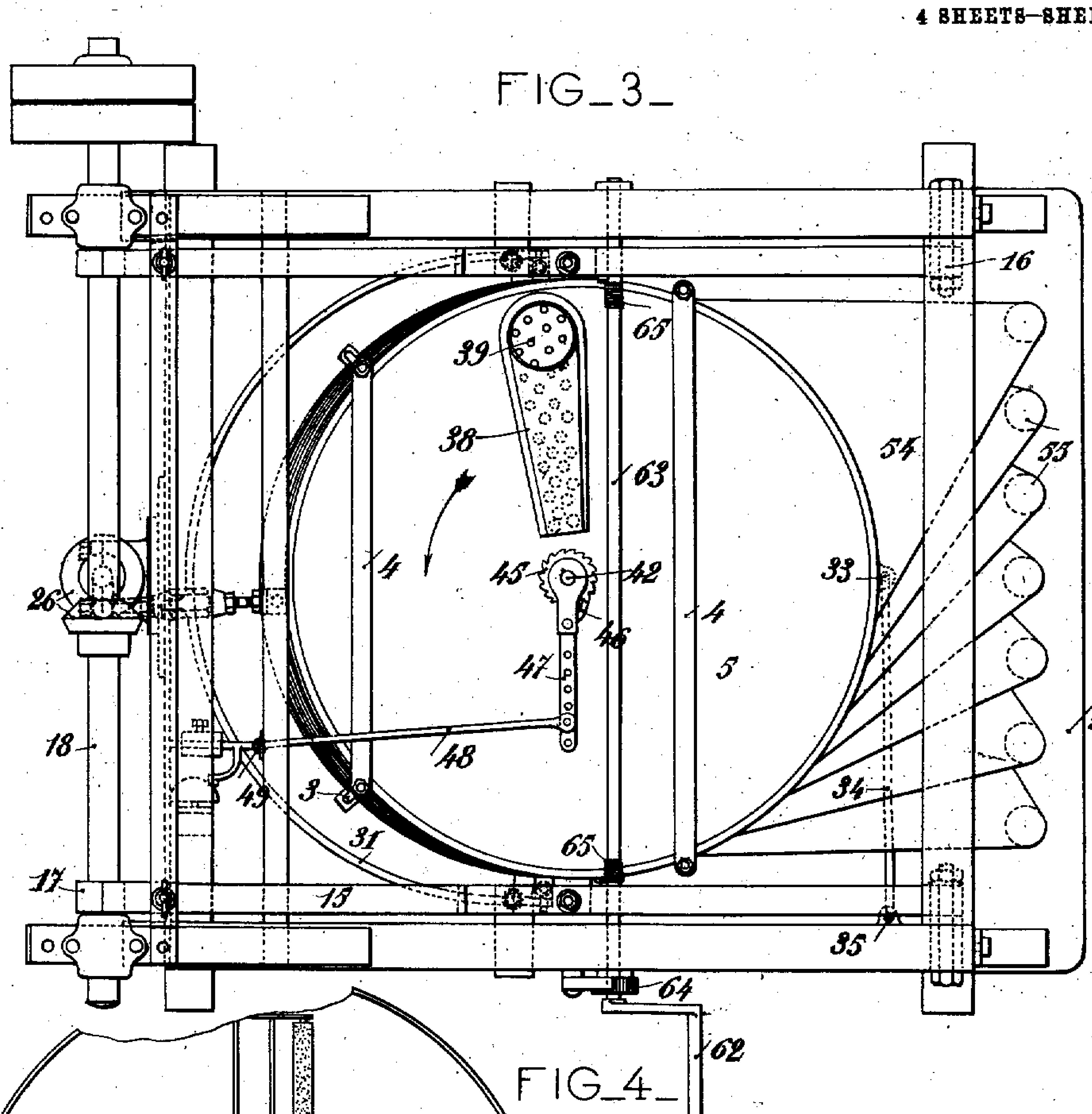


FIG_4_

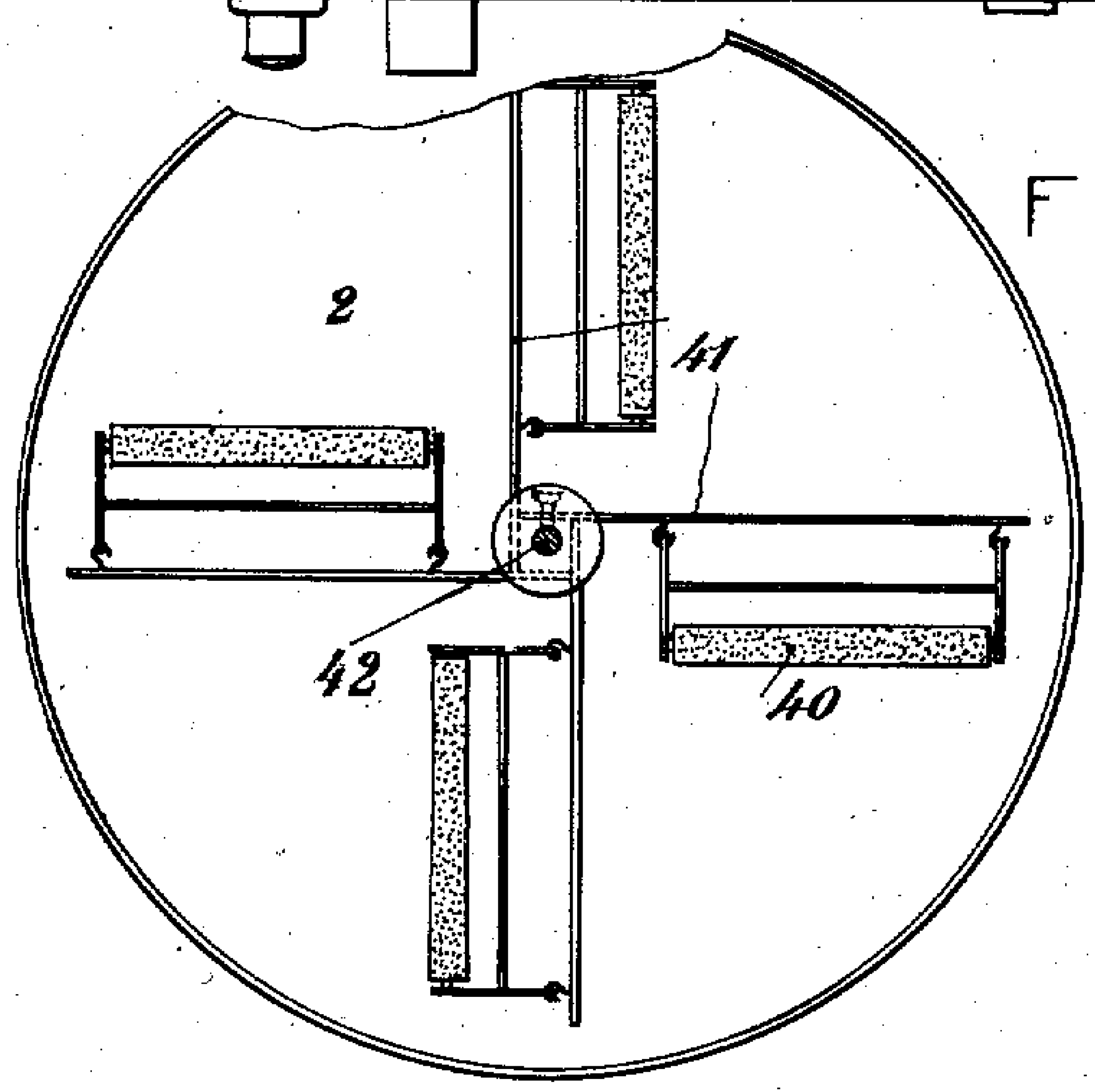
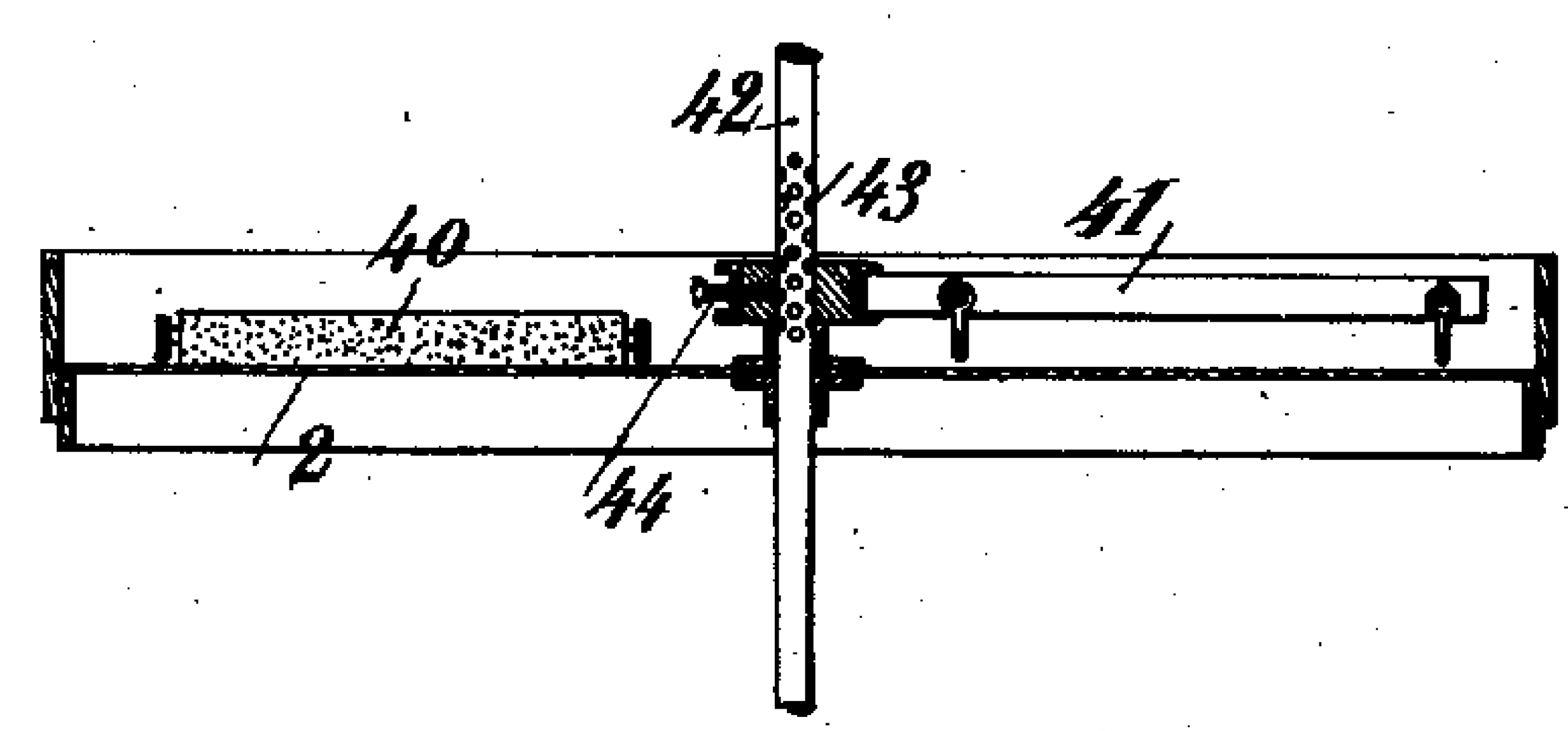


FIG_5_



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4 SHEETS—SHEET 4.

FIG_6_

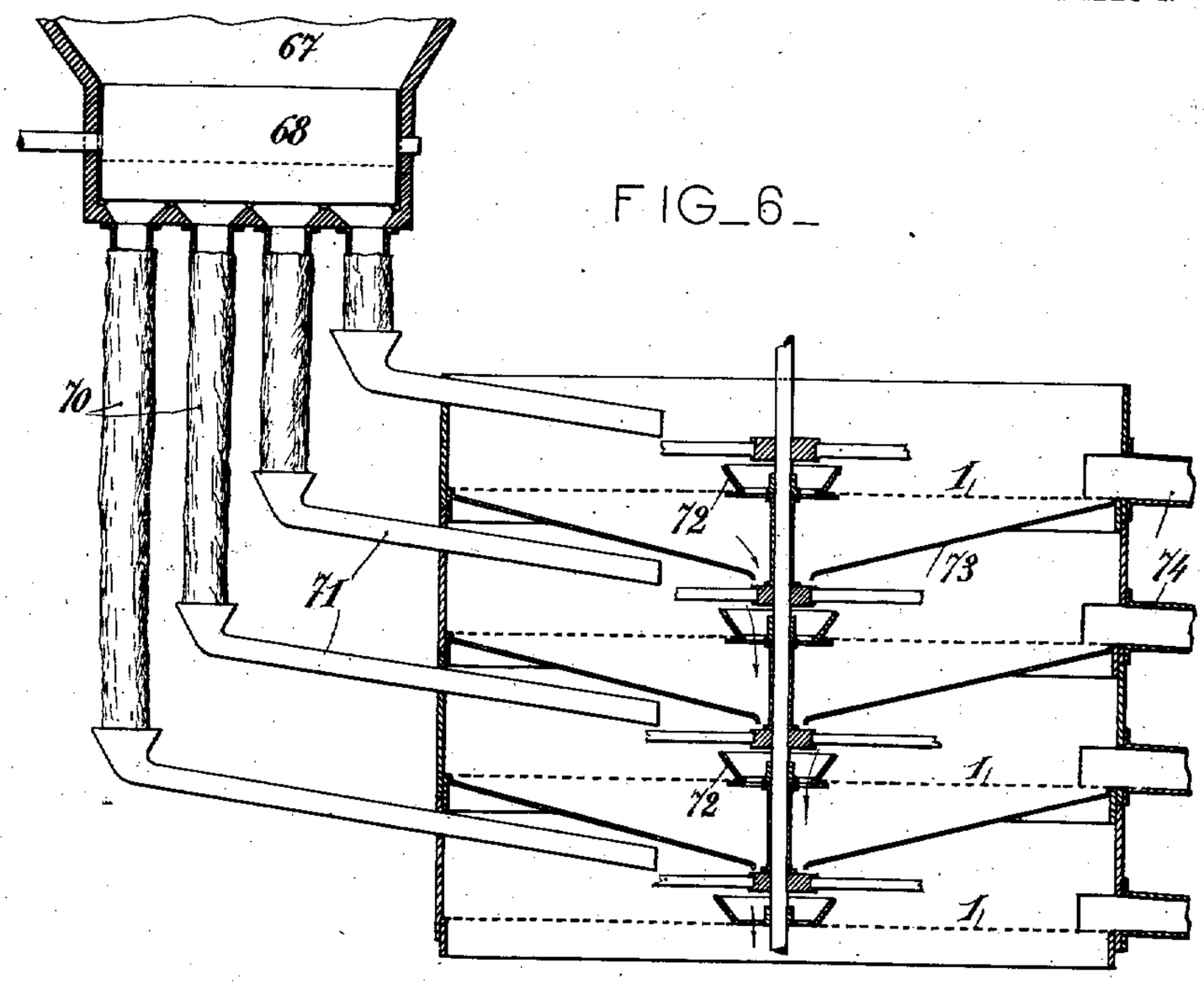
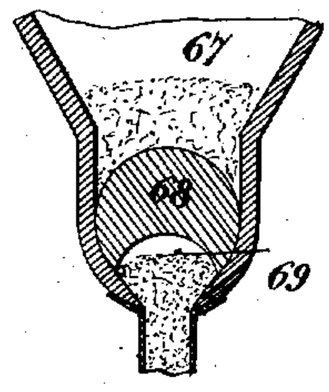


FIG_7_



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UNITED STATES PATENT OFFICE.

JOSEPH BERNARD LOISON, OF PARIS, FRANCE.

SIEVING-MACHINE.

989,167. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed August 19, 1909. Serial No. 513,656.

To all whom it may concern:

Be it known that I, JOSEPH BERNARD LOISON, a citizen of France, residing at 18 Rue Clapeyron, Paris, France, have invented new and useful Improvements in Sieving-Machines, of which the following is a specification.

My invention relates to a sieving machine adapted for use in sifting all kinds of materials the coarseness and hardness of which vary considerably, such as flour, sand stone, emery, etc., said sieving machine being formed of a number of superposed sieves on which the material is submitted at the same time to a curvilinear movement so called plan-sifter motion and to a vertical shaking movement of a variable frequency and extent, the material being at the same time automatically spread on the sieves by rotatable brushes. By means of the curvilinear motion in coöperation with the vertical shaking movements which are adapted to disengage the particles of material jammed in the meshes of the sieves, and the spreading out of the material by the brushes, results are obtained which it was not possible to get at up to the present.

My invention consists also in providing a machine adapted to work in a completely closed space, and having a great strength while requiring a motive power as small as possible.

My machine is also characterized by a great flexibility in operation owing to the fact that the superposed sieves may be provided from top to bottom, with screens having decreasing meshes so that the material may be classed into several groups of different sizes while by a slight alteration of the mechanism, when the material is to be sifted through a single sieve, several sieves of the same mesh may be superposed in view of enlarging the operating surface and consequently the output of the machine. Different combinations may also be embodied by mounting in the same machine sieves of the same mesh and sieves having meshes decreasing from top to bottom. One single machine may thus be sufficient for effecting a great number of operations happening in practice.

In the annexed drawings: Figure 1 is a front view of my improved machine, Fig. 2 is a side view thereof, Fig. 3 is a plan view, Figs. 4 and 5 are details of the brushes, in plan view and vertical section, respectively, Fig. 6 is a diagrammatic view showing a number of superposed sieves having the same mesh, Fig. 7 is a cross section of the feeding drum.

My sieving machine comprises a plurality of circular sieves 1 mounted one upon the other and each provided with a wire, silk or other screen 2 (Fig. 5) according to the nature of the material to be sifted. Said sieves are held together by means of side rods 3 a number of which pass at upper end through cross bars 4 (Fig. 3) extending across the circular cover 5 on the sieves. The sieves are mounted in a frame comprising vertical posts 6, horizontal frames 7, 8 diagonal braces 9 and stiffening plates 10 so as to obtain a very strong and rigid structure. The sieves are supported by two vertical rods 11 and on the lower ends thereof are screwed nuts 12 having a hemispherical head which engages in a corresponding housing in brackets 13 fixed to the lower sieve. At their upper ends, the rods 11 are provided with similar nuts 14 which bear upon swinging levers 15. The levers 15 are pivoted on stud shafts 16 (Figs. 1 and 3) and operated by two cams 17 keyed on the driving shaft 18 having the driving pulleys 19 secured thereon. The ends of the levers 15 which coöperate with the cams are covered with fiber pieces 20 adapted to reduce the noise and the wear. Said ends are also hung by buffer springs 22 to a frame 21 mounted on the frame of the machine. When the levers 15 descend together with the sieves after having been lifted by the cams, they fall upon screwed studs 23 forming adjustable stops and mounted on brackets 24 secured to the frame of the machine. A curvilinear movement is also imparted to the sieves from the driving shaft 18 through a vertical crank shaft 25 geared to the driving shaft by bevel pinions 26 and rotating in bearings 27. The crank shaft is connected by a ball or universal joint B to an adjustable connecting rod 28 which is secured at one end to a vertical rod 29 fixed at its lower end to the lower sieve and passing at its upper end through an eye C mounted on the upper sieve. The crank shaft 25 is also connected at its lower end by a universal joint 30 to a forked connecting rod 31 (Figs. 1 and 3) which is secured at both ends by slides 32 to two rods 3. At a point 33 diametrically opposite the crank shaft, the lower sieve is connected by a connecting rod

34 to the frame at 35, so that, in operation, the point 33 moves along an arc of a circle while the other points of the sieves move in the space along a more or less elongated ellipse, disregarding the vertical shaking movement imparted by the cams 17.

The material to be sifted is fed to the machine by a hopper 36 connected by a hose pipe 37 to a feeding receptacle 38 having a vertical part and a horizontal part extending along a radius of the upper sieve and containing a perforated partition 39 (Fig. 3) slightly curved downwardly and having holes increasing in diameter from the periphery to the center. Said feeding receptacle is secured to the cover 5 of the machine which is provided with a radial slot for allowing the material to pass.

On the upper face of each screen 2, are rotated in a step by step motion, a series of four rotatable brushes 40 mounted on two elastic arms 41 at right angles to each other, the center part of which is bored for receiving a vertical rod or shaft 42 adapted to hold all the series of brushes together. In the surface of said shaft, are formed a number of small recesses 43 (Fig. 5) located at a small vertical distance to each other and adapted to receive the ends of set screws 44 securing the arms 41 to the shaft 42. Each of the screens 2 is perforated at the center and clamped around the central opening between two metallic sleeves surrounding the shaft 42. On the upper end of the shaft 42 is keyed a ratchet wheel 45 (Fig. 3) engaging with a pawl 46 pivotally connected to an arm 47 which normally is held stationary but may be rotated on shaft 42. The arm 47 is provided with holes into one of which engages a rod 48 connected to an upright lever 49 which is pivoted at 50 (Fig. 1) on the frame and carries a counter-weight 51 and a clapper 52 coacting with a bell 53 secured to the frame. The counterweight 51 has a tendency to withstand any movement of the rod 48 and consequently of the arm 47. When oscillating in the direction indicated by the arrow, the sieves will carry the brushes 40 with them by friction on the screens, while in the oscillating movement of the sieves in the opposite direction, the brushes will be prevented from turning by the pawl 46 engaging the ratchet 45. The brushes consequently will rub on the upper face of each screen and spread the material in a uniform and relatively thin layer. If a screen happens to burst, the brush will be carried with it in its return movement on account of the intervening frictional resistance, the ratchet will throw back the pawl and with it the arm 47 and the rod 48, which will act on the lever 49 to lift the counterweight 51; the latter, in the following movement in the direction of the arrow, will fall again so that the clapper 52 will ring the bell 53 and give thereby a signal that the brushes do not work normally.

Each sieve has in its circular wall a slot communicating with a flat spout 54 through which the material which has not passed through the meshes of the screen may escape. The spouts are provided at their ends with mouth pieces 55 which in a plan view (Fig. 3) are arranged in order on a line according to the size of the material delivered. Under the mouth pieces, is mounted a bagging table 56 provided with chutes 57. The mouth pieces are connected to these chutes by hose pipes 58 provided at their lower ends with a double wall, one engaging into the chute while the other is fixed around it so as to prevent any dust from flowing into the surrounding atmosphere. The bags 59 adapted to receive the sifted material are fixed by straps 59′ to the lower ends of the chutes 57. Beneath the lower sieve is arranged a hopper 60 (Fig. 1) ending into a hose pipe through which the finest material is collected.

For taking the sieves away from the machine, a crank or handle 62 is keyed on a horizontal shaft 63 carrying a ratchet 64 provided with a retaining pawl. On the shaft 63 are wound two ropes 65 which may be attached on both sides of the machine to hooks 66 secured to the upper sieve. For causing the whole series of sieves to descend on to a carriage 61 provided therebeneath, it is only necessary to attach the ropes to the hooks, to remove the different connections and then to permit the handle 62 to turn, the retaining pawl having been disengaged. The sieves may be easily mounted in position by the same but reversed operations.

If it is only desired to sift the material through a single size of mesh, sieves 1 having screens of the same mesh size may be used according to the arrangement shown in Fig. 6. In this case, the output of the machine is consequently amplified in proportion to the number of sieves. The material may then be fed to the upper sieve by the above described device and to the sieves under the upper one by a feeding device 67 (Figs. 6 and 7) in which a drum 68 rotates, said drum having a longitudinal slot 69. The material coming into said slot is distributed to a series of hose pipes 70 connected to pipes 71 which end above each sieve. In this case, each sieve has in its center a small recessed disk 72 above which is located the delivery end of a collecting hopper 73 which receives all the material falling through the sieve located above. The sifted material thus descends in the form of a central stream through the machine while the refuse is ejected through lateral spouts 74 which are connected together outside of the machine. Of course both arrangements may

be used in combination, some of the sieves being arranged as in the first case and the remainder being arranged as described in the latter case. If the material to be sifted contains for instance a considerable amount of grains of a certain size, several screens of the same mesh corresponding to said grain size will be superposed so that the machine has a large output for such size of grains while a number of sieves of a different mesh will be arranged to sift the grains of other sizes, the operation of the machine being the same with any number of sieves. My machine has consequently a great flexibility of operation so that it may be readily adapted to all cases happening in practice. The material while being sifted is therefore submitted to a curvilinear movement corresponding substantially to an ellipse under the action of the crank shaft 25 and connecting rods 28 and 31. The material is also prevented to engage into the meshes by the shocks imparted to the sieves by cams 17, the extent of said shaking movement being controlled or nullified by means of the adjustable stops 23 when no shocks are required as for instance for flour. The material fed by the feeding device 36 on to the first sieve along a horizontal radius thereof is immediately spread by one of the brushes on an upward movement whereby the spreading of the material in a uniformly thin layer is considerably facilitated. The brushes are also adapted to keep the screens clean, which is indispensable for a good sifting.

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

1. In a sieving machine: in combination, circular superposed sieves, a feeding mechanism, a driving shaft, a crank shaft operated thereby, an adjustable rod connected to the crank shaft, a vertical rod on the sieves at a point near the crank shaft and connected to the connecting rod at a point near the top of the superposed sieves, a forked rod connected to the crank shaft and to the lower sieve along a diameter at right angles with the plane passing through the axis of the sieves and the crank shaft, a rod connecting a point of the lower sieve remote from the crank shaft to the frame, means for imparting to said sieves a vertical shaking movement, and rotatable brushes for automatically spreading the material on the sieves, substantially as set forth.

2. In a sieving machine, in combination: a frame, circular superposed sieves, a feeding mechanism, means for imparting to the sieves a curvilinear movement, vertical rods supporting the sieves, oscillating levers connected to said rods, a driving shaft, cams on said shaft actuating the oscillating levers, buffer springs on the frame for the oscillating levers, adjustable stops on said frame for the levers, and rotatable brushes for automatically spreading the material on the sieves, substantially as set forth.

3. In a sieving machine, in combination, a frame, a feeding mechanism, means for imparting to the sieves a curvilinear movement, means for imparting to the sieves a vertical shaking movement, rotatable brushes in frictional contact with the material on the sieves, elastic arms carrying said brushes, a vertical shaft to which the arms are secured, a ratchet on said shaft, a pawl coöperating with said ratchet, a normally fixed arm supporting the pawl and means connected to said arm for signaling any disorder in the operation of the brushes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH BERNARD LOISON.

Witnesses:

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H. C. COXE.