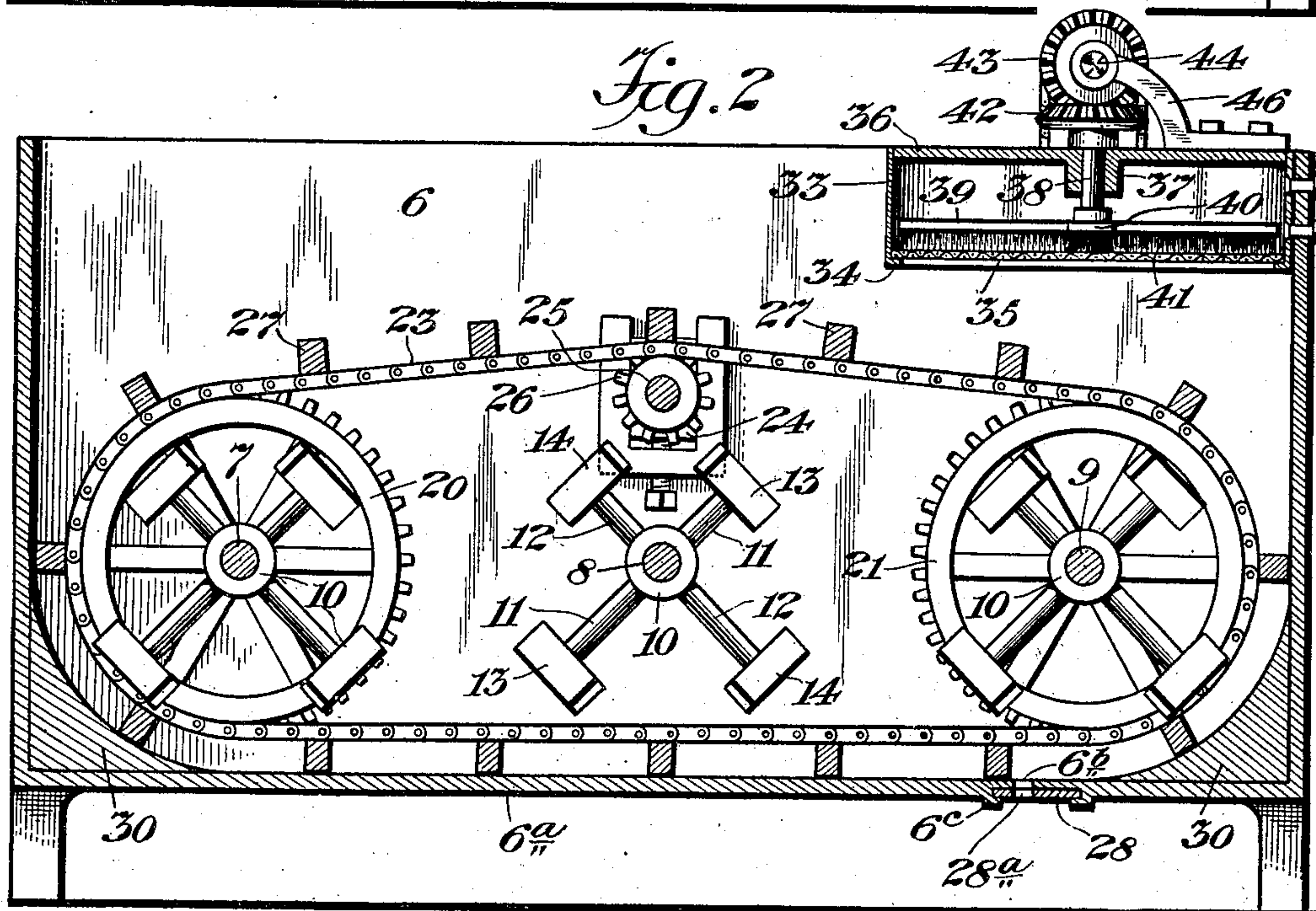
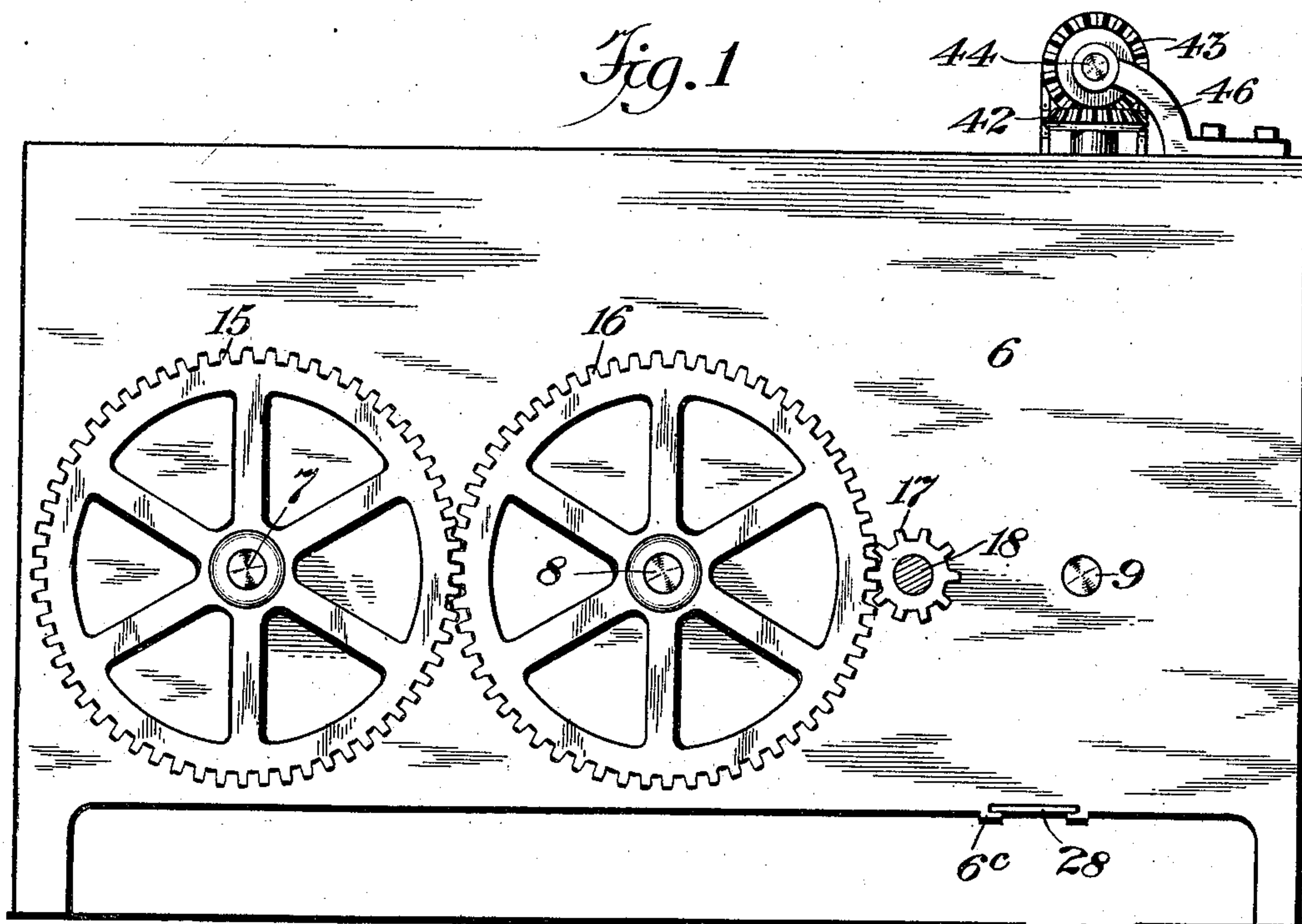


No. 889,606.

PATENTED JUNE 2, 1908.

G. J. HICKS.
BLENDING MACHINE.
APPLICATION FILED APR. 4, 1906.

2 SHEETS—SHEET 1.



Witnesses
J R Appelman
 Herbert E. Dane.

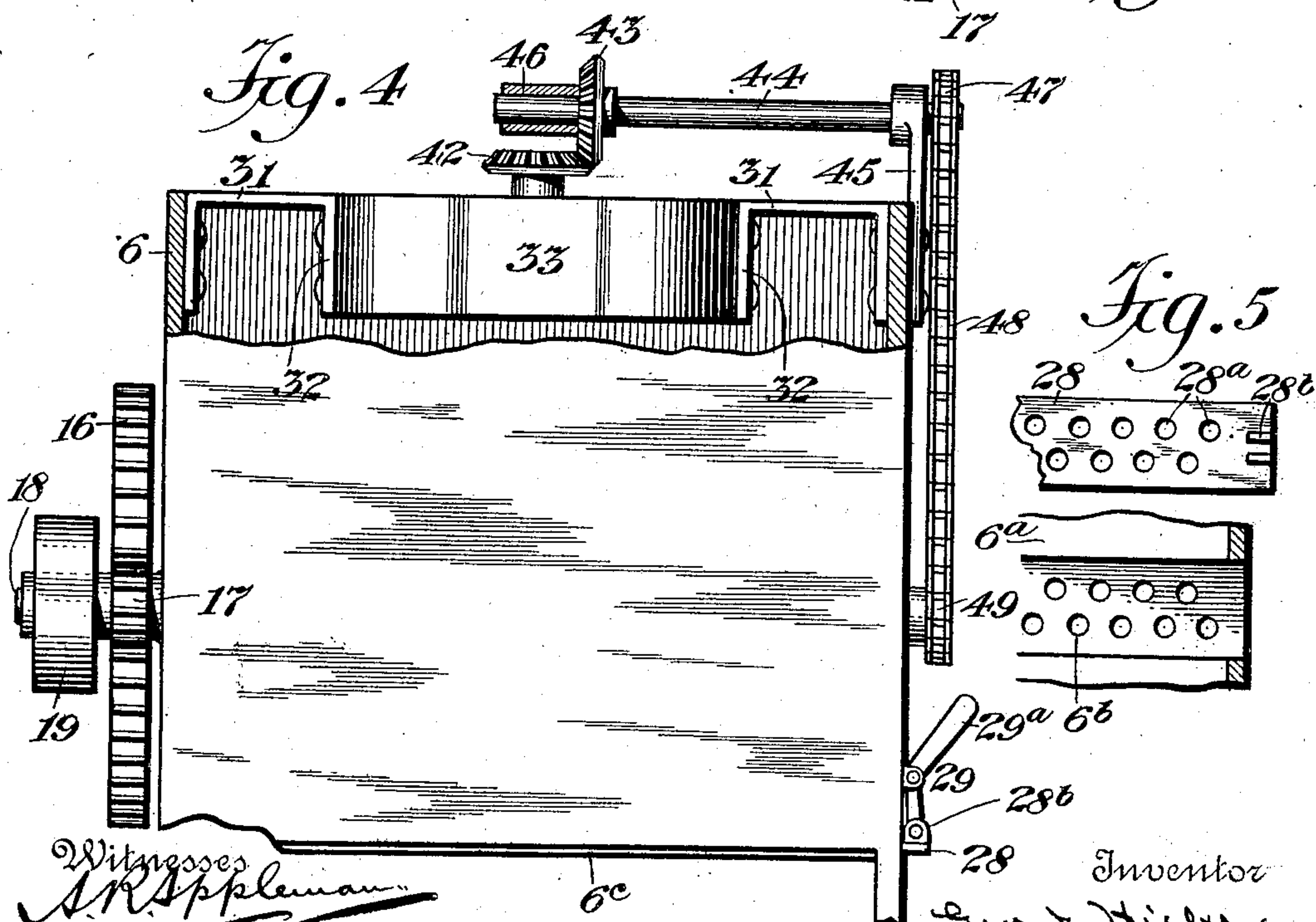
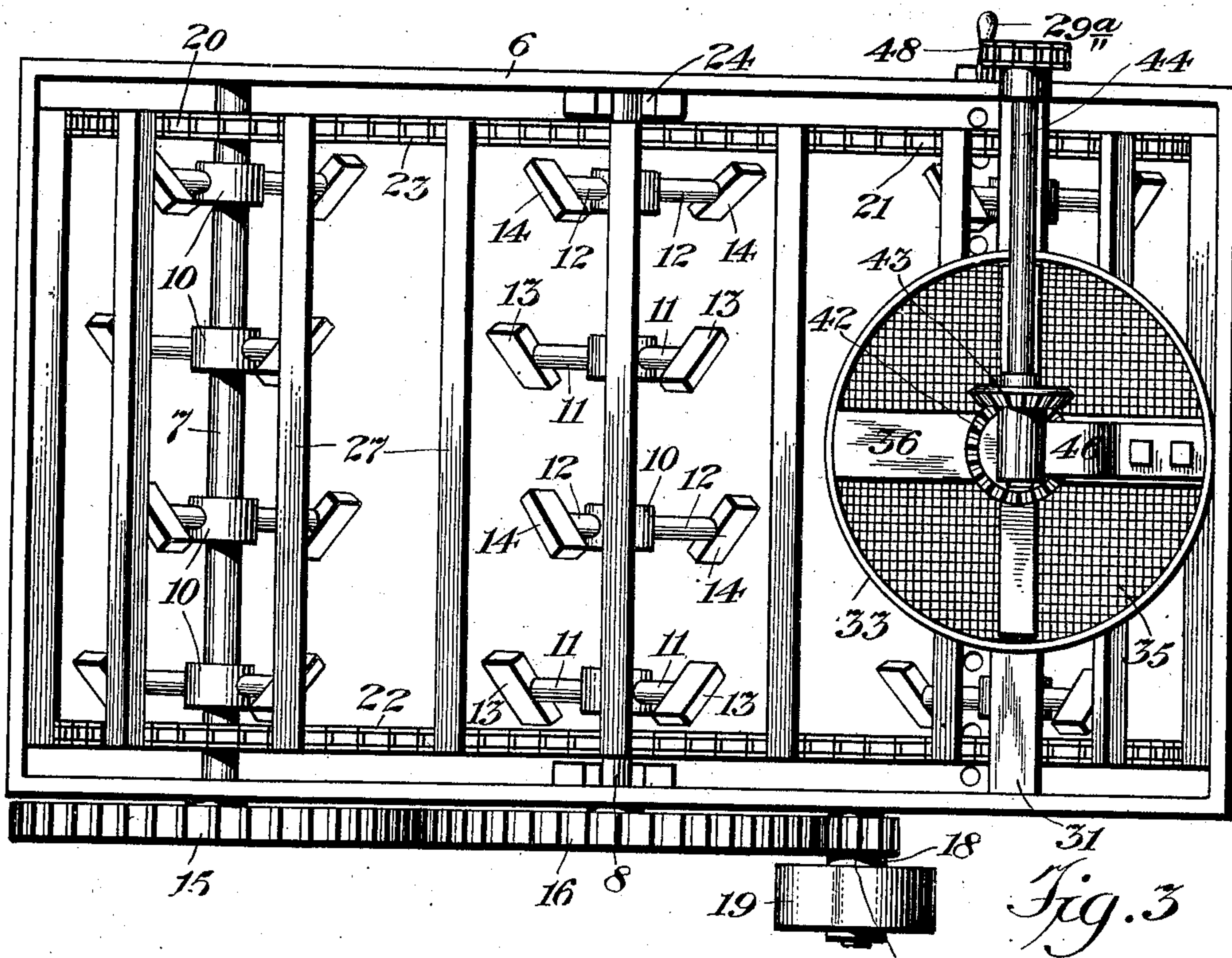
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By his Attorney Chas. F. Rame

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE J. HICKS, OF ARDSLEY, NEW YORK.

BLENDING-MACHINE.

No. 889,606.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed April 4, 1906. Serial No. 309,753.

To all whom it may concern:

Be it known that I, GEORGE J. HICKS, citizen of the United States, and resident of Ardsley, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Blending-Machines, of which the following is a specification.

The subject of this invention is a machine primarily designed for blending flour and has for its more important object the efficient and rapid conduct of the blending operation in a manner insuring the most satisfactory results in the subsequent utilization of the blended material.

With the above and other objects in view the novel machine embodying my invention comprises peculiarly conditioned means for lifting and overturning the flour in a differential manner. Provision is also made for thoroughly screening the material previous to such lifting and overturning operation, and further, for effecting the proper removal of said material as it becomes completely blended.

One arrangement for accomplishing the overturning and lifting action referred to, comprises a shaft carrying arms provided with stirrer heads or agitators disposed at such relatively different angles that as the shaft is revolved, said agitators, in addition to lifting and overturning the flour, will cause a back and forth tumbling movement of the same, so that the flour is not only intimately blended but is also brought to a highly lightened and aerated state and the presence of lumpy and compressed conditions avoided. A plurality of shafts similarly equipped and simultaneously actuated will extend the blending capacity of the machine.

In the accompanying drawings forming part of this specification—Figure 1, is a side elevation of a blending machine embodying my invention. Fig. 2, is a central vertical longitudinal section of the machine. Fig. 3, is a plan view of the machine. Fig. 4, is an end elevation of the machine partly broken away, and Fig. 5 shows certain details of the machine to be hereinafter referred to.

Similar reference characters designate corresponding parts in the several figures wherein they occur.

Within the box or tank 6 constituting the body or main part of the machine is the lifting, overturning, and back and forth tum-

bling means comprising a horizontal shaft having arms carrying stirrer-heads or agitators disposed at such relatively different angles as to accomplish, when the shaft is revolved, the several functions noted. As disclosed, there is a plurality of these shafts, three being shown, transversely arranged, and designated 7, 8 and 9 respectively, one shaft being near each end and the third shaft being intermediately within the lower portion of the blending compartment presented by the box-interior. These shafts revolvably bear at their end portions in the box-sides and each rigidly carries collars or hubs 10, (four for each shaft being shown) from each of which project two radial arms, the arms, indicated at 11, 11, carried by the first and third collars, being arranged to extend at right angles with respect to the arms 12, 12, carried by the second and fourth or alternate collars. On the outer extremities of these arms are obliquely disposed stirrer-heads or agitators 13, 14, generally in the form of flat rectangular blocks, one of the broad faces of each of which is designed to act positively on the material.

It will be noted that the agitators, 13, 13, pertaining to each of the first and third collars are diagonally positioned with respect to each other and have their angles of direction the reverse of those in which the agitators 14, 14, of each of the second and third collars extend. It will be further seen, more particularly with reference to Fig. 3, that while the agitators of each shaft are presented in two transverse pairs, the angular relation of the agitators of the first and third collars with respect to the agitators of the second and fourth collars, so differs as to have the effect, when the shaft is revolved, of tumbling the material transversely back and forth. This action is supplemented by the difference in the angular positions of the agitators of the intermediate shaft 8, with respect to the complementarily located agitators of the shafts 7, 9 and also by reason of the difference in the direction of rotation of the intermediate shaft with respect to that of the said end shafts, the effect being to exert a further back and forth tumbling of the material but in a direction longitudinally of the machine.

To provide for the simultaneous and differential driving of the shafts 7, 8, 9, one end of each of the shafts 7, 8, projects beyond the box at one side, said projecting ends having

secured thereon intermeshing gear-wheels 15, 16, of large diameter, the wheel 16 being engaged by a gear-pinion 17 revoluble with a stub-shaft 18 supported on the side of the machine and adapted to be driven through the medium of a band-pulley 19, secured thereon.

On the shafts 7, 9, within the blending compartment and closely adjacent to the sides of the same, are sprocket wheels 20, 21, which are geared together in pairs by longitudinally disposed sprocket chains 22, 23, serving to insure the simultaneous revolution of said shafts in corresponding directions. The diameter of the wheels 20, 21, is such that the chains can move in planes clear of the circular paths of rotation of the stirrer-heads or agitators of the several shafts. I prefer to locate in adjustable bearing boxes 24 on the inner sides of the machine, at an intermediate point of the blending compartment, an upper transverse shaft 25 carrying sprocket pinions 26 engaged with the chains and adapted to take up slack therein for insuring the proper transmission of motion.

The chains 22, 23, are connected together by transverse slats 27, equi-distantly spaced and constituting a series extending throughout the length of the chains. These slats at the upper chain-passes will operate in their path of travel to longitudinally shift and distribute the material, so that the blending operation will be conducted with comparative uniformity in all parts of the blending compartment, while the slats at the lower chain-passes, moving in an opposite direction and in contact with the inner surface of the box-bottom 6^a, will operate to conduct the highly blended product which has reached this plane, in the direction of and to the discharge. For this latter provision, the bottom 6^c, somewhat near one end of the machine, contains a transverse series of perforations 6^b, shown in Fig. 5 as being in two rows, the perforations of one row alternating with those of the other row. On the under side of this portion of the bottom 6^a are transversely extended parallel guides or cleats 6^c, in which slides a gate 28, likewise containing a series of alternating perforations 28^a said gate projecting slightly at one side of the box 6, where it has upper ears 28^b, in which is pivotally secured one end of a bell-crank lever 29 fulcrumed on the box-side and presenting the operating handle 29^a. Obviously, by moving the handle, the gate can be adjusted so that its perforations will be either entirely in or out of registration with the perforation 6^b of the bottom, to completely open or close the discharge from the box, or there may be such intermediate adjustment as will contract the passage area through the openings to any desired extent, and thus regulate the quantity of material passing from the machine.

Rigidly secured filling-pieces 30 on the compartment bottom, at each end of the machine, have curved surfaces vanishing at the bottom and end walls, and in contact with which curved surfaces the slats 27 move as the blending compartment; these said curved surfaces at the ends of the blending compartment serving to bring the entire bottom surface of the compartment into contact with the moving slats 27 and thereby avoiding possibility of the undue accumulation of material at any point in the compartment.

Secured against the inner surfaces of the side walls of the box 6 near the supply end of the same and adjacent to the upper edge thereof, are inwardly-extending hangers 31 which for the sake of increased rigidity may be of the inverted yoke-shape most clearly shown in Fig. 4, to present the depending portions 32 attached to and supporting the annular sieve-body 33 at diametrically opposite points of the latter. It will be noted that said body occupies such position that the sieve of which it forms part will be centrally supported between the side walls, so that screened material passing through the sieve will be properly delivered within the box to a considerable portion of the one part of the endless conveyer element presented by the chains and slats. The sieve-body 33 has a lower inner horizontal flange 34 upon which rests the circular screen-section 35. A bar 36, spanning the upper part of the sieve, has a central under-boss 37, perforated to form the bearing in which turns a vertical stub-shaft 38 rigidly carrying at its lower end a brush-frame consisting of crossed bars 39, 40, disposed at right angles with respect to each other and intermediately connected together. These bars are provided with the brushes 41 which, as the frame revolves, circularly sweep over and in contact with the entire screen-surface.

On the upper projecting end of the stub-shaft 38 is secured a beveled gear-pinion 42 meshing with a corresponding pinion 43 fixed on a transverse shaft 44 near the inner end thereof, said shaft being revolubly supported at its outer portion in a bearing at the upper end of a short vertical standard 45 bolted externally on the contiguous box-side near the top thereof. The extreme inner portion of the shaft 44 is supported by and turns in a bearing provided at the end of an overhanging bracket 46, the base of which is bolted to the bar 36.

Mounted on the outer projecting end of the shaft 44, to transmit a revolving motion to the latter, is a sprocket pinion 47, geared by a sprocket chain 48 with a similar pinion 49 on the end of the shaft 9, which projects at that side of the machine.

During an early period of the blending operation, the gate 28 will be in the cut-off position. The pulley 19 is driven so that the

shaft 9 will be revolved toward the left, effecting a corresponding direction of the rotation of its supported stirrer-heads or agitators, and also causing the upper pass of the endless conveyer to move toward the left-hand end of the blending compartment. The shaft 7, with its arms and agitators, will be actuated in a direction similar to the shaft 9 and its parts, but the intermediate shaft, its arms and agitators, will by reason of the external gear-wheels 15, 16, be actuated to move in a reverse direction. Coincidentally, the brush-frame 39, 40, will be rotated but at a higher rate of speed. With the movable parts thus actuated, different qualities of flour are introduced within the sieve and under the action of the rotating brush are efficiently screened and caused to descend into the blending compartment. The flour is then mechanically distributed within said compartment, both the endless conveyer and the revolving agitators combining to secure this result, and said agitators by reason of their peculiar adjustments and coaction operating to effect the lifting, overturning and back and forth transverse and longitudinal tumbling movements of the material previously referred to. In the early stage of the blending operation, when the gate is closed, the slats 27, moving with the lower pass of the conveyer, will shift the material on the bottom 6^a to the right-hand end of the compartment, where said material will be carried up along the curved surface of the adjacent filling-piece 30, which function will have the effect of restoring such material to the main body being acted upon within the machine. When the flour has attained a predetermined blend, the gate 28 can be opened to permit the discharge of such quantity of the blended product as may be desired.

The actuation of the machine can be so regulated, or the quantity of flour delivered to the sieve so gaged, that the blending and discharging operation can be simultaneously and continuously conducted. The product after leaving the machine, can be conveyed to and stored in a suitable bin or bins, or it may be delivered direct to a mixing and kneading machine for conversion into dough.

The previously described relation established between the endless conveyer and the lower portion of the box, and also between said conveyer and the differentially acting agitators interposed between the upper and lower conveyer-passes, is regarded as important, as such peculiar disposition of parts not only conduces to compactness of structure, but so involves the said several features that their highly efficient coöperation are assured.

It will be appreciated from the foregoing description that the novel machine disclosed is capable of both rapidly and thoroughly blending an exceedingly large quantity of flour, with the attendant advantage of im-

parting highly desirable qualities to the product. Furthermore, the general construction is such that while it is both durable and capable of positive operation, it is also so simple and accessible in character that it can be readily maintained in a cleanly condition. It will also be comprehended that the machine will be highly useful in mixing or blending, or both, numerous other materials, such as meal, cement, etc., and with a slightly modified discharge provision, can be utilized as a mortar, concrete or other mixer.

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

1. In a machine of the character described, the combination with a tank having a suitable discharge, of an endless distributor within said tank and embodying upper and lower passes, of agitating means between said passes operative to lift, overturn and effect a back and forth tumbling movement of the material acted upon by the distributor, said agitating means comprising oppositely rotating elements each provided with a plurality of striking surfaces set at different angles to each other and at different angles to the direction of rotation.

2. In a machine of the character described, the combination with a tank having a suitable discharge, of a screening device at the supply portion of said tank for the delivery of screened material within the latter, an endless distributor within said tank embodying upper and lower passes, agitating means between said passes for lifting, overturning and effecting a back and forth tumbling movement of the screened material, said means comprising oppositely rotating elements each provided with a plurality of striking surfaces said surfaces being disposed at different angles to each other and at different angles to the direction of rotation and actuating means for the screening device, distributor, and the said means within the latter.

3. In a machine of the character described, the combination with a tank having a suitable discharge, of an endless distributor within the tank and providing a movable distributing part, horizontal shafts below said part and each provided with radially supported agitators complementarily disposed and obliquely extending in opposite directions, and actuating means for said distributors and rotating said shafts in opposite direction.

4. In a machine of the character described, the combination with a tank having a suitable discharge, of a screening device delivering to the supply portion of the tank, an endless flexible distributor within the latter and presenting a movable distributing part, horizontal shafts below said part and each provided with radially supported agitators com-

plementarily disposed and obliquely extending in opposite directions, and actuating means for the screening device, distributor and shafts.

5 5. In a machine of the character described, the combination with a tank having an inlet and a suitable discharge, of an endless distributor within said tank, horizontal shafts interposed between the passes of the distrib-
10 uter and each provided with radially supported agitators complementarily disposed and obliquely extending in opposite directions, and means for actuating said distributor and for simultaneously but oppositely re-
15 volving the shafts.

6. In a machine of the character described, the combination with a tank having a suitable discharge, of an endless conveyer within the tank, the upper pass of said conveyer
20 constituting a distributor and the lower pass being in close relation to the tank-bottom for shifting material thereon, means interposed between said passes for lifting, overturning and imparting a back and forth
25 tumbling movement to the material, and actuating means for said endless conveyer and for the said means between the passes thereof.

7. In a machine of the character described, the combination with a tank having a suitable discharge, of a screening device delivering to the supply portion of the tank, an endless conveyer within the latter, the upper
30 pass of said conveyer constituting a distributor and the lower pass being in close relation to the tank-bottom for shifting the material
35 thereon, shafts interposed between the passes and each provided with radially supported agitators complementarily disposed and obliquely extending in opposite directions,
40 and means for actuating said screening de-

vice and endless conveyer and for simultaneously revolving the shafts in relatively opposite directions.

8. In a machine of the character described, the combination with an inlet and a tank 45 provided with a suitable discharge of shafts within said tank having belt-supports mounted thereon to revolve therewith, belts passing around said supports and connected by slats, each of said shafts being provided with
50 radially supported agitators complementarily disposed and obliquely extending in opposite directions, and actuating means for one of said shafts.

9. In a machine of the character described, 55 the combination with a tank provided with a suitable discharge, of shafts within said tank having sprocket wheels mounted thereon to revolve therewith, belts geared with said supports and connected by a series of spaced
60 slats to present an endless conveyer, the slats when at the lower pass of the conveyer being movable in close relation to the tank-bottom, intermediate shafts between the upper and lower conveyer passes, each of said
65 shafts being provided with radially supported agitators complementarily disposed and obliquely extending in opposite directions, and means for driving one of said conveyer-shafts and the intermediate shaft in opposite
70 directions with respect to each other.

Signed at New York in the county of New York and State of New York this 8th day of September A. D. 1905.

GEORGE J. HICKS.

Witnesses:

CHAS. F. DANE,
HERBERT E. DANE.