

L. R. ENGLISH.
WASHING MACHINE.
APPLICATION FILED MAY 22, 1909.

947,611.

Patented Jan. 25, 1910.

3 SHEETS—SHEET 1.

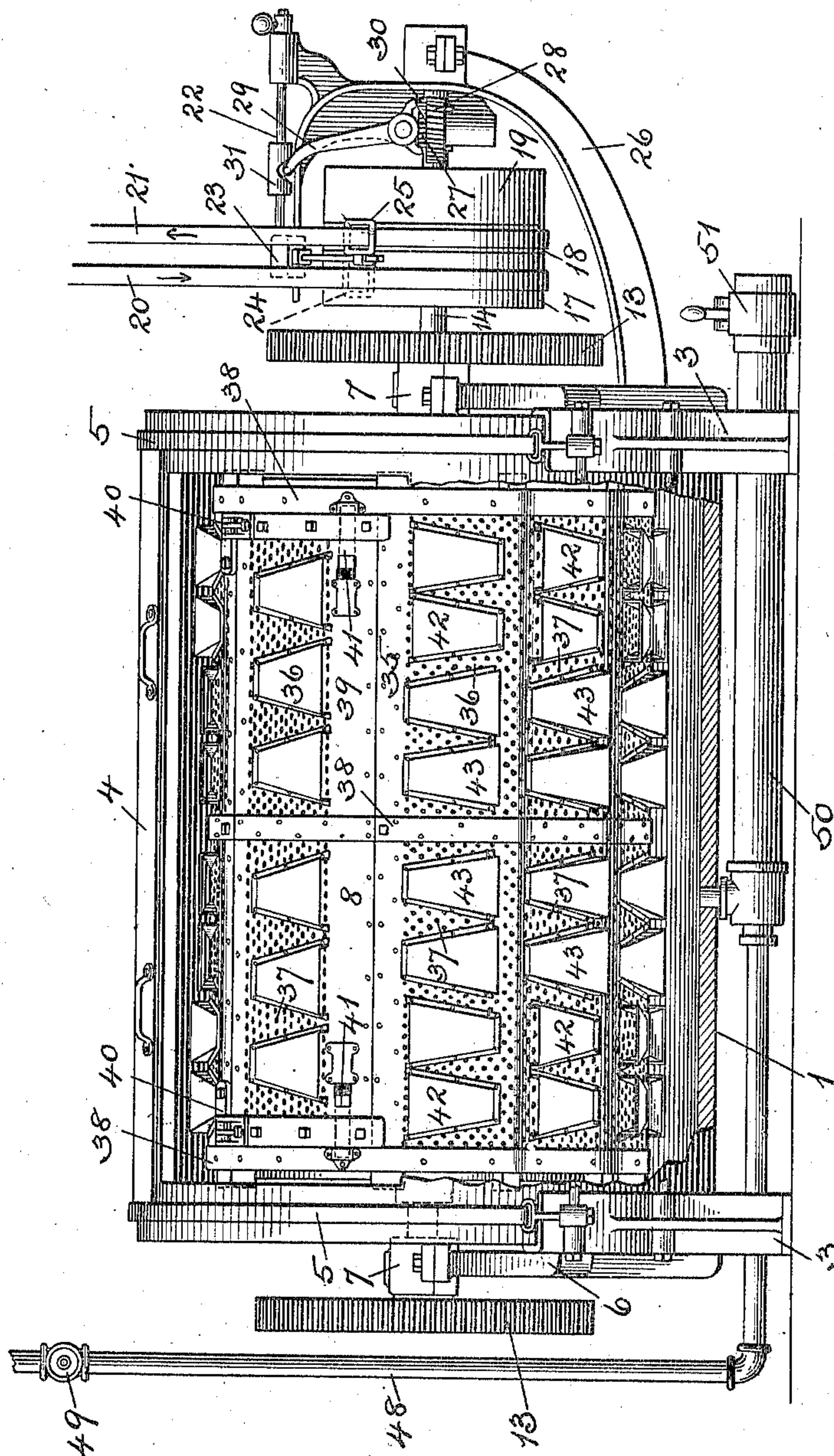


Fig. 1.

Inventor

Witnesses

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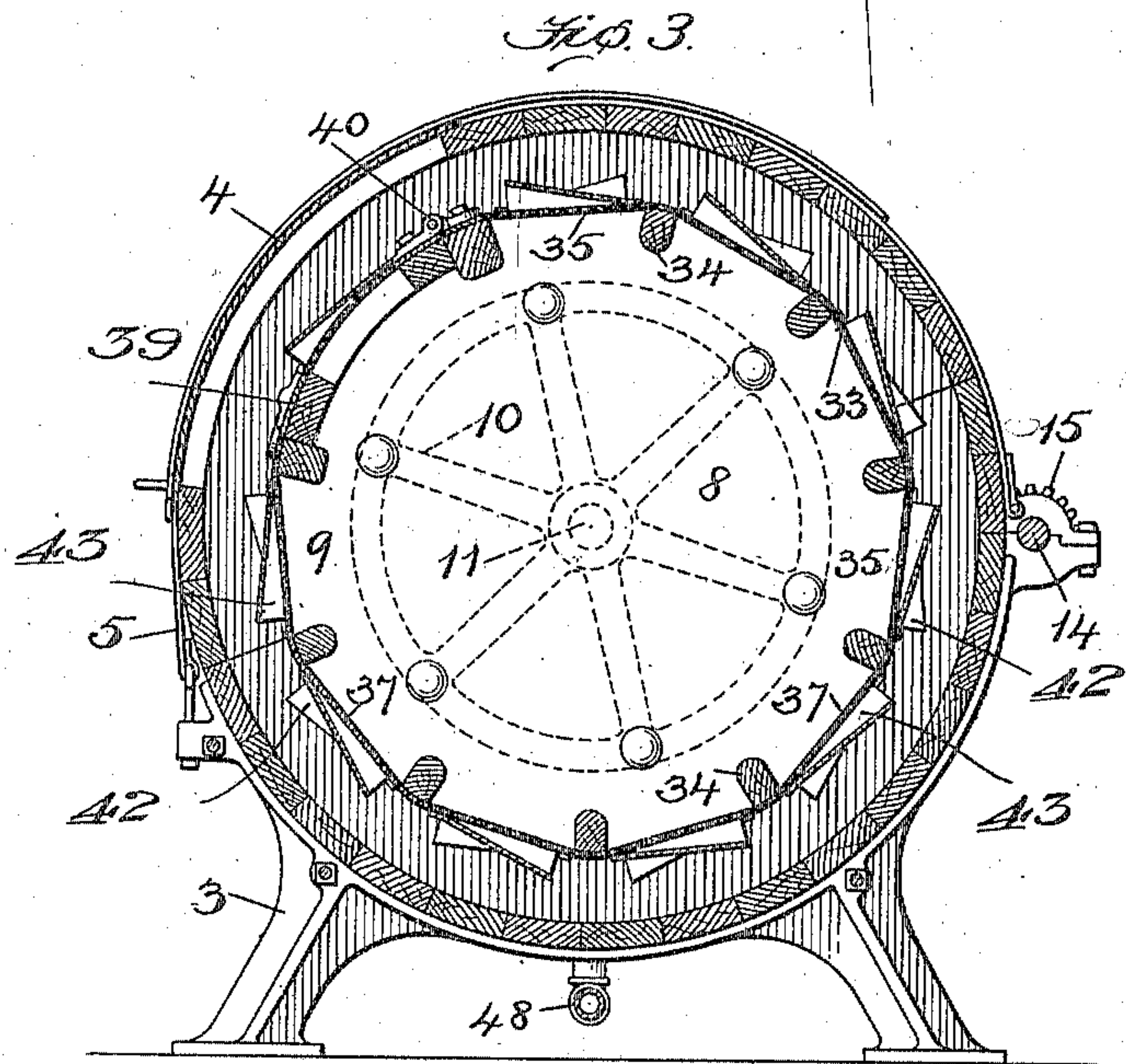
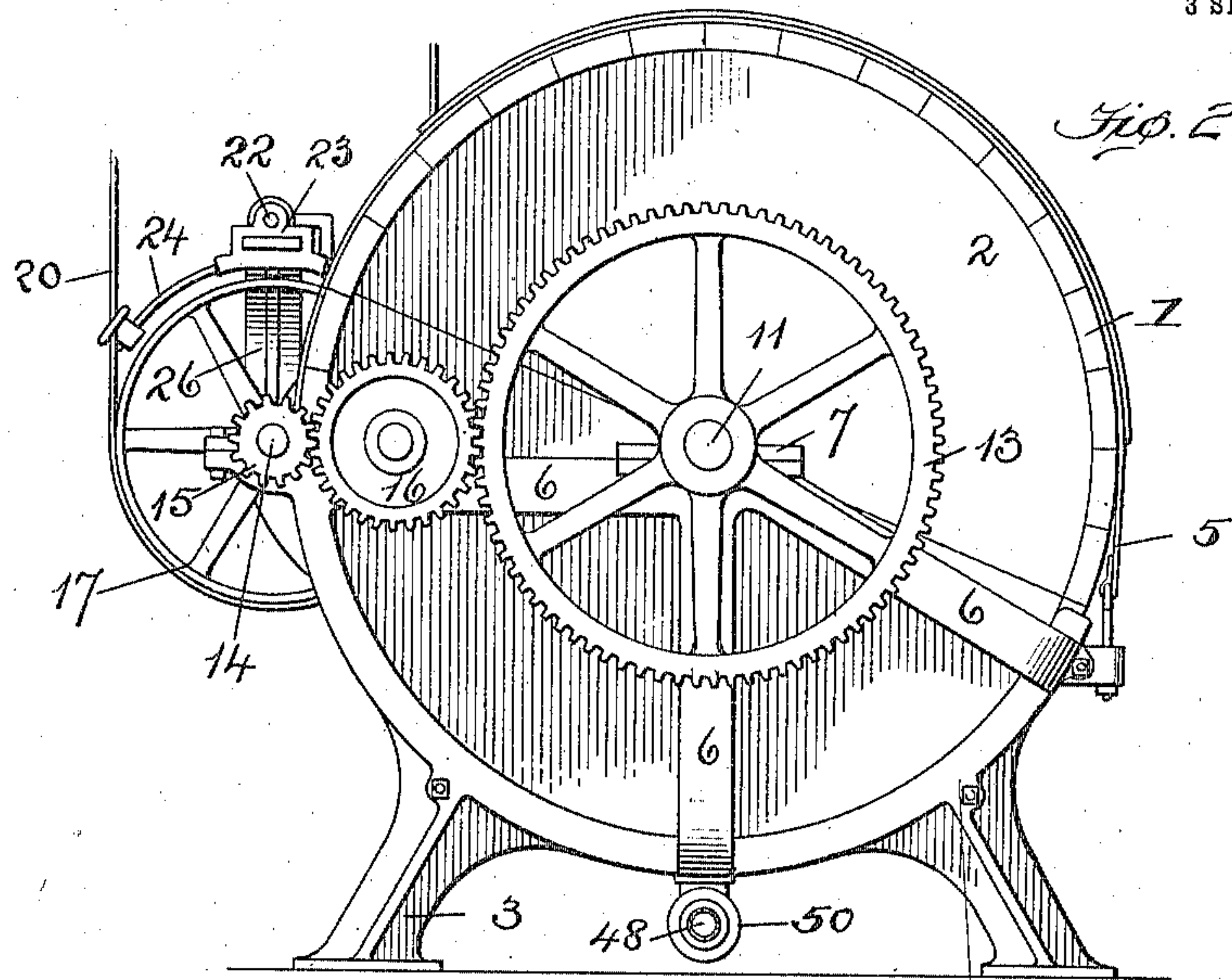
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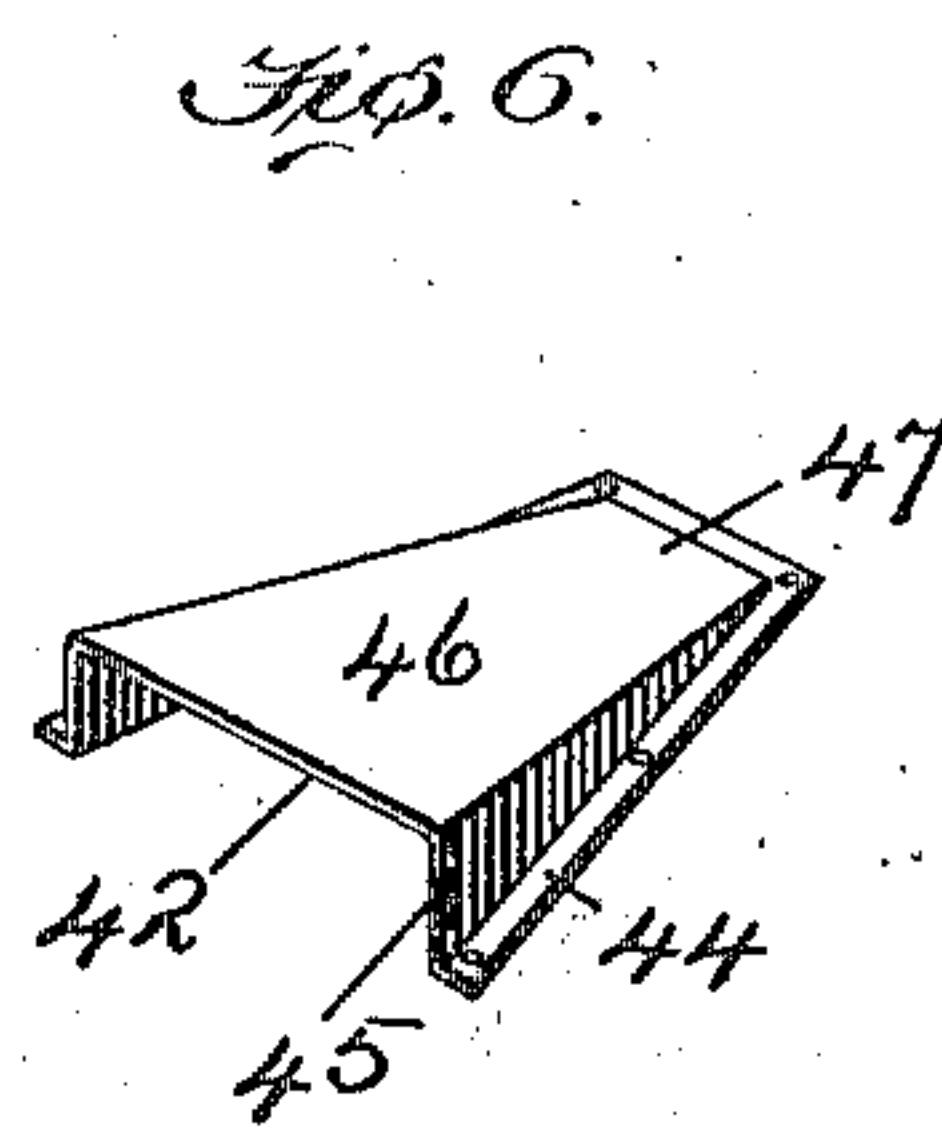
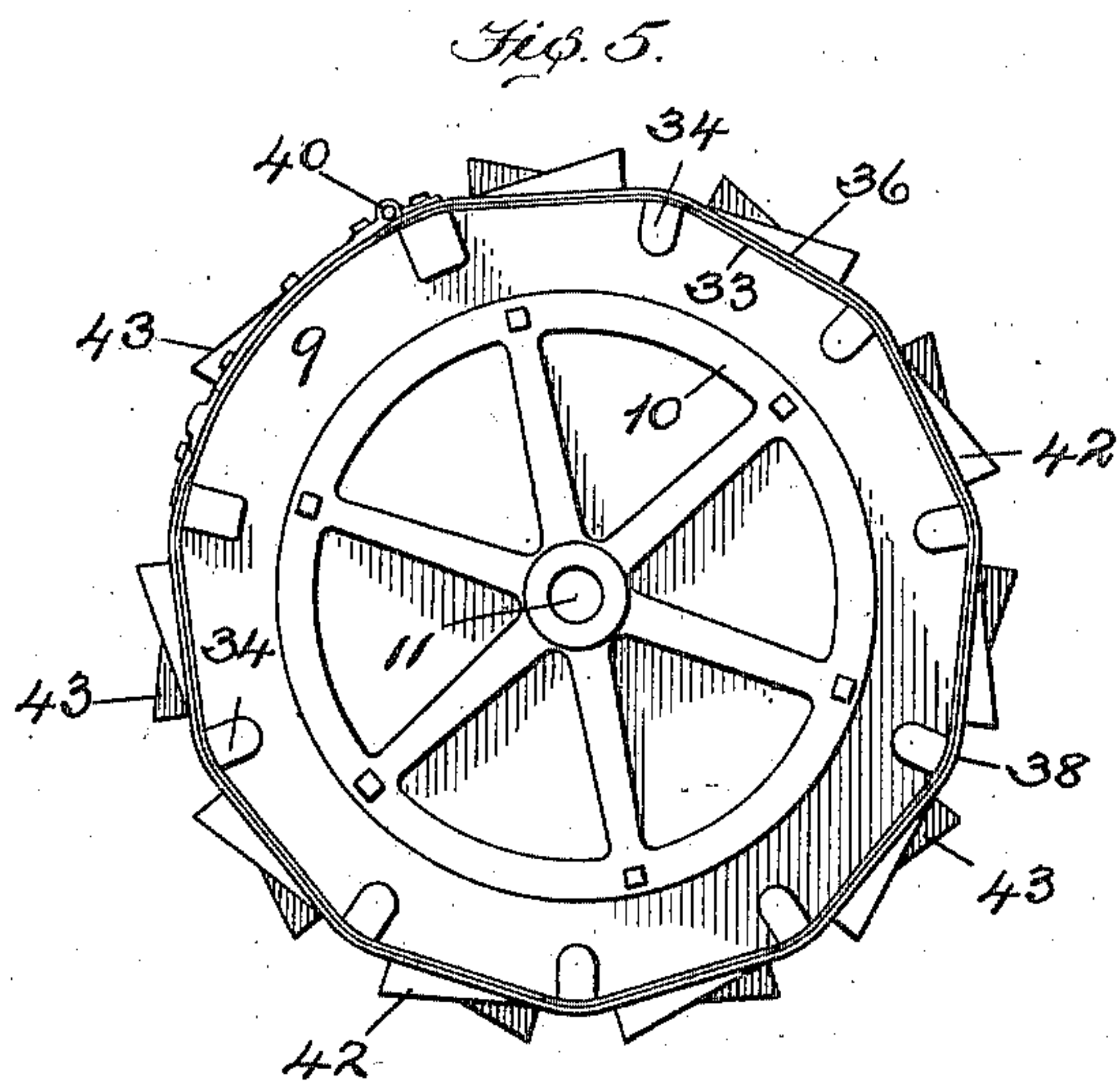
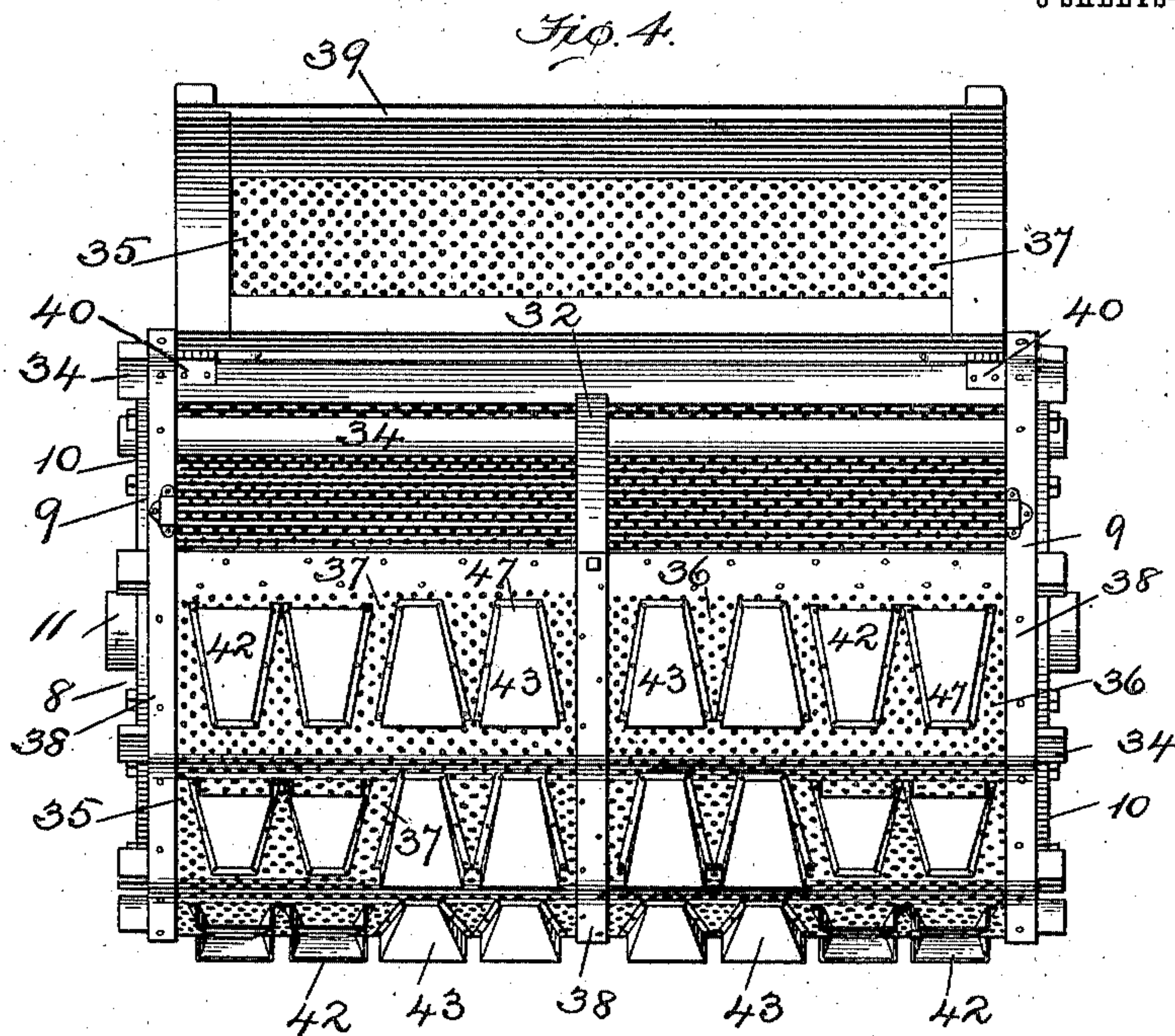
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UNITED STATES PATENT OFFICE.

LORENZO R. ENGLISH, OF BALTIMORE, MARYLAND.

WASHING-MACHINE.

947,611.

Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed May 22, 1909. Serial No. 497,654.

To all whom it may concern:

Be it known that I, LORENZO R. ENGLISH, a citizen of the United States, residing at Baltimore, in the State of Maryland, have
5 invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to improvements in washing machines such for example as are
10 applicable for use in laundries and particularly adapted for washing clothes, linens or other fabrics.

One object of the invention is to provide an improved construction of machine that
15 will quickly and thoroughly wash articles of the character mentioned without liability of damage or injury thereto and which will insure a constant circulation of water, air and soap solution through and about the fabric
20 or articles being washed.

Another object of the invention is to provide an improved construction of cylinder for washing machines having one or more compartments and provided with a circum-
25 ferential sheet-metal covering having numerous perforations therein of comparatively small area and to provide said sheet-metal covering with exterior means for accumulating and forcing water through some
30 of the perforations in jets or streams to the interior of the cylinder during revolution of the latter and permitting the water in the cylinder to simultaneously pass outwardly through other perforations in said covering.

35 A further object of the invention is to provide an improved cylinder for washing machines having one or more compartments and a plurality of individual pockets for each compartment,—said pockets projecting
40 circumferentially from the outer side of the cylinder covering so as to continuously and simultaneously feed air and water into and discharge the same from the compartment or compartments and thereby maintain a
45 constant circulation of the water to and from the compartment without regard to the direction in which the cylinder may be revolved.

Another object is to provide an improved
50 construction of water pocket for attachment to the perforated covering of the cylinder for accumulating and driving the air and water through the perforations in jets into the cylinder and in direct contact with the
55 articles undergoing washing.

Another object is to provide an improved washing machine cylinder having a perforated circumferential surface for the simultaneous inlet and outlet of water with a plurality of pockets secured against and projecting outwardly from said surface over
60 some of the said perforations and projecting tangentially therefrom, and some of the pockets being arranged with their openings facing in one direction while the openings
65 of other pockets are faced in an opposite direction.

Another object is to provide an improved construction of cylinder with a perforated circumferential surface and having tangen-
70 tially-projecting spaced-apart rows of pockets secured against the outer side of said perforated surface which are larger at one end than at the other,—the larger end of the
75 pockets being open and the smaller end thereof closed and the pockets serving to dip up the water and deliver it into the cylinder through the perforations in a plurality of spaced-apart streams.

A further object is to produce a cylinder
80 having a perforated circumferential surface with a plurality of separate and individual pockets attached thereto on the outer side and over some of said perforations and arranged to effect a continuous inlet of water
85 and air to the cylinder no matter in which direction the cylinder may be rotated.

With these and other objects in view the invention is illustrated in the accompanying
90 drawings in which,

Figure 1 illustrates a washing machine constructed in accordance with the invention,—the outer casing being broken away to show the inner revolving cylinder in side elevation. Fig. 2, is an end elevation of the
95 machine. Fig. 3, a vertical cross-section through the same. Fig. 4, a side elevation of the cylinder detached from the casing. Fig. 5, an end elevation thereof, and Fig. 6, shows in perspective, one of the pockets detached
100 from the cylinder.

Referring to the drawing the numeral, 1, designates an outer shell or casing of any suitable construction but preferably of a cylindrical form with solid ends, 2, and
105 which is sustained on suitable legs or supports, 3. This shell or case is also provided with a sliding door, 4, by means of which access may be had to the interior thereof.

The shell is preferably formed in two 110

parts or halves which may be held together in any suitable manner, such for example as by means of straps or bands, 5.

The supports, 3, for the shell are located at opposite ends of the latter and are provided with inwardly-extending bars, 6, which converge and form central bearings, 7, at each end of the shell.

A cylinder, 8, is located within the shell and is provided with circular heads or ends, 9, to which suitable plates, 10, are bolted on the exterior. These plates have trunnions or short shafts, 11, which project through suitable perforations in the ends, 2, of the outer shell and are sustained in bearings, 7, on the end supports so the cylinder may be revolved within the shell. In the present instance the shafts, 11, by which the cylinder is sustained, project through and beyond the bearings, 7, and carry comparatively large gears, 13, which are driven from a main horizontal shaft, 14, through pinions, 15, and small gears, 16, as clearly seen in Fig. 2.

In driving or rotating the cylinder it is desirable that power be applied to both ends thereof, hence the gears, 13; pinions, 15, and gears, 16, are provided at both ends of the shell and are all driven from the one horizontal shaft, 14.

For reasons presently to be described, the cylinder is to be revolved a few revolutions in one direction and then its movement is reversed so as to give it a few turns or revolutions in a reverse direction. To effect this I have provided one end of the shaft, 14, with three pulleys, 17, 18, and, 19, respectively. The pulleys, 17, and, 19, are both loose pulleys while the pulley, 18, is tight on the said shaft. Two driving belts, 20, and, 21, are also provided,—one traveling in one direction and the other traveling in a reverse direction which is readily accomplished by twisting one of the belts. A belt shifter is also provided and while its construction may vary, in the present instance it comprises a rod, 22, capable of movement horizontally and carrying a head, 23, with shifter arms, 24, and, 25, extending laterally from opposite sides thereof and over or partly around the pulleys. The shifter arm, 24, engages the belt, 20, while the arm, 25, engages the belt, 21. The rod, 22, and head, 23, are sustained by a bracket, 26, which in turn is carried by one of the end supports, 3, as clearly shown in Fig. 1. The shifting of the belts is accomplished automatically by means of worm gears, 27, and, 28, which are driven by the horizontal shaft, 14, and through the movement of a rock lever, 29, which is rocked by means of a lug, 30, carried by the revolving gear, 28. The upper end of the rock lever engages a collar or head, 31, on the rod, 22, and when thrown, moves said rod back or forth as the case may be, thus carrying the head and shifter

arms with it. It will therefore be understood that as the gear, 28, revolves slowly it will rock the lever, 29, thereby shifting the belts and reverse the direction of revolution of the cylinder.

The improved cylinder to contain the article to be washed is best illustrated in Figs. 3, 4 and 5 of the drawings which will now be described. In the present instance the cylinder is provided with the two ends or heads, 9, and also with a central vertical partition 32, which divides the same into two compartments. It is obvious however that the number of partitions employed is immaterial as the operation of washing is precisely the same in all the compartments.

The periphery or circumference of each head, 9, and also of the partition, 32, is provided in the present instance with a plurality of flat faces, 33, so that an angle or bend is formed between each two adjoining faces. A plurality of cross-bars or ribs, 34, extend horizontally between the heads and with the heads form an open frame or support. Obviously the cross-bars may extend from one head to the other or they may extend only from a head to the interposed partition. These bars have their outermost surface flush with the peripheries of the heads and partition and project inwardly from said surfaces for a purpose presently to be explained.

A covering, 35, is provided for the cylinder, and in practice consists of sheet-metal plates which follow closely the contour of the peripheries of the heads and partition, thus producing flat faces, 36, between adjacent ribs or cross-bars. These plates are provided with numerous small perforations, 37, through which water and air may freely pass or circulate back and forth between the revolving cylinder and the outer shell or casing. Suitable bands or rings, 38, of metal encircle the perforated covering and bind or hold the same against the heads and intermediate partition.

A door, 39, is provided in the cylinder and is preferably hung on hinges, 40, while suitable spring bolts, 41, at the ends thereof serve to hold the same closed. By means of the door access may be had to the interior of the cylinder for the deposition or withdrawal of articles undergoing the laundering operation.

It will be understood that the articles to be washed are deposited in the cylinder and the latter then closed. During the washing operation the cylinder will be revolved and the cross-bars or ribs will cause the articles to be tumbled in the cylinder while water and air will circulate by flowing in and out through the perforations in the sheet or plates, 35. It is very desirable that the circulation of the water and air through the revolving cylinder and the casing be accom-

plished with certainty as this constant circulation effects very desirable results, and although the articles undergoing the washing operation are carried up by the cross-bars, 34, and then dropped, they tend to a considerable extent to lie flat against the inner surface of the plates, 35, and to a greater or less extent seal the perforations, and thus hinder the proper circulation of water between the shell and cylinder. To assist the bars to overcome this, I provide the circumference of the cylinder with a plurality of pockets or scoops, 42, and, 43, of a peculiar construction and arrangement. These pockets are rigidly secured against the outer surfaces of the sheet or flat plates and over some of the perforations, 37, thereof, and have laterally-projecting flat bottom flanges, 44; an outwardly-extending inclined side wall, 45; and an inclined top, 46. When in position the flat bottom flanges of the pockets will lie close against the flat portions of the sheet or plates, and the inclined tops, 46, extend tangentially from the outer surface of the plates and beyond the heads and partitions so that the smaller closed end, 47, of the pockets will seat close against the plate while the larger open end thereof will project outwardly from said plate. The pockets are small as compared to the distance between the heads or between a head and a partition so that a plurality of them may be attached to the sheet side-by-side over some of the perforations and in a horizontal row.

By reference to Figs. 1 and 4 it will be noted that in the present instance the pockets are arranged in two sets or series,—one set being denoted by the numeral, 42, and the other set being designated, 43. While in the present instance the two series of pockets are arranged in rows at opposite ends of each compartment it is obvious that they may be otherwise arranged and that the number of such rows may vary.

During the operation of the machine I provide the hereinbefore described driving mechanism that will cause the cylinder to be revolved for a limited number of revolutions in one direction, then reversed and driven for a limited number of revolutions in the opposite direction. The object of thus reversing the revolution of the cylinder is to prevent the tangling of the articles of clothing which is found to take place to a serious extent if the cylinder is revolved continuously in one direction, and another object in reversing the direction of revolution is to improve the circulation of the water. As the revolution of the cylinder is to be periodically changed, I have arranged the pockets so that one set or series of pockets will have their openings presented in one direction while another series of pockets will have their openings presented in a reverse

direction so that when the cylinder revolves in one direction one set of pockets will accumulate and direct the water through some perforations into the cylinder while water may be discharged through other perforations and other pockets from the cylinder. Upon a reversal of the cylinder revolutions the series of pockets that before received the water will then discharge the water. This arrangement of pockets on the perforated cylinder covering is particularly effective in practice in producing a rapid and thorough washing of articles of fabric. It insures a positive and continuous circulation of water and soap solution together with air to and from the revolving cylinder and it causes the water to be taken up by the individual pockets and driven into the cylinder through the perforations beneath the pockets and against the articles being washed in a plurality of strong jets or streams. It will thus be understood that during the operation of the cylinder, whether there be one or more compartments, and also whether the revolution of the cylinder is in one or the other direction one series of pockets will direct water and air from the outer chamber through the perforations and into the revolving cylinder compartment or compartments in jets or streams, while at the same moment, water and air will pass out from the same compartment through other perforations and pockets and therefore a continuous and simultaneous inlet and outlet of air and water is effected.

The provision of reversely arranged pockets on the outer side or surface of the cylinder aids in discharging the water from the cylinder as well as its admission thereto,—for example if the cylinder be revolved in the direction that will cause all the pockets of the series, 42, to take up water the tapering pockets of the series, 43, during their passage through the water in the lower part of the shell will divide or make a trough through the water in the shell and thus relieve the perforations beneath the series of pockets, 43, free of external pressure and thereby enable the water to readily pass outwardly. Thus it will be seen that the admission of water through pockets, 42, in a plurality of vertical planes and the simultaneous exit of water through pockets, 43, also in a plurality of planes causes a thorough and complete circulation of water at all times in the several compartments no matter in which direction the cylinder is being turned.

In practice I have found it desirable to arrange all the pockets on the swinging door in one and the same direction to prevent crushing the pockets immediately at the rear of the door when the latter is swung backward.

For convenience in admitting water to the shell I provide an inlet pipe, 48, having a

valve, 49, to control the flow of water there-through and to effect a discharge of water from the shell I provide an outlet pipe, 50, having a valve, 51, therein.

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

1. The combination with an outer casing, of a cylinder revolubly mounted therein and
10 having a perforated circumferential surface; pockets having an opening at one end only and bottom flanges extending laterally and secured against the surface of the cylinder and said pockets being arranged in a
15 plurality of rows and in different vertical planes with the openings of adjacent rows facing in opposite directions.

2. The combination with an outer casing, of a cylinder having spaced-apart vertical
20 heads with horizontal cross-bars connecting the heads, and also having a perforated metal covering extending about the cross-bars between said heads; two series of independent pockets attached to the perforated
25 metal covering between the heads and arranged in rows in different vertical planes and one series of pockets opening in one direction while the other series of pockets opens in a reverse direction said pockets being
30 arranged in horizontal rows between two adjacent cross-bars.

3. The combination with a casing, of a cylinder comprising vertical spaced-apart
35 heads, cross-bars connecting the heads and a metal covering encircling the cross-bars and

having perforations therein between said cross-bars; a plurality of pockets having one end larger than the other and said larger end being open and said pockets being secured against the metal covering between the
40 cross-bars and over perforations and arranged in vertical planes between the heads whereby the larger open ends of the pockets will direct water and air in jets into the cylinder between the said cross-bars while the
45 latter tumble the articles that are being washed.

4. A washing machine cylinder having spaced-apart vertical heads, a plurality of cross-bars extending horizontally between
50 and connecting the heads and the outer side of each bar being substantially flush with the circumference of the heads, a metal covering encircling the cross-bars and having perforations extending therethrough between
55 said bars, individual pockets attached to the metal covering in horizontal rows between the cross-bars and heads and projecting outwardly beyond the circumference of the heads, and some pockets in a given horizontal
60 row between two cross-bars opening only in one direction while other pockets in the same row and between the same two cross-bars open only in a reverse direction.

In testimony whereof I affix my signature
65 in presence of two witnesses.

LORENZO R. ENGLISH.

Witnesses:

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G. FERDINAND VOGT.