

(No Model.)

2 Sheets—Sheet 1.

J. A. SALADIN.
BARLEY OR OTHER GRAIN WASHER.

No. 515,618.

Patented Feb. 27, 1894.

fig. 1.

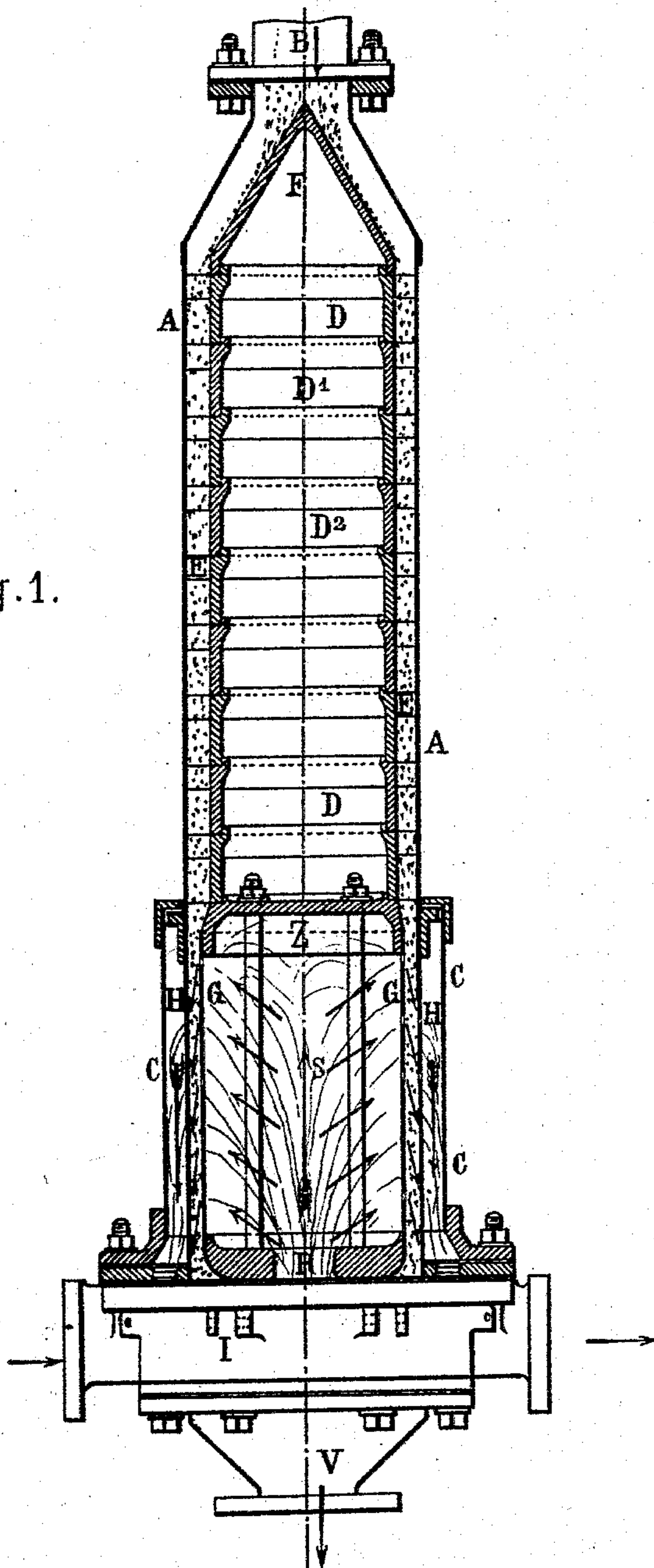


fig. 2.

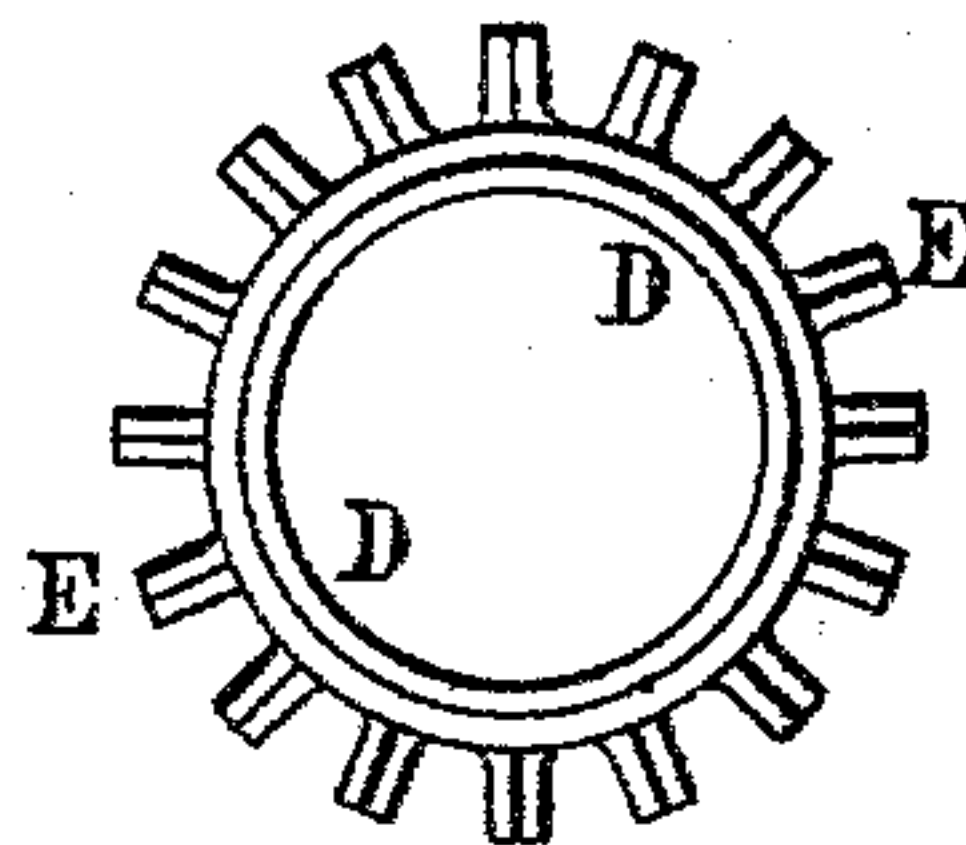


fig. 3.

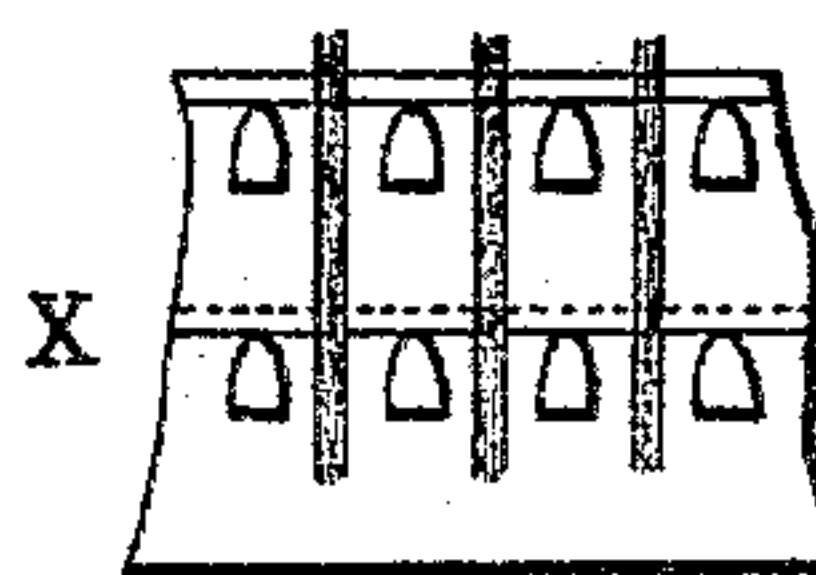
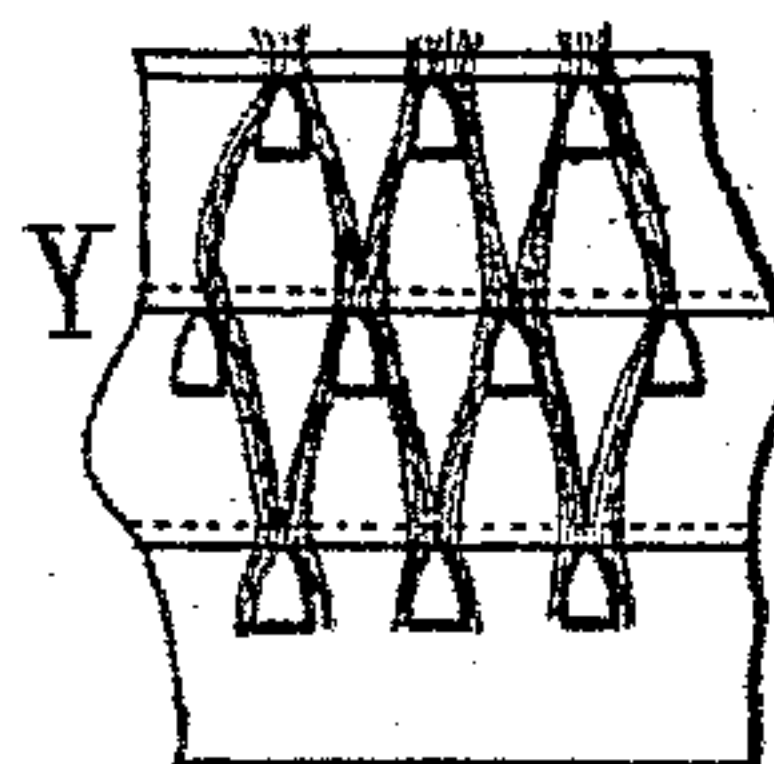


fig. 4.



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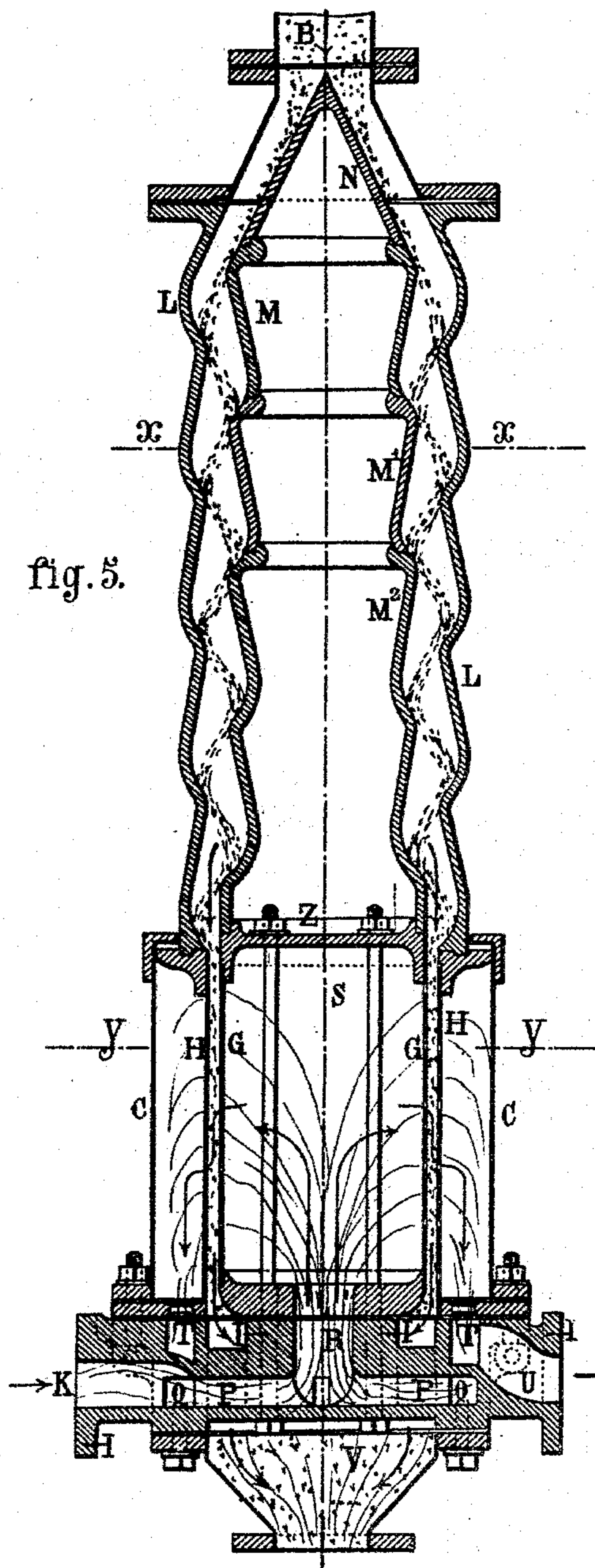


fig. 5.

fig. 7.

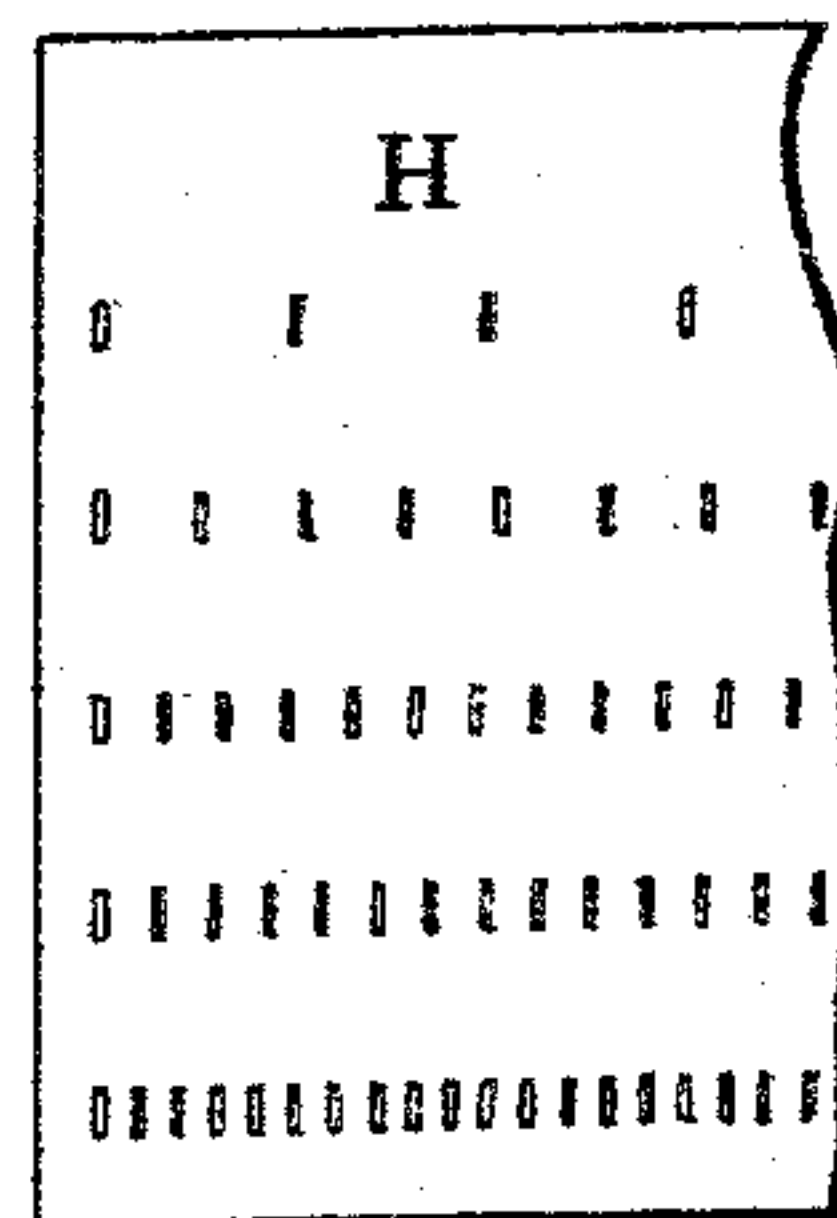


fig. 8.

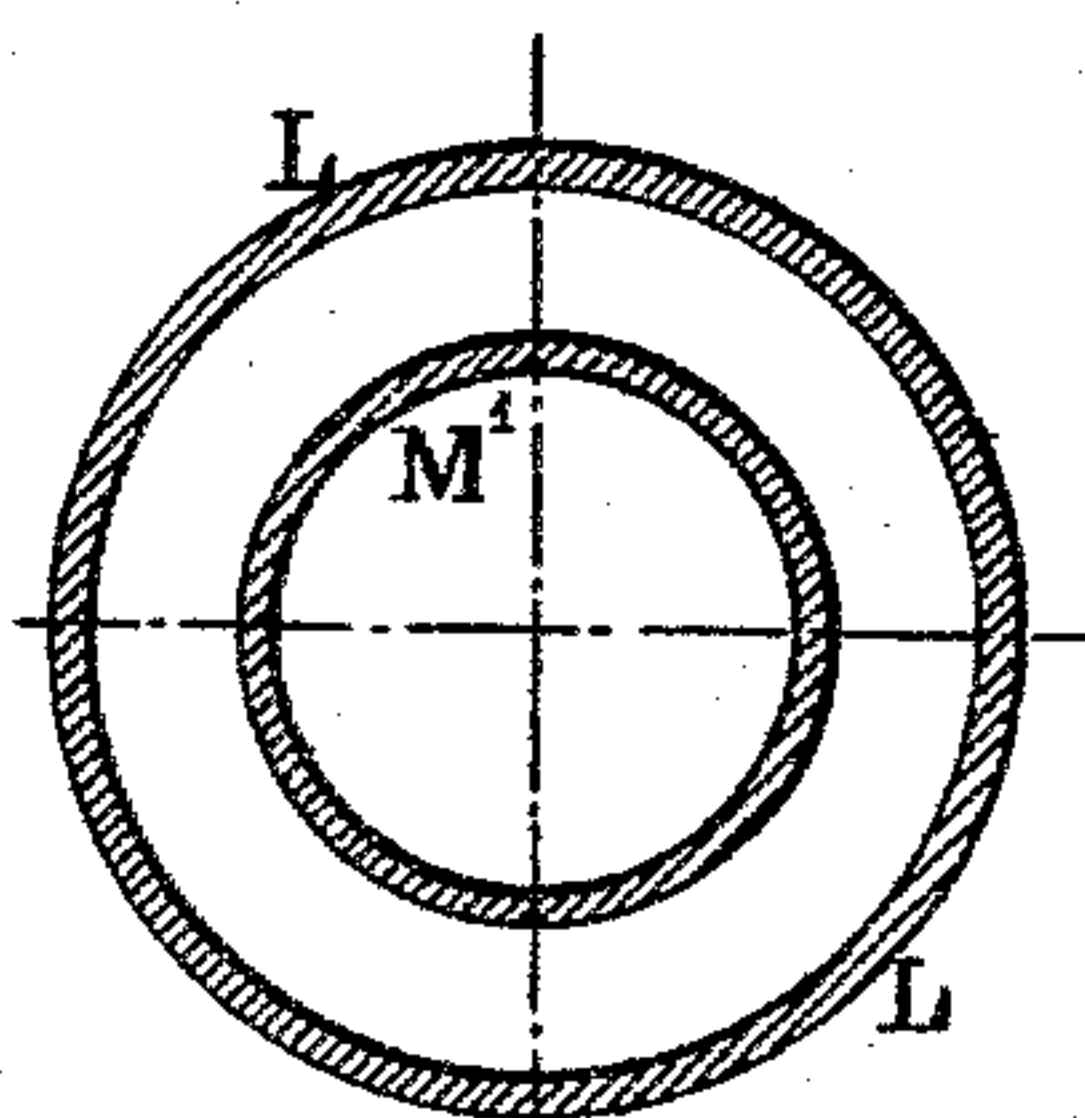


fig. 9.

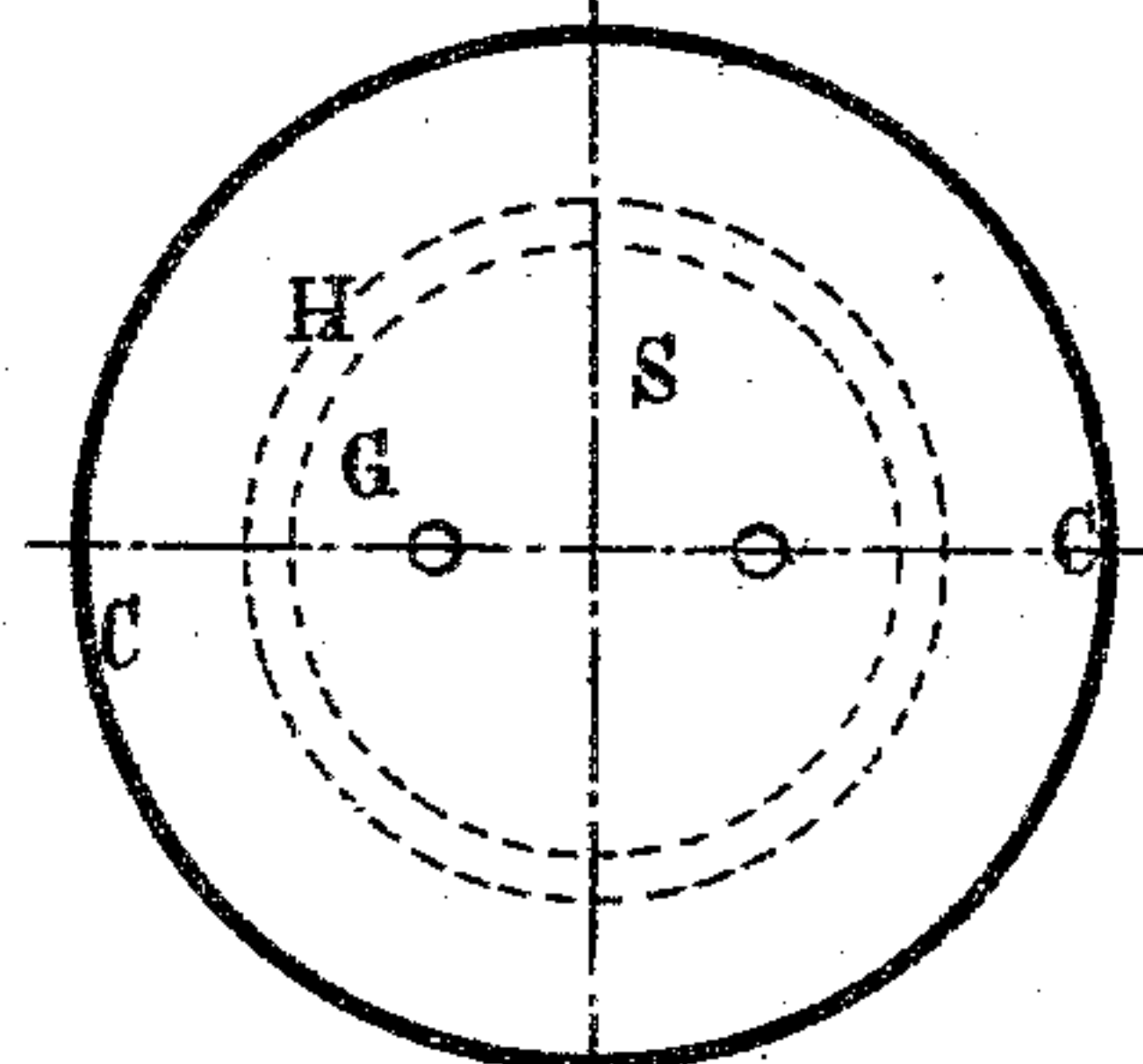
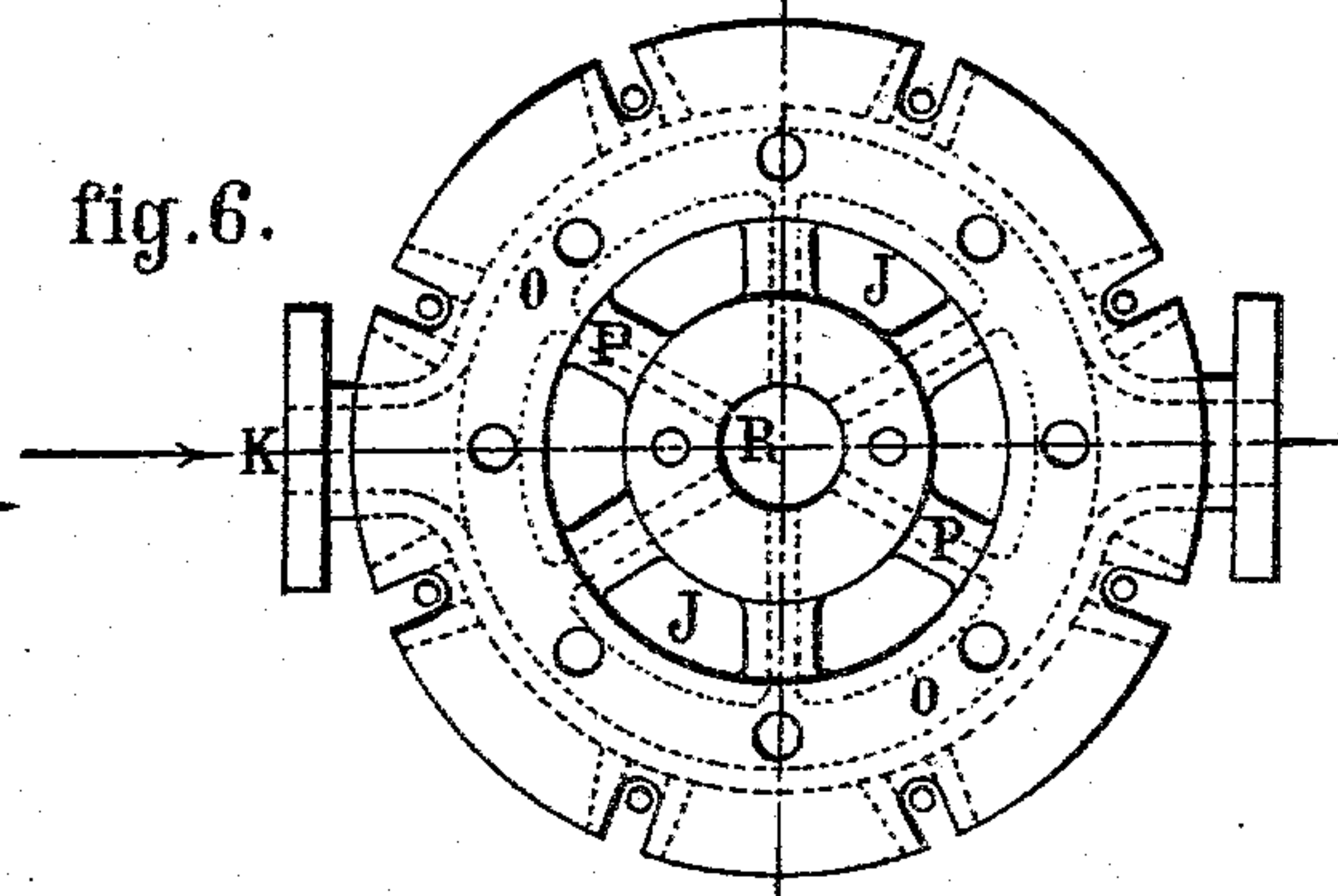


fig. 6.



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UNITED STATES PATENT OFFICE.

JULES ALPHONSE SALADIN, OF NANCY, FRANCE.

BARLEY OR OTHER GRAIN WASHER.

SPECIFICATION forming part of Letters Patent No. 515,618, dated February 27, 1894.

Application filed February 6, 1893. Serial No. 461,204. (No model.)

To all whom it may concern:

Be it known that I, JULES ALPHONSE SALADIN, a citizen of France, and a resident of Nancy, in the Department of Meurthe-et-Moselle, France, have invented a new and useful Improvement in Barley or other Grain Washers, of which the following is a specification.

This invention relates to apparatus for washing or cleaning grain or seeds or other granular materials or produce. The improved apparatus hereinafter described is more particularly applicable to the purpose of removing the impurities adhering to barley as delivered by the grower in order to cleanse it and prepare it for being placed in germinating cases for the manufacture of malt. The grain supplied to this improved apparatus is acted on in the first place by a washer or rubber in which the individual grains are caused to rub against each other and against fixed obstacles or rubbing surfaces in the presence of water. This constitutes the first stage of the operation. The grain is afterward caused to pass into a separating, filtering or rinsing apparatus in which the dirty water about the grain being the water charged with the impurities detached from the grain in the preceding operation is washed away by a stream of clean water. This constitutes the second stage of the operation. The two parts of the apparatus in which these two stages of the operation are performed may be connected together being arranged vertically one above the other as hereinafter described.

In order that this invention may be fully understood I shall now proceed more particularly to describe the same and for that purpose shall refer to the several figures on the annexed sheets of drawings the same letters of reference indicating corresponding parts in all the figures.

Figure 1 of the accompanying drawings represents in vertical section a washing or rubbing apparatus constructed according to this invention with a series of pins and Fig. 2 represents in plan one of the rings provided with pins as employed in this apparatus. Fig. 3 represents the development of a portion of one of these rings the pins being arranged vertically one above the other. Fig. 4 illus-

trates a modified arrangement in which the pins of one row are arranged opposite to the intervals between the pins of the adjacent rows. Fig. 5 illustrates in vertical section a washing or rubbing apparatus with annular or circumferential baffles or zigzag passages. Fig. 6 represents in plan the casting forming the base of the apparatus. Fig. 7 illustrates a development of a portion of the perforated sheet metal cylinder of the filtering apparatus. Fig. 8 represents the washing apparatus in horizontal section on the line $x-x$ Fig. 5. Fig. 9 represents a horizontal section of the filter on the line $y-y$ Fig. 5.

The washing apparatus is composed of a watertight external cylindrical casing A of sheet iron or other metal connected at one end with a tube B through which the grain is supplied to the apparatus and at the other end with a separating or filtering apparatus C. In the interior of this casing A there is a hollow cast iron column D built up with a series of rings $D^1 D^2$ fitted together one above the other. Each ring is provided on its external surface or periphery with pins or baffles E. A cone F is provided on the top of the central column for the purpose of dividing the falling mass or body of grain and distributing it equally at the circumference so as to direct it into the annular space between the cast iron column D provided with the baffles and the outer casing A. When the rings, all of which are provided with the same number of pins E, are arranged one above the other (Fig. 3, Development X) in such a manner that the pins stand in the same vertical lines, the grain falling in the space between two adjacent pins pursues a vertical direction without meeting any obstacle until it reaches the bottom, but when the second ring from the top is arranged below the first ring in such a position that its pins are situated under the intervals between the pins on the first ring as represented in Fig. 4 (Development Y) the grain after passing between the upper series of pins comes in contact with the lower series of pins so that the stream of grain is divided in two and the two divisions in like manner come in contact with and are again divided by the pins of the third ring and so on. The rings being thus arranged with the

pins of each ring over the spaces between the pins of the adjacent rings the grain is brought into contact with the pins in passing each ring and the streams are divided at each contact. The grains are thus caused to rub against one another and against the pins and as this action takes place in the presence of water the impurities on the surface of the grains gradually become detached and mix with the water.

When it is desired to wash the grain it is advisable to soak it previously for a few hours in an ordinary soaking trough with a conical bottom. The washing apparatus is then connected with the discharge tube of the trough. It is evident that the number of pins or obstacles with which the grain is brought into contact can be regulated according to the condition and nature of the materials treated. With this object it is simply necessary to cause any desired number or series of the rings to describe a fraction of a revolution so as to alter the relative positions of the pins or baffles and arrange the latter one above the other or otherwise as required.

Figs. 5 to 9 illustrate a modified arrangement or construction of apparatus which may be employed in carrying out my invention. According to this arrangement the apparatus is composed of an external cast iron casing L and an internal column M likewise of cast iron, forming between them an interval or annular space or passage down which the grain falls. The sides of this passage are formed by a series of inclined surfaces and circumferential obstacles over which the grain descends sliding over the surface of the cast iron and rubbing the grains together so that by the time it reaches the bottom it has been acted on by about ten obstacles or baffles each causing the direction of the stream to be changed.

As in the apparatus previously described the upper end of the column is provided with a cone N which divides the grain and directs it toward the circumference. The inner column may be shortened by taking away one or more of the removable rings M M' of which it is composed in order to reduce the number of baffles or surfaces of contact if required. The rubbing apparatus is placed in direct communication with the grain supply tube B and with the filter C in which the grain is washed and rinsed. The grain after being rubbed in apparatus constructed according to either of the arrangements hereinbefore described as examples and being mixed with the water which has taken up the dirt and impurities passes into the filtering or separating apparatus arranged underneath the rubber. The part of the apparatus in which this second stage of the operation is performed forms a continuation of the washer or rubber and is composed of three concentric casings. Two of these casings marked G and H constructed with perforated galvanized sheet iron are ar-

ranged in the interior of the apparatus with a space of about four and one-half inches (twelve millimeters) between them. The third casing marked C forms an external shell inclosing the apparatus and preventing leakage. The annular space between the two perforated sheets G and H is situated beneath the annular space in the washer through which the rubbed grain descends mixed with the water. This grain passes between the perforated plates where it is spread out in a thin sheet four and one-half inches thick with a descending movement. The perforations in the two plates or cylinders G and H are of course of such dimension that the grain cannot pass through them. The three casings of sheet metal are supported upon a hollow casting I perforated with holes or passages.

The passage or orifice K (Figs. 5 and 6) is for the admission of clean water. This water flows into a circular channel O communicating with six hollow arms P through which the water flows into a central passage R and ascends into the central space or chamber S in the inner perforated cylinder G. Another circular passage T communicates with the second annular space being the space between the cylinders G and H and discharges the water into the outlet U.

The action of the apparatus is as follows: The grain proceeding from the rubber passes in a thin layer into the annular space between the two perforated sheets G and H descends through the casting I passing through the openings J between the arms P and is discharged through a discharge orifice V whence it falls into the germinating case. As hereinbefore explained clean water is introduced through the opening K. This water ascends through the casting I until it reaches the inner space S and being supplied under a certain amount of pressure it passes through the perforations in the cylinder G and through the thin descending layer of grain and escapes through the perforations in the cylinder H into the annular space between this cylinder and the outer casing C. In passing through the thin layer of grain the clean water drives off the muddy water charged with the impurities detached from the grain and compels it to escape into the space between H and C whence it finally passes away through the outlet U carrying with it all the impurities with which the grain was contaminated.

In order to render the filter more powerful or efficient in its action the cylinders G H may be perforated in the manner represented in Fig. 7. According to this arrangement the holes of the upper series or row being the holes with which the grain comes in contact in the first place are comparatively few in number and set wide apart so as to allow a relatively small quantity of water to pass, the holes of the second and each succeeding se-

ries being set closer and closer together as they approach the bottom. By means of this arrangement, the grain as it descends is traversed by currents of water gradually increasing in force and volume and on arriving at the bottom of the filter is mixed with clean water only, being completely cleansed of all impurities.

To enable the action of the apparatus to be observed a short length of transparent glass tubing is connected with the dirty water outlet U which enables the amount of dirt or impurities carried with the water to be seen. With the same object the outlet for the water may be divided so as to obtain as many distinct currents as there are series of perforations in the outer perforated cylinder H for example in order to show the progress of the operation in different parts of the apparatus.

In case the orifices of the filter are accidentally choked by grains getting into the holes they may be cleared by unscrewing the bolts in the casing I which bolts are hinged so as to admit of being turned back and releasing the outer casing C which can then be lifted off or removed. The filter being thereby uncovered it can be easily cleaned and the holes cleared out if necessary.

These apparatus possess the advantage of being automatic in their action and requiring no motive power except that which is derived from the natural weight of the grain mixed with water.

The grain may be acted upon by any other suitable liquid or mixtures of liquids in place of the water hereinbefore described.

I do not limit myself to the precise forms, dimensions, proportions and materials here-

inbefore described and illustrated by way of example in the accompanying drawings, but

What I claim as my invention is—

1. In apparatus for washing grain, seeds, and like material, the combination with a washer or rubber having a continuous annular passage for descent of the grain together with a cleansing liquid, of a filter composed of concentric casings forming a continuation of the washer or rubber and provided with lateral passages through which horizontally directed currents of water or other rinsing liquid may be made to traverse the descending body of grain to carry away the dirty washing liquid and other impurities, substantially as described.

2. In apparatus for washing grain, seeds, and like material, the combination with a washer or rubber having a continuous descending annular passage provided with baffles, of a filter forming a continuation of the washer or rubber and composed of three concentric casings, the two inner casings being provided with perforations that are increased in number and set closer together toward the lower ends of said casings, and means for causing a flow of water through the filter in such manner as to pass through said perforations and traverse the grain in horizontal currents, substantially as described.

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

JULES ALPHONSE SALADIN.

Witnesses:

W. YONG,
G. DELONY.