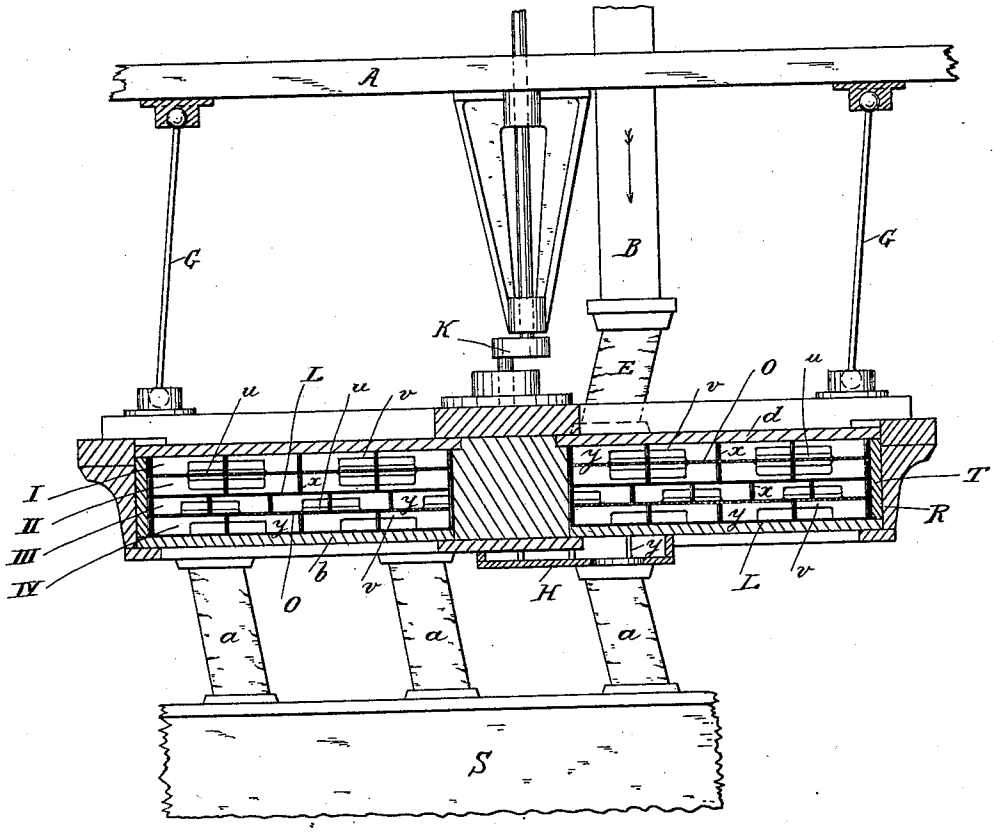
(No Model.) 2 Sheets—Sheet 1.

C. HAGGENMACHER.

CHOP GRADER.

No. 428,908. Patented May 27, 1890.

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

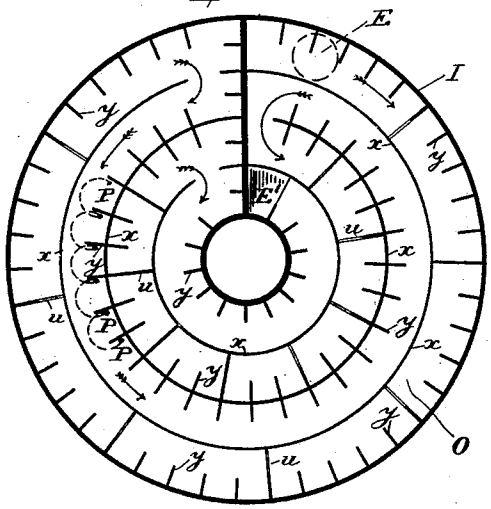


Fig. 3.

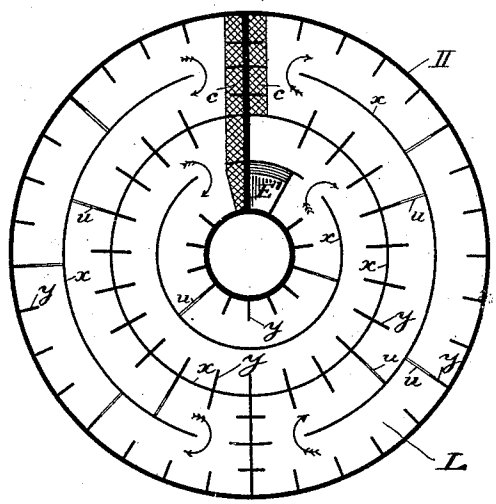


Fig. 4.

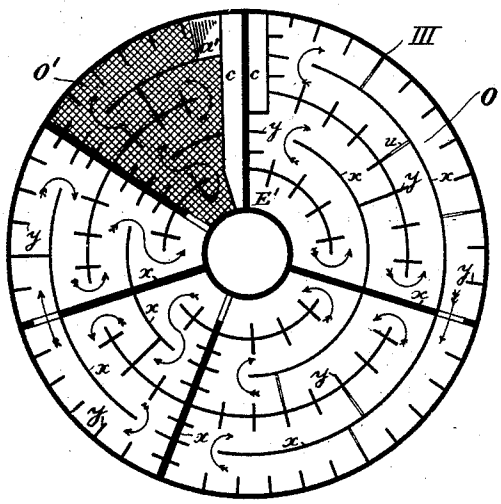
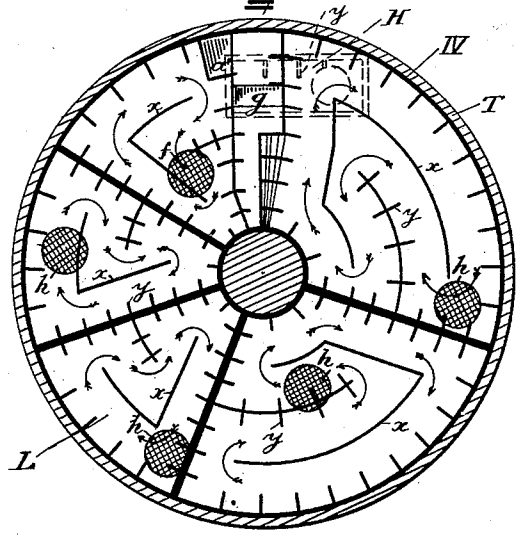


Fig. 5.



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UNITED STATES PATENT OFFICE.

CARL HAGGENMACHER, OF BUDA-PESTH, AUSTRIA-HUNGARY.

CHOP-GRADER.

SPECIFICATION forming part of Letters Patent No. 428,908, dated May 27, 1890.

Application filed January 10, 1890. Serial No. 336,535. (No model.) Patented in Brazil September 28, 1888, No. 625; in Portugal September 28, 1888, No. 1,288; in India October 22, 1888, No. 91; in South Australia October 24, 1888, No. 1,128; in Victoria October 27, 1888, No. 6,293; in New South Wales October 27, 1888, No. 1,037; in Canada October 31, 1888, No. 32,868; in Tasmania November 1, 1888, No. 624/10; in New Zealand November 6, 1888, No. 3,357; in Cape of Good Hope November 15, 1888, No. 485; in Queensland November 23, 1888, No. 683; in Switzerland December 1, 1888, No. 149; in Argentine Republic January 10, 1889, No. 772, and in West Australia April 17, 1889, No. 184.

To all whom it may concern:

Be it known that I, CARL HAGGENMACHER, a citizen of Switzerland, residing at Buda-Pesth, in the Kingdom of Austria-Hungary, have invented certain new and useful Improvements in Chop-Graders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Letters Patent have been obtained for this invention as follows: In Argentine Republic, No. 772, dated January 10, 1889; in Brazil, No. 625, dated September 28, 1888; in British India, No. 91, dated October 22, 1888; in Victoria, No. 6,293, dated October 27, 1888; in Tasmania, No. 624/10, dated November 1, 1888; in New South Wales, No. 1,037, dated October 27, 1888; in West Australia, No. 184, dated April 17, 1889; in South Australia, No. 1,128, dated October 24, 1888; in Cape of Good Hope, No. 485, dated November 15, 1888; in Portugal, No. 1,288, dated September 28, 1888; in Switzerland, No. 149, dated December 1, 1888; in Queensland, No. 683, dated November 23, 1888; in Canada, No. 32,868, dated October 31, 1888; in New Zealand, No. 3,357, dated November 6, 1888.

This invention relates to machines for sifting and sorting meal and flour of the class shown and described in my application filed September 29, 1888, Serial No. 286,743; and it consists in the novel construction and combination of the parts, as hereinafter fully described and claimed.

In the drawings, Figure 1 is a vertical section through the machine. Fig. 2 is a horizontal section through the middle of the first or top frame, drawn to a smaller scale. Figs. 3, 4, and 5 are respectively horizontal sections through the middle of the second, third, and fourth or bottom frames, Fig. 5 showing also the frame-box and supplemental chamber.

R is a box containing sifting and collecting frames, which will hereinafter be more fully described. The box R is pivotally suspended from a stationary support—such as the rafters A—by the rods G, and has a substantially horizontal circular oscillating or gyrating motion imparted to it by means of the revolving crank K or any other equivalent mechanism adapted to give the box a gyrating movement. The box shown is circular in form, corresponding to the frames which it incloses; but the said box and frames may be made polygonal, oval, or of other curved outline not truly circular without departing from the present invention, and the gyrations of the said box need not be confined to exactly horizontal or circular paths; but a circular box gyrating in a circular path is preferred for cheapness in construction and in a small machine.

The material to be operated on passes into the upper part of box R from the stationary chute B through the flexible inlet-pipe E, formed of textile or other suitable material.

S is a stationary receptacle below the box R and connected thereto by the flexible discharge-pipes *a*, similar to pipe E.

The frames I II III IV rest superposed upon the bottom *b* of box R, and are inclosed by its circular side wall T and lid *d*, which are secured together by any approved means. Each frame is provided with curved guide-slats *x*, in line with the main direction of the travel of the material, and with cross-slats *y*, substantially at right angles to such direction of travel.

For the purpose of turning over the material some of the slats *y* (preferably every alternate slat) have low ridges *u*, extending from the ends of them to the opposite guide-slat *x* or to the frame side. These ridges *u* are of a height about equal to the mean depth of the material operated on, and are not shown in the sectional plan views, to avoid confusion. Other of the slats *y* (preferably the alternating slats not provided with ridges *u*) are provided with bridges *v* at their tops, extending from their ends to the opposite slat *x* or to the frame side. These bridges are for the purpose of evening the material upon the frame-bottoms. They also strengthen the frames to which they are attached and help to support the frames above them. Some of

the frames are provided with bottom surfaces of perforate material O and others with imperforate bottom surfaces L. The perforate surfaces O may be formed of perforated metal, woven wire, or silk fabric, and are for sifting the material. The imperforate surfaces L may be formed of close-woven linen or any other substance through which the material cannot pass, and are for the purpose of collecting the material. The slats x and y are for the purpose of causing the material to travel upon the bottom surfaces of the frames in prearranged paths. The directing action of the slats upon the material is illustrated in Fig. 2.

P are particles of material which are caused to move in the paths of the dotted semicircles by the gyrations of the surface upon which they rest, the direction of their travel being determined by the side upon which the slats y are placed. These particles would move in circular paths; but as soon as they have performed the first halves of their circular journeys they meet the slats y, which arrest their motion during the time they would be passing over the second halves of the circles and only permit them to resume their journeys in the forward direction, as indicated by the arrows. By placing the slats in appropriate positions the particles can be caused to travel in any desired direction. The bottom surfaces need not be exactly horizontal, as the particles can mount inclined planes; but it is preferred to pivot the box horizontally to avoid accumulations.

The irregular shape and size of the particles, their friction against each other and against the sides and slats, and many other circumstances all tend to modify the theoretical semicircular paths in which the particles should travel; but what is true of a single particle is also true with regard to an immense number of particles when the surfaces over which they are caused to travel are sufficiently numerous, and the slats are arranged in a sufficiently complex manner to meet all requirements. Every particle is in turn brought in contact with some portion of the sifting-surface, and the collecting-surfaces are for the purpose of conducting the sifted material to certain desired parts of the remaining sifting-surfaces beneath them. The slats x keep the streams of material traveling in definite paths, and the arrangement of slats x and y may be varied and modified to an almost unlimited extent to adapt the machine to different sorts of material.

The sifting-surfaces may be combined with the collecting-surfaces in many different ways. For instance, two or more sorts of material might be operated upon simultaneously in a single box by using separate superposed segmental frames or by dividing the circular frames by suitable partitions. The sifting-frames may be provided with plain sifting-surfaces having meshes of equal size all over them, or the sifting-frames may have different-sized meshes at different parts of the same frame, adapting it to sort the material as well as to sift it.

In a machine constructed as shown in the drawings four frames I II III IV are used. Of these frame I is the uppermost, and the position of the inlet-pipe E is indicated by a dotted circle in Fig. 2. This frame is provided with the plain perforate sifting-surface O, over which the material is caused to travel in the direction of the arrows by the slats x and y. The material which is too coarse to pass through the sieve falls through the opening E′, and through a similar opening E′ in the bottom of frame II onto the corresponding portion of the perforate surface O of frame III, the position of the opening above being indicated by its reference-letter E′. The coarse material passes over the perforate surface O of frame III, as indicated by the arrows, and the very coarse particles are caused to travel onto the part O′, in which the meshes are very wide apart. The lumps which will not pass through O′ are discharged down the opening a' through a similar opening a' in frame IV and in the bottom of the frame-box. The very coarse material which passes through O′ is collected by the imperforate surface L of frame IV, under O′, and discharged through the opening f in said surface and in the box-bottom down one of the discharge-pipes a. The material which passes through the bottom O of frame I falls upon the imperforate bottom surface L of frame II and is conducted, as shown by the arrows, to the openings c. The material falls through these openings and through corresponding openings c in frame III onto the imperforate surface L of frame IV under said openings, upon which it is conveyed to the discharge-opening g.

As discharge-opening g is too near to opening a' for one of the pipes a to be connected to each conveniently, a small supplemental chamber H is provided under the opening g and secured to the bottom of the box. This chamber is furnished with slats y for directing the material to an outlet-opening in its bottom, where a pipe a may be conveniently attached.

Frame III has its bottom surface formed of perforate material O of different-sized mesh, and some of the slats x are arranged radially, so that its surface is divided into segments, each segment being adapted to separate a different grade of material.

The grades of material which fall through the bottom of frame III are kept separate upon the imperforate surface L of frame IV, which is divided up into corresponding similar segments. The material in the segments of frame IV is conveyed to the separate discharge-openings h and falls through similar openings in the bottom of the box down the remaining discharge-pipes a.

The openings f g h and the openings c of frame II may be covered with net-work, as

shown, to keep back anything which may not be wanted to pass through them—for instance, mesh-cleaning material, such as balls of wood; but the presence of this net-work is not essential to the action of the machine.

I do not claim in this application anything which I separately claim in the aforesaid application, Serial No. 286,743, filed September 29, 1888.

What I claim is—

1. In a chop-grader, a frame having a substantially horizontal gyrating motion and provided with curved guides in line with the desired main direction of travel of the material, and cross-slats *y*, extending part way across its surface between said guides for causing the material to travel over the said surface in substantially circular paths, as hereinbefore set forth.

2. In a chop-grader, the combination, with a horizontally-gyrating circular frame-box, of a series of circular superposed frames in said box, the bottom surfaces of said frames being provided with curved guide-slats *x*, in line with the desired main direction of travel of the material, and with cross-slats *y*, extending part way between said guide-slats for causing said material to travel, substantially as set forth.

3. In a chop-grader, the combination, with the horizontally-gyrating frame-box provided with an inlet at its top and outlets at its bottom, of the bottom frame having an imperforate bottom surface divided into separate non-communicating segments having radial sides and provided with separate outlets, each communicating with one of the said outlets of the box, and a frame superposed upon said bottom frame and provided with a perforate bottom surface divided into separate communicating segments corresponding with the said segments of the bottom frame and adapted to separate the material into different grades, both of the said frames being substantially circular in form and provided with guide-slats *x* and cross-slats *y*, for directing the material over their surfaces, substantially as and for the purpose set forth.

4. In a chop-grader, the combination, with the horizontally-gyrating frame-box having two separate outlet-openings in convenient proximity to each other, of a discharge-pipe connected directly to one outlet-opening, a small supplemental chamber secured to the bottom of the box below the other outlet-opening and provided with cross-slats *y*, for directing the material, an outlet-opening, and a second discharge-pipe connected to the said outlet-opening of the supplemental chamber at a convenient distance from the first said discharge-pipe, substantially as and for the purpose set forth.

5. In a chop-grader, the combination, with the horizontally-gyrating frame-box, of the series of substantially circular frames I II III IV, superposed one above the other in said box and provided with guide-slats *x* and cross-slats *y*, for directing the material, frames I and III being further provided with perforate sifting-surfaces and separate discharge-openings for unbolted material, frame II with an imperforate collecting-surface and openings *c*, discharging onto the bottom of frame IV, and frame IV with an imperforate collecting-surface divided into segments having radial sides and provided with separate discharge-openings and adapted to collect and discharge the different grades of material which fall into its said segments, substantially as and for the purpose set forth.

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

CARL HAGGENMACHER.

Witnesses:
H. GAEHLER,
WILLIAM MÁRIÁSSY.