

(No Model.)

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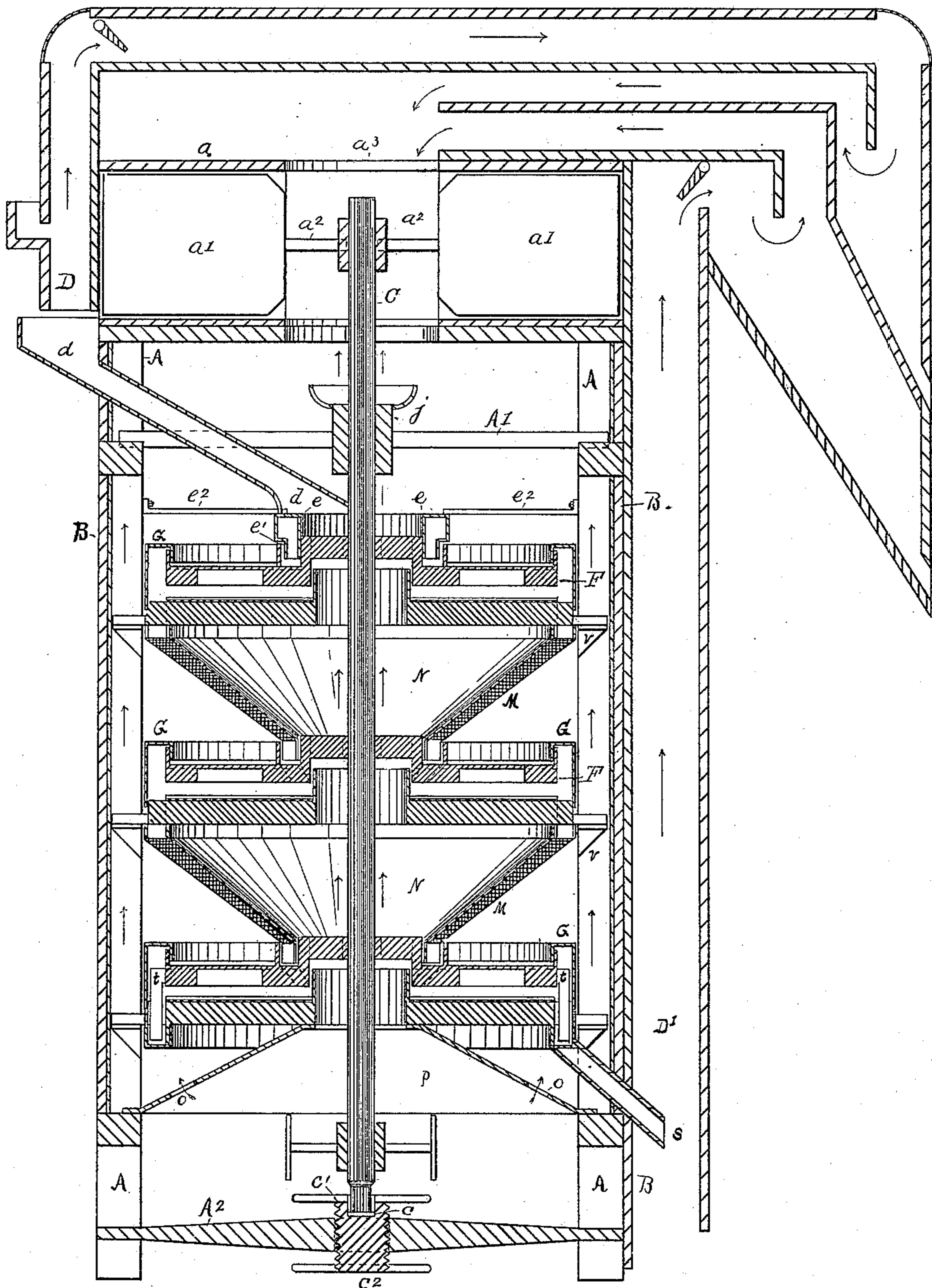
C. M. GILBERT.

GRAIN SCOURER.

No. 363,381.

Patented May 24, 1887.

Fig. 1



Witnesses:
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W. G. O'Brien.

Inventor:
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(No Model.)

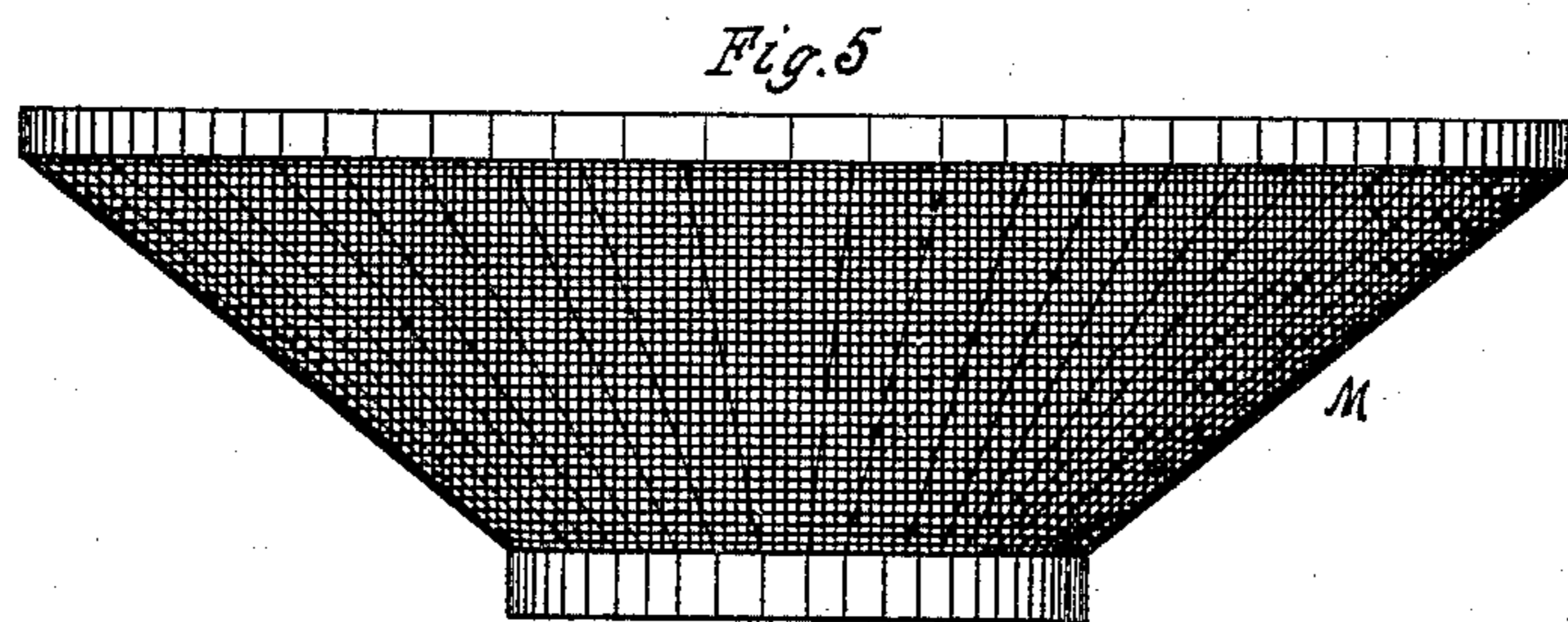
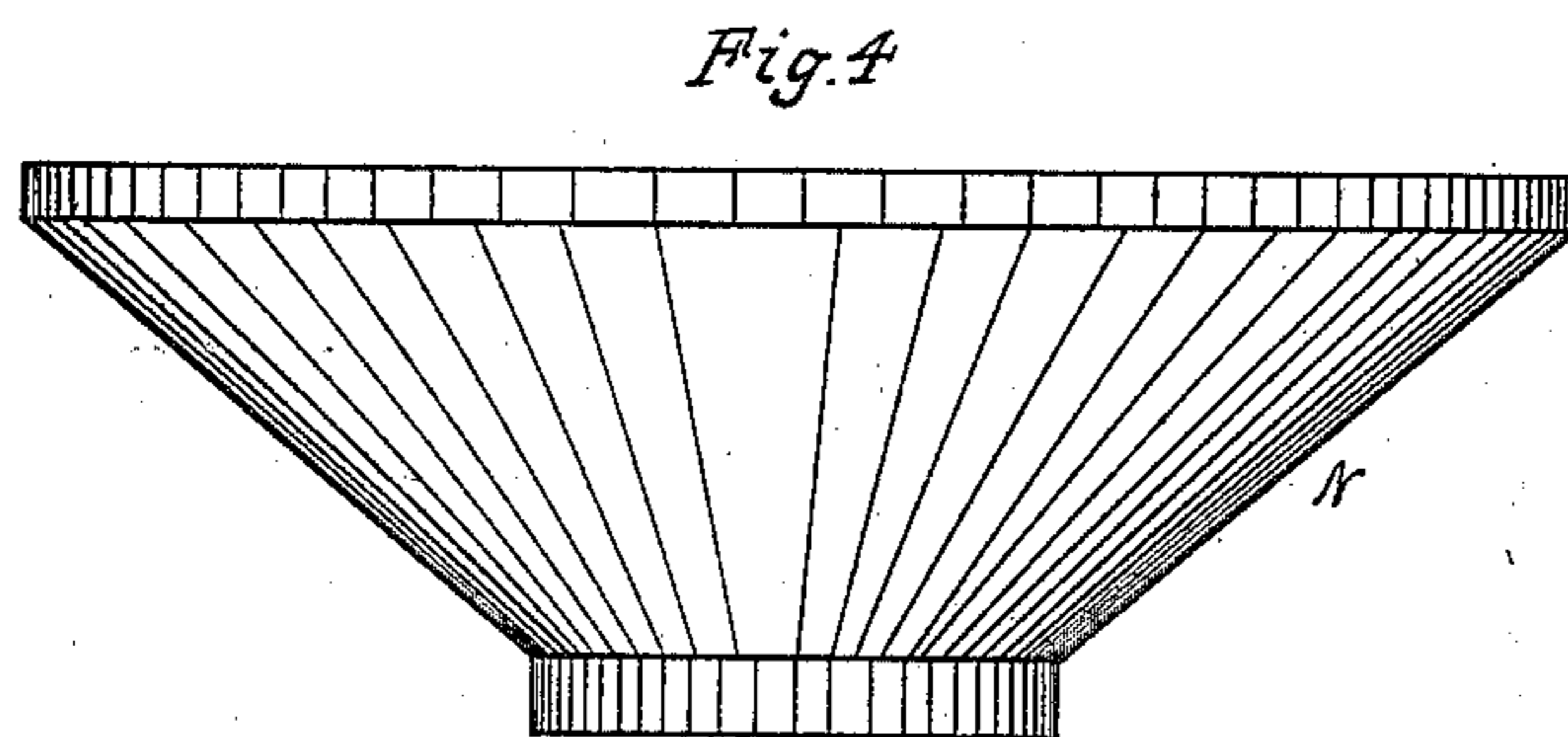
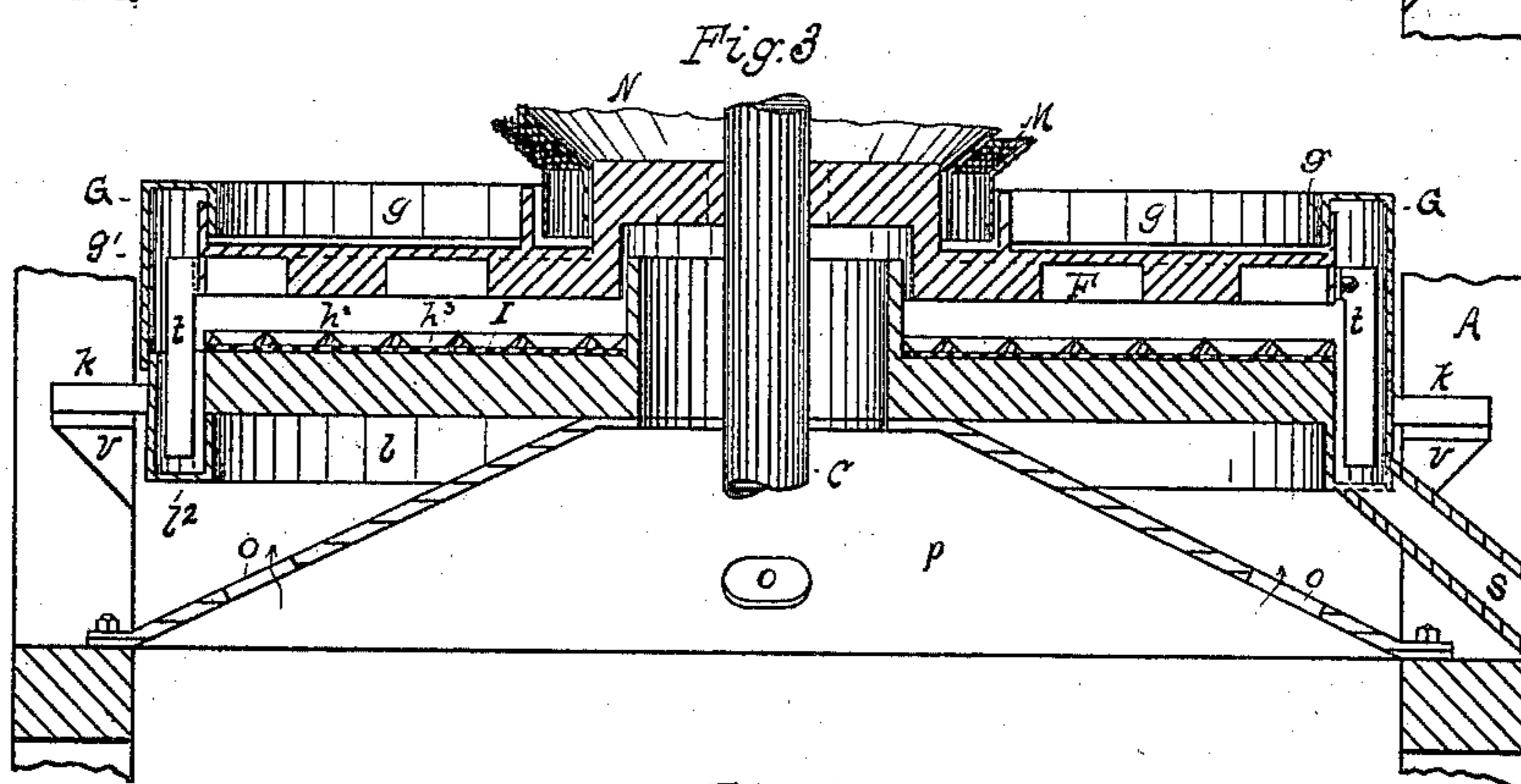
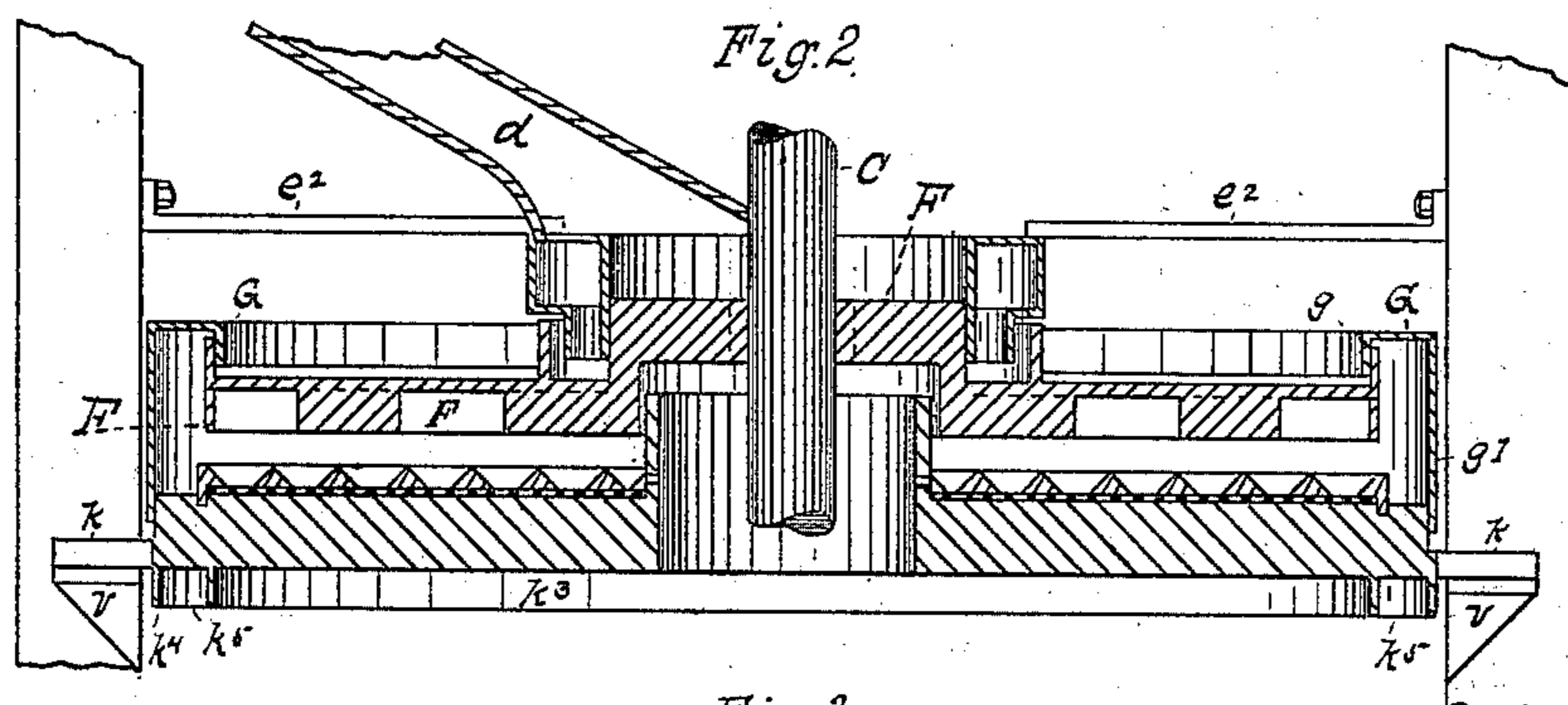
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C. M. GILBERT.

GRAIN SCOURER.

No. 363,381.

Patented May 24, 1887.



Witnesses:

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(No Model.)

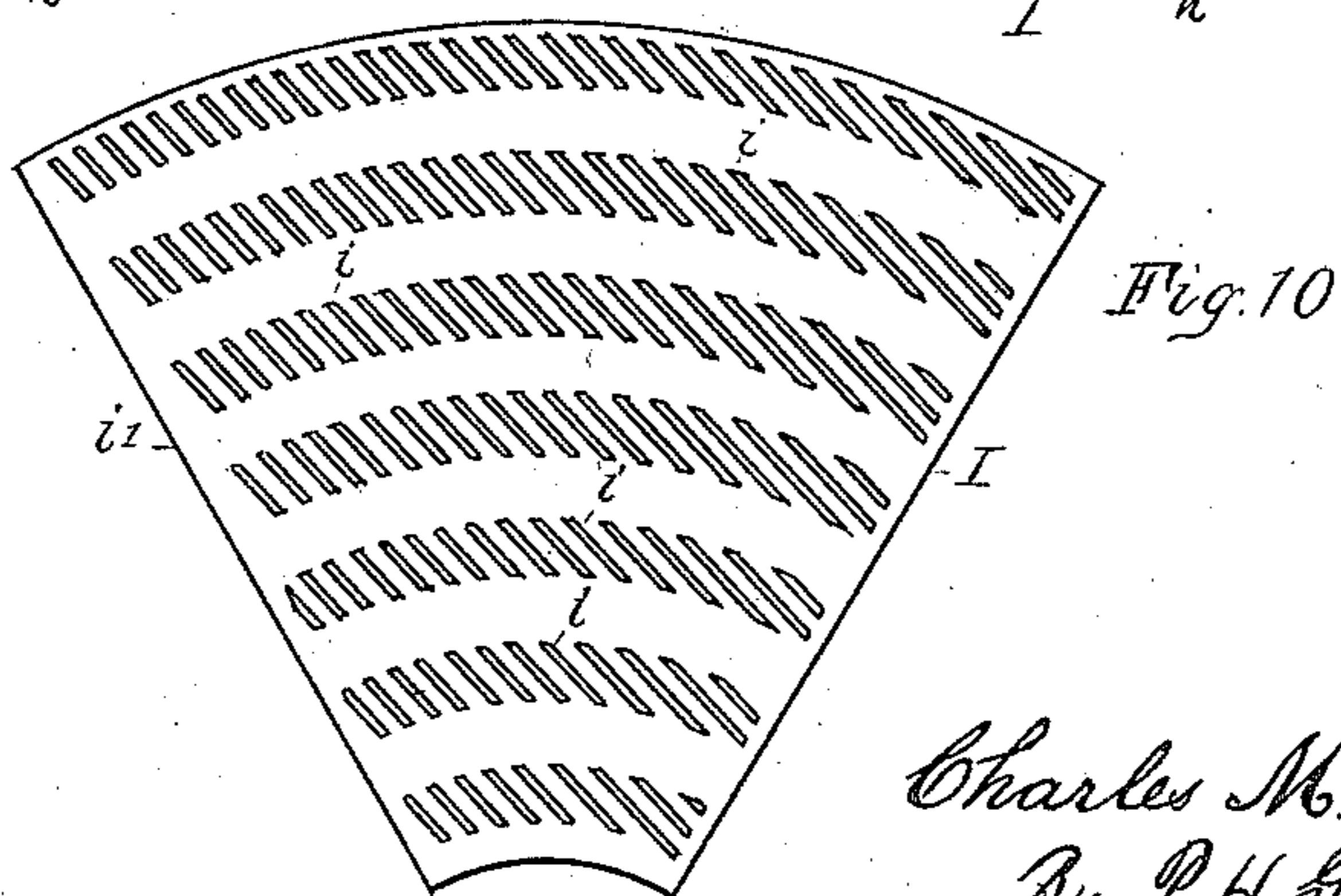
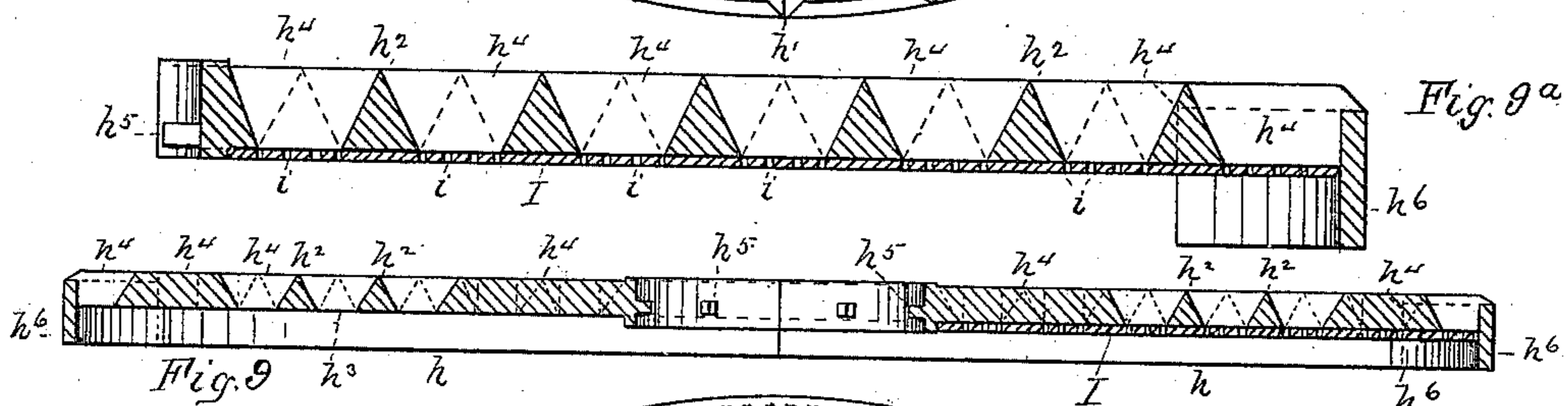
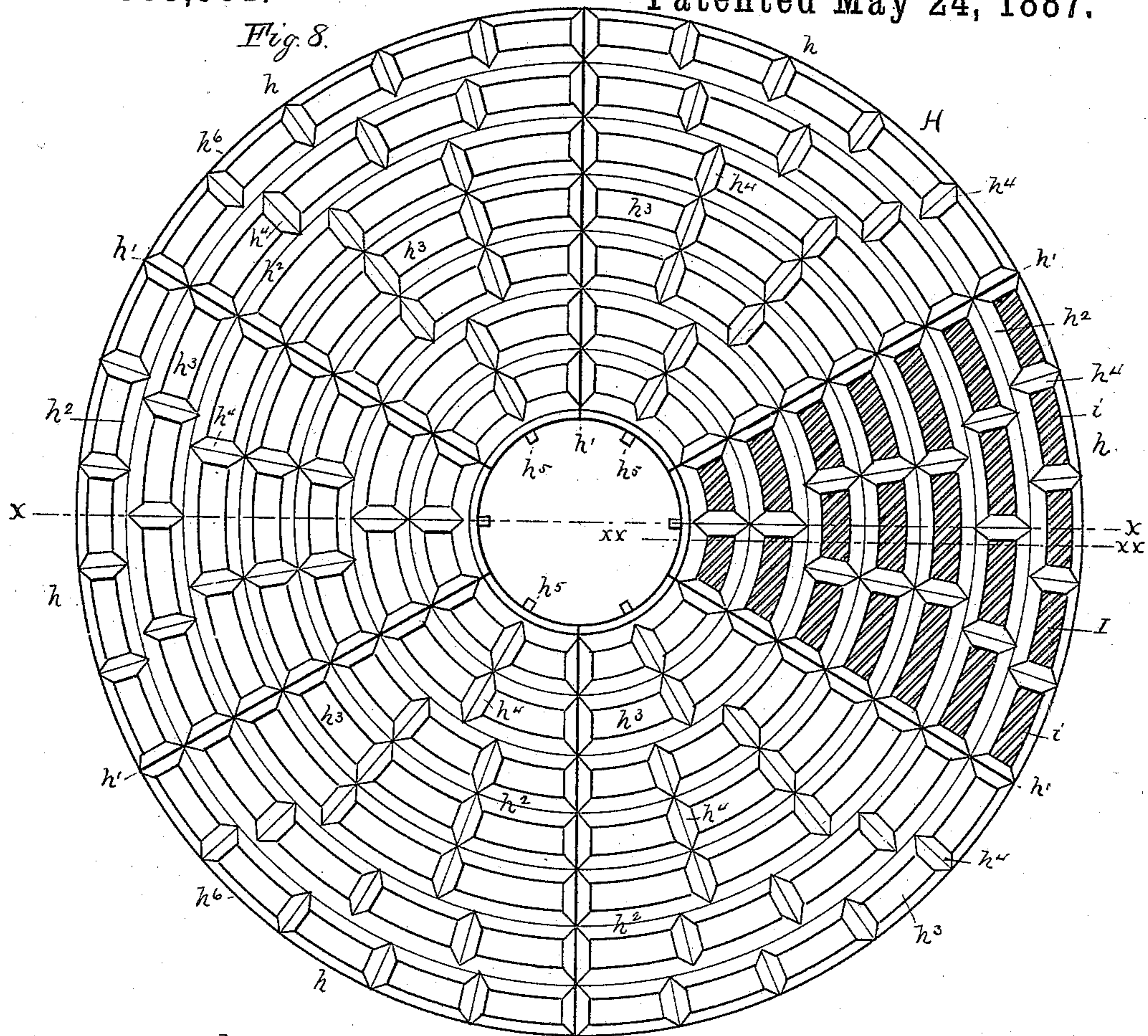
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C. M. GILBERT.

GRAIN SCOURER.

No. 363,381.

Patented May 24, 1887.



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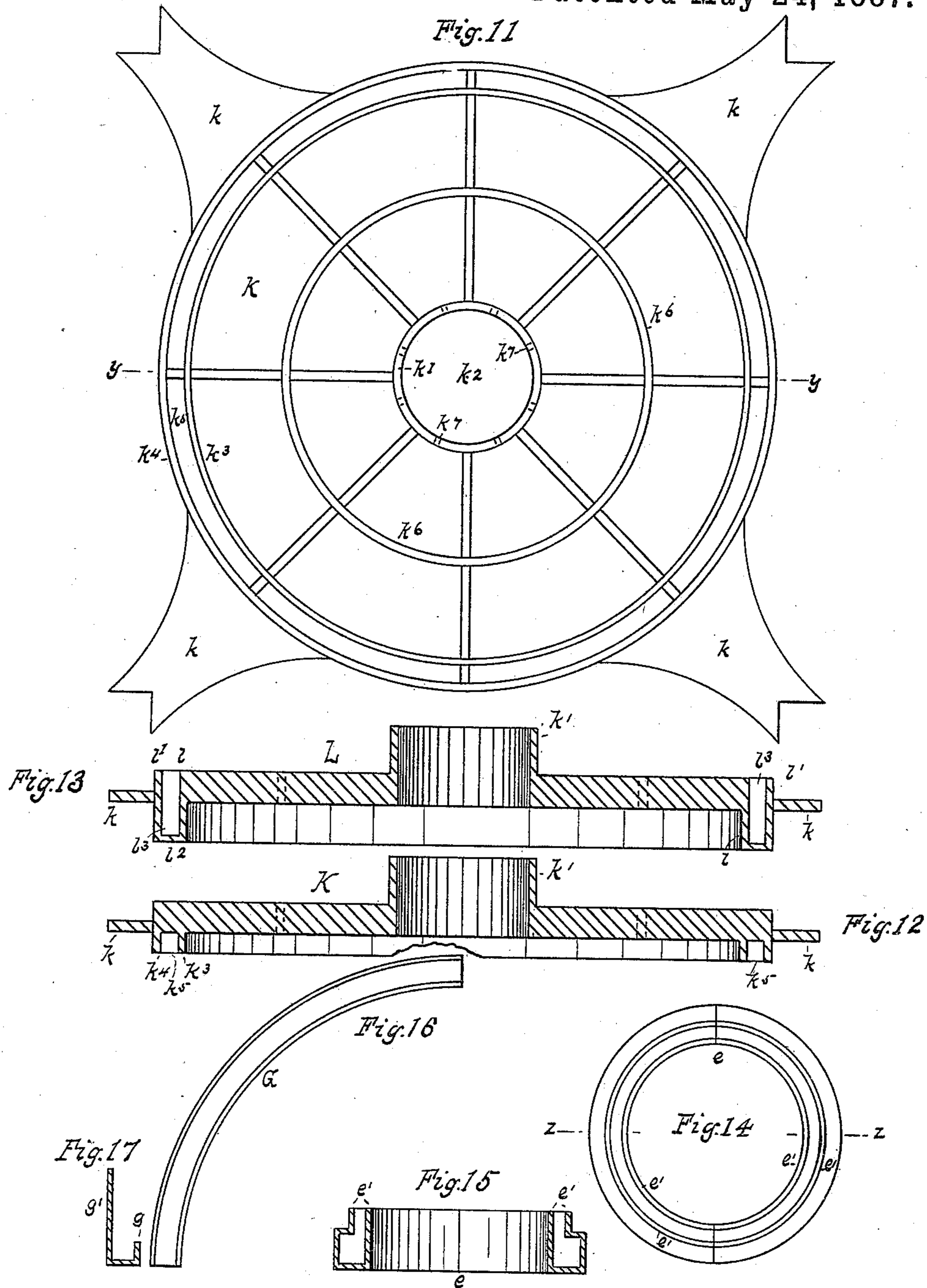
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C. M. GILBERT.

GRAIN SCOURER.

No. 363,381.

Patented May 24, 1887.



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UNITED STATES PATENT OFFICE.

CHARLES M. GILBERT, OF MINNEAPOLIS, MINNESOTA.

GRAIN-SCOURER.

SPECIFICATION forming part of Letters Patent No. 363,381, dated May 24, 1887.

Application filed August 25, 1886. Serial No. 211,784. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. GILBERT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Grain-Scourers, of which the following is a specification.

My invention relates to machines for scouring and cleaning grain.

The object of the invention is the production of a machine that will effect more thorough scouring and cleaning of grain than is accomplished by the ordinary machines for that purpose.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of the machine. Figs. 2 and 3 are central sectional views of the portions of the machine containing, respectively, the upper and lower sets of scouring mechanisms. Fig. 4 is a detail view of the inner sheet-metal funnel. Fig. 5 is a detail view of the outer funnel-shaped sieve. Fig. 6 is a top view in detail of the revolving scouring-plate. Fig. 7 is a bottom view of the same. Fig. 7^a is a section of the same on the line W W of Figs. 6 and 7. Fig. 8 is a detail view of the stationary scouring-disk. Fig. 9 is a section of the same on the line X X of Fig. 8. Fig. 9^a is an enlarged sectional view of one of the sections of the scouring-disk on the line x x x x of Fig. 8. Fig. 10 is a detached view of one of the sections of the perforated plate used in connection with the stationary scouring-disk used as a backing or cover for the disk. Fig. 11 is a detached view of the stationary spider for supporting the scouring-disk. Fig. 12 is a sectional view of the same on the line Y Y of Fig. 11. Fig. 13 is a sectional view of the lower spider which supports the lower scouring-disk, and which has an annular channel, into which the grain is discharged after passing through the scouring mechanism and by which the grain is carried to the separating-trunk of the machine. Fig. 14 is a detached view of the feed-cup secured to the frame of the machine and inserted between flanges on the revolving scouring-plate. It is illustrated in inverted position to show its flanges more clearly. Fig. 15 is a section of the same on the line z z of Fig. 14. Fig.

16 is a detail view of the cap fastened to the stationary spider and overlapping the flange on the revolving scouring-plate, and Fig. 17 a cross-section of the same.

A in the drawings designates the frame of the machine, and B its housing, placed in line with the outside of the frame and leaving a suitable space between the housing and scouring mechanism to form a passage around the latter for an upward current of air to the fan through the eye of the fan-case.

α is the fan-case, in which the blades α' of the fan operate, and α^3 is the eye of the fan-case. The blades are attached by their arms α^2 to the vertical shaft C, by which they are rotated. The shaft C is held in position by a journal, j , on an upper bridge-tree, A', and its lower end rests on a step, c , carried by a lighter-screw, c' , supported by the lower bridge-tree, A², and the shaft is lightered (raised or lowered) to adjust the revolving scouring-plates relatively to the stationary disks, as may be required for the work to be performed, by turning the lighter-screw c' , which may be screwed up or down in the bridge-tree A². When the shaft is at the desired point of elevation, the lighter-screw is held in position by means of the lock-screw c^2 .

d designates the feed-spout leading from the mouth of the wind-trunk D to a circular feed-cup, e , at the middle of the machine. The discharge end of the spout should be in curved form to conform to the curve of the feed-cup. The feed-cup is cast in halves, to facilitate placing it around the shaft and central opening of the machine and removing it when desired, and the semicircular sections, when joined, form a ring or cup with an open center. The ring or cup is hollow and at its under side has an opening extending its entire circumference, and has flanges e' extending downwardly from the sides of this annular opening. In placing the feed-cup in position the flanges e' are inserted between circular flanges on the revolving scouring-plate in such position as to prevent the latter flanges rubbing the former when in operation. A suitable opening is provided in the upper surface of the cup e for receiving the mouth of the spout d , and the grain is fed into the cup through this opening and thence descends

through the open bottom between the flanges e' and through the annular opening f^4 of the revolving scouring-plate to the fixed scouring-disk. The cup e is supported centrally to the machine by cross-bars e^2 , which are secured to the frame of the machine.

F is the revolving scouring-plate and is fastened by means of its hub f' to the shaft C, by which it is operated. The plate is of cast-iron or other suitable metal, of circular form, with a central opening around its hub, and has spokes f , for supporting it, extending from its hub f' to a flange, f^2 , surrounding and extending above the central opening of the plate. A flange, f^3 , also extending above the plane of the plate, is provided a short distance toward the periphery from the flange f^2 , and an annular opening, f^4 , through the plate is thus provided between the two flanges $f^2 f^3$ for the descent of the grain from the cup e to the stationary scouring-disk. There is also an upwardly-projecting flange, f^5 , around the extreme outer edge of the plate F, the purpose of which will be hereinafter fully explained.

On the under side of the plate F are cast projecting ribs or beaters of suitable width and thickness—an inch and a half high by an inch thick is deemed desirable—and which to make them durable should be chilled or hardened on their outer edges.

The beaters f^5 nearest the center extend from the inner flange f^2 through the space f^4 and beyond the flange f^3 onto the plate at the outer side of the flange f^3 , and should be of sufficient strength to sustain the weight of plate F. The beaters f^5, f^6, f^7 , and f^8 are preferably set in radial lines and in circular rows from the central opening to the outer edge of the plate and at about equal distances apart in their respective rows, and should vary in length and in the position of the rows, so as gradually to increase the number of beater-surfaces toward the periphery of the plate.

The ends of the beaters of each series should overlap those of the succeeding series to produce an unbroken beater action upon the grain as it is carried on its course from center to periphery of the scouring-disk.

The scouring-plate F, being fast to the shaft C, may be raised or lowered with the shaft by turning the lighter-screw e' to increase or diminish the space between that plate and the stationary scouring-disk, as may be required by the work to be performed. In being thus adjusted the flanges $f^2 f^3$ of the plate slide freely up or down around the flanges e' of the cup e , and the outer flange, f^5 , slides freely up or down around the flange g of the circular cap G.

G is an annular cap, the outer and longer side, g' , of which is bolted to the stationary spider, and the inner and shorter side, g , of which overhangs the flange f^5 of the scouring-plate, thus forming an annular box or inclosed space around the scouring-plate F and disk H for receiving the grain when it is carried over the edge of the stationary disk by the revol-

ving plate, and also for excluding the wind-current from the parts so inclosed. The cap G is preferably cast in sections of one-fourth its circumference for convenience in casting as well as in placing and removing it.

H is the stationary scouring-disk, made of chilled cast-iron or other suitable metal, and preferably in sections, h , of one-sixth or one-eighth of its circumference, in order that the parts may be used interchangeably and conveniently inserted or removed, and the sections are joined on the lines h' . (Shown in Fig. 8.) The sections h are made up of alternate segmental ribs h^2 and intervening spaces h^3 . The ribs are preferably made about a half-inch wide at the base and about a half-inch high and tapering from the base to the top. They may be conical or of any suitably angular shape in cross-section. In the drawings they are shown with their sides inclining in straight lines from the base to a sharp ridge; but they may be rounded at the top, and thus be made more durable. Connecting these ribs are cross-bars h^4 , of similar forms in transverse section to the ribs, and are of suitable number to stiffen the ribs and offer resisting-surfaces to the grain, and should increase in number toward the outer edge to decrease the length of the openings h^3 between the ribs. The sections h being joined together to form the disk H, the ribs h^2 form rings, and the intervening spaces h^3 become circular openings, broken into short arc-shaped apertures by the cross-bars h^4 .

The sections of the scouring-disk are secured to the stationary spider by means of lugs h^5 at one end passing through slots in the inner flange of the spider, and at the other end by a downward flange, h^6 , at the periphery of the disk which overhangs a flange near the outer edge of the spider.

I is a perforated backing for the openings of the scouring-disk H. This backing is preferably made of sheet-steel having short slots i in curved rows corresponding with the openings h^3 of the scouring-disk and cut at angles to the radii of the curves; but the slots or perforations i may be of any desirable shape, or wire-cloth may be used instead of perforated sheet metal. In place of a single plate forming the backing for the entire scouring-disk it is preferable to use sectional pieces i' , corresponding with the divisions h of the scouring-disk, as shown in Figs. 8 and 10, one of the perforated pieces being shown in position in Fig. 8.

I do not wish to restrict myself to the use of a scouring-surface of the character set forth to machines of the construction shown, for these parts may be constructed in shape of staves to form a cylindrical-shaped scouring case without departing from the principle of construction and operations of these features of my invention.

K is the stationary spider made fast to the frame of the machine by means of the brackets v , bolted to the frame A, and on which brackets

the spider is fastened and supported by its lugs k . A flange, k' , around a central opening, k^2 , of the spider extends upward into the central opening formed by the flange f^2 of the revolving scouring-plate and in close proximity to its sides. A central draft passage-way is thus formed through the scouring plates and disks.

k^3 k^4 are downward flanges around the outer edges of the spider, and between these flanges is a suitable space, k^5 , for the descent of the grain that has passed over the edge of the scouring-disk. To the outer flange, k^4 , is fastened the longer flange, g' , of the cap G, and the hollow of the cap and the annular space k^5 are thus connected and are shut off from the action of the fan-current.

k^6 is a ring connecting the spokes of the spider to stiffen them.

k^7 are the slots for receiving the lugs k^5 on the ends of the scouring-disk sections.

L is the lower stationary spider, constructed similarly to that just described, except that its outer flanges, l' , are connected by a bottom, l^2 , to form a circular trough or channel, l^3 , for receiving and holding the grain as it falls from the edge of the lower scouring-disk. Scrapers t , bolted on the periphery of the revolving scouring-plate and traveling in the trough l^3 , conduct the grain to an opening at the bottom of the trough, which communicates with a spout, S, for discharging the grain from the scouring mechanism.

M is a wire-cloth or other suitable perforated funnel-shaped sieve fastened around the outer flange, k^4 , of the stationary spider to receive the grain which has passed through one of the scouring mechanisms and conduct it into the next below, and N is a tight metal funnel placed within the funnel-shaped sieve M, and attached to the inner flange, k^3 , of the spider, for receiving the small particles which have fallen through the scouring-disk H and backing I. The funnel N prevents these separated particles from being again mingled with the grain and allows them to be drawn up by the fan action through the central opening of the machine. The funnel-shaped sieve M causes further separation of fine particles from the grain in its descent over the perforated surface, and the particles so separated are carried off by the fan action outside of the scouring mechanism.

The operation of the machine is as follows: The wheat or other grain in entering the feed-spout d is acted upon by the upward air-draft in the trunk D, and light matter, such as dust, chaff, &c., is taken from it. From the spout the grain descends into the feed-cup e , thence through its open bottom and through the opening f^1 of the revolving plate F onto the scouring-disk H, where it is subjected to the operation of the beaters of the plate F. The plate F being fast on the shaft C revolves with it, preferably at a speed of four hundred to six hundred revolutions per minute, according to the condition of the grain; and by the action of the beaters on the plate the grain is

carried around over the surface of the stationary disk H, and by coming in contact with the raised cross-bars h^1 in its course around the disk, and also with the ribs h^2 in its passage toward the periphery, the grain is rolled and turned end over end by the beater action. The scourings, dust, &c., removed from the grain by its passage over the disk fall through the perforations of the disk K and backing I into the imperforate funnel N and are prevented from again mingling with the grain, and are carried by the fan action upward through the central opening of the machine to the fan (as indicated by arrows) and blown thence into a dust-room or other receptacle for the purpose. The grain upon reaching the edge of the scouring-disk falls through the space k^5 between the outer flanges of the fixed spider into the funnel-shaped sieve M and descends over the surface of the wire-cloth into the opening f^4 of the next scouring-plate and onto the second scouring-disk, where it is subjected to the same treatment as above described. The dust, scourings, &c., sifted from the grain in its passage over the wire-cloth of the funnel-shaped sieve M are carried away by the upward current (indicated by arrows) outside of the scouring mechanisms. Upon entering the lower scouring mechanism the grain is subjected to the same treatment as heretofore described, and when thence discharged falls into the trough l^3 , whence the scrapers t deliver it to the spout S, which discharges it into the separating-trunk D', where it is again subjected to a fan-current for removing light matter. The light particles which fall through the lower scouring-disk and its backing are carried away by the outside draft, which is admitted through openings o in the bottom plate, p , of the machine.

What I claim, and desire to secure by Letters Patent, is—

1. In a grain-scourer, a stationary scouring-surface composed of ribs and cross-bars with intervening openings and a perforated backing for said openings, in combination with revolving beaters for carrying the grain over said scouring-surface.

2. In combination, a frame and casing, horizontal scouring-disks having apertures covered with perforated material, revolving beaters for moving the grain over the scouring-disks, outer funnel-shaped sieves for conducting the grain to the successive scouring-disks, inner imperforate funnels for receiving the scourings, and a fan for creating a draft centrally through said funnels and disks and exteriorly around said disks and sieves, substantially as set forth.

3. In a grain-scourer, in combination, a frame and casing, a fan and fan-case therein, a central vertically-adjustable shaft therein, scouring-plates rotated by said shaft, fixed scouring-disks, openings in said disks and perforated coverings therefor, funnel-shaped sieves for conducting the grain from one disk to another, imperforate funnels for receiving

the scourings from said disks, and disconnected draft passage-ways both centrally through said disks and funnels and around the exterior of said disks and sieves, substantially as set forth.

4. The combination, with a revolving scouring-plate having a central opening and circular flanges near said opening, of an annular feed-cup having the sides of its open bottom extending within said flanges, for the purpose set forth.

5. In a grain scourer, a revolving scouring-plate having a central opening and an upward flange around said opening, spokes at the upper portion of said flange bearing a hub, a flange encircling said inner flange, openings in the plate between said flanges, a flange around the edge of said plate, and beaters in radial courses projecting from the lower surface of said plate, substantially as set forth.

6. The combination, with a stationary spider and a revolving scouring-plate having an upward flange around its edge, of an annular cap having its outer side fastened to the periphery of said spider and its inner side overhanging said flange, for the purpose set forth.

7. In a grain-scourer, an upper revolving scouring-plate having downwardly-projecting beaters, in combination with a stationary scouring-disk composed of segmental ribs connected by cross-bars, annular openings between said ribs, and a perforated covering for said openings, for the purpose set forth.

8. The combination of the scouring-disk H, formed in sections h and comprising ribs h^2 and cross-bars h^4 , having the intervening openings h^3 , and the backing I, made in sections i' and having slots i , substantially as shown and described.

9. A scouring mechanism having a central and a surrounding draft passage-way, an interior imperforate funnel for conducting scourings to the central draft passage-way, and an exterior funnel-shaped sieve for conducting the grain and sifting small particles into the outer fan-draft passage-way.

10. The combination, with the spider K, having slots k^7 and flanges k^3 , of a scouring-disk composed of the interchangeable sections h , provided with lugs h^5 and a flange, h^6 , substantially as described.

11. In a grain-scourer, in combination, a revolving scouring-plate having a central opening and the spider K, having a central opening and provided with flanges k^3 k^4 , having the intervening openings k^5 , substantially as and for the purpose set forth.

12. In a grain-scourer, the spider L, having an annular trough, l^3 , formed by the circular flanges l^1 and bottom l^2 , in combination with the cap G, substantially as described.

13. The combination, with a spider having circular flanges forming an intermediate annular space for the descent of grain, of a funnel-shaped sieve attached to the outer flange and an imperforate funnel attached to the inner flange, for the purpose set forth.

14. The combination, with a revolving scouring-plate having a central opening and two circular flanges forming an annular space, of a funnel-shaped sieve for conducting grain to said annular space, and an interior imperforate funnel for preventing the mingling of scourings with the grain.

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