

(No Model.)

4 Sheets—Sheet 1.

H. C. BAKER & J. W. FREE.
MALTING MACHINERY.

No. 496,335.

Patented Apr. 25, 1893.

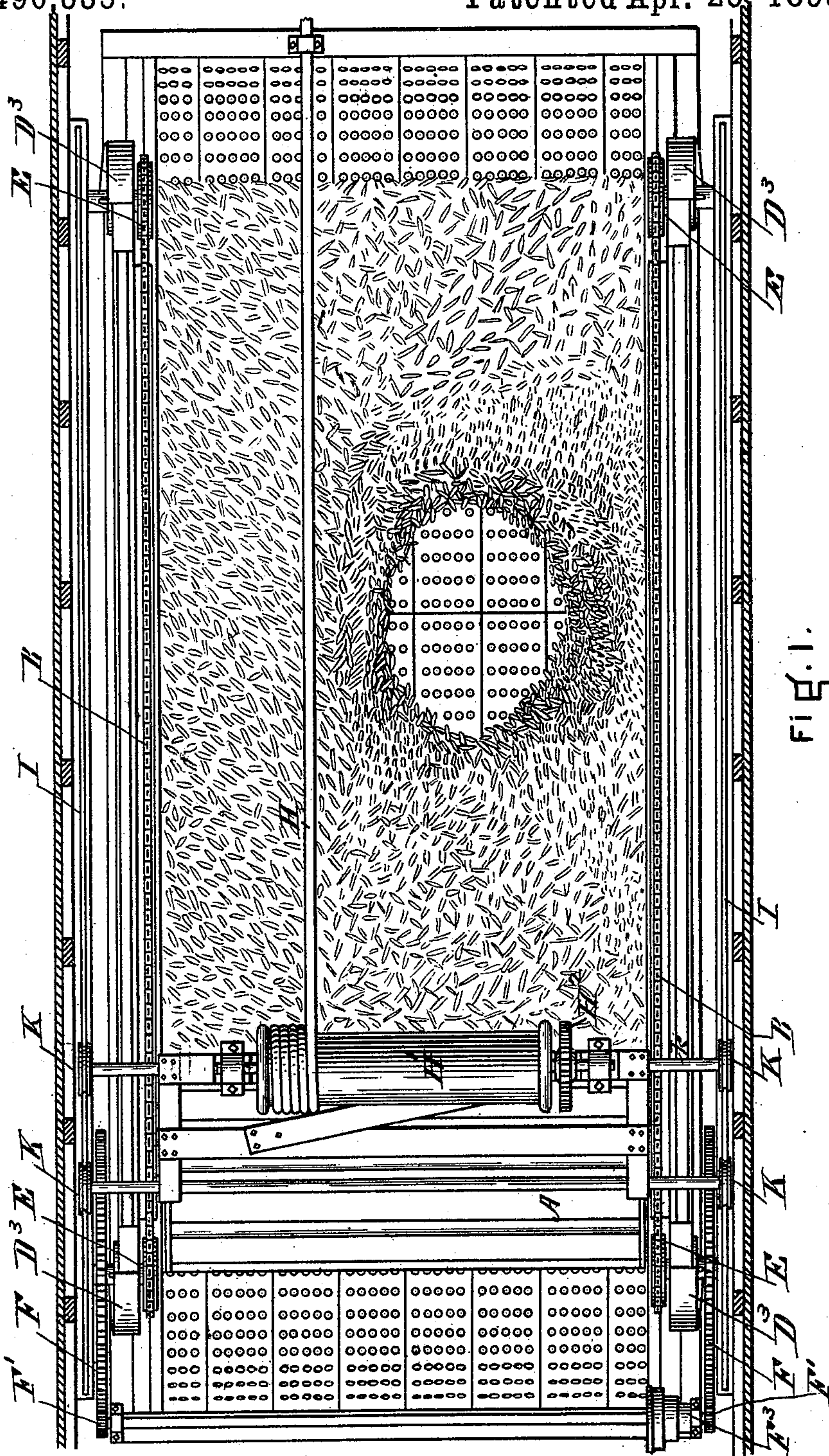


FIG. 1.

WITNESSES
Frank S. Parker
Edward S. Day

INVENTORS.
Humbert C. Baker
John W. Free

(No Model.)

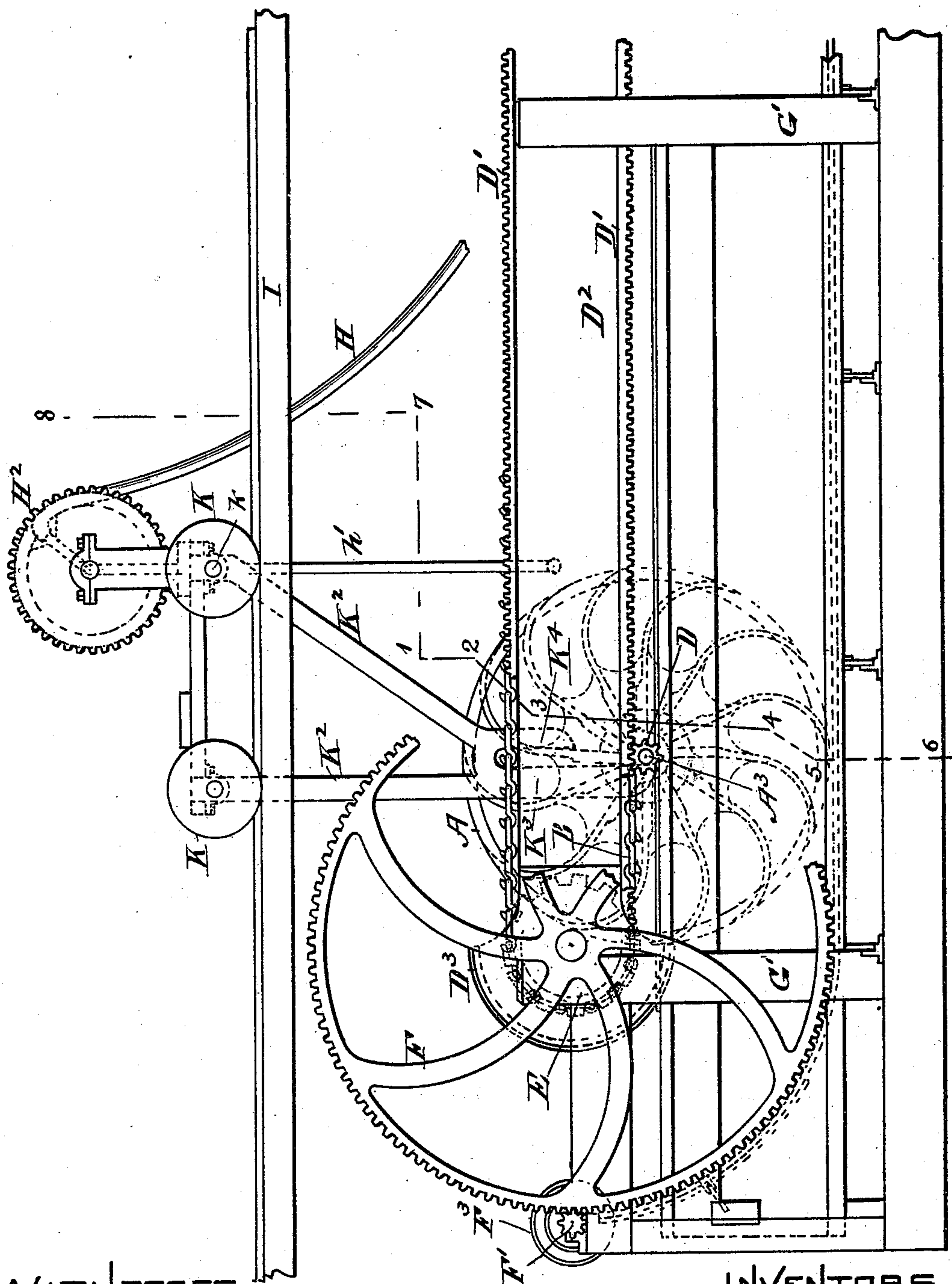
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WITNESSES

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FIG. 2

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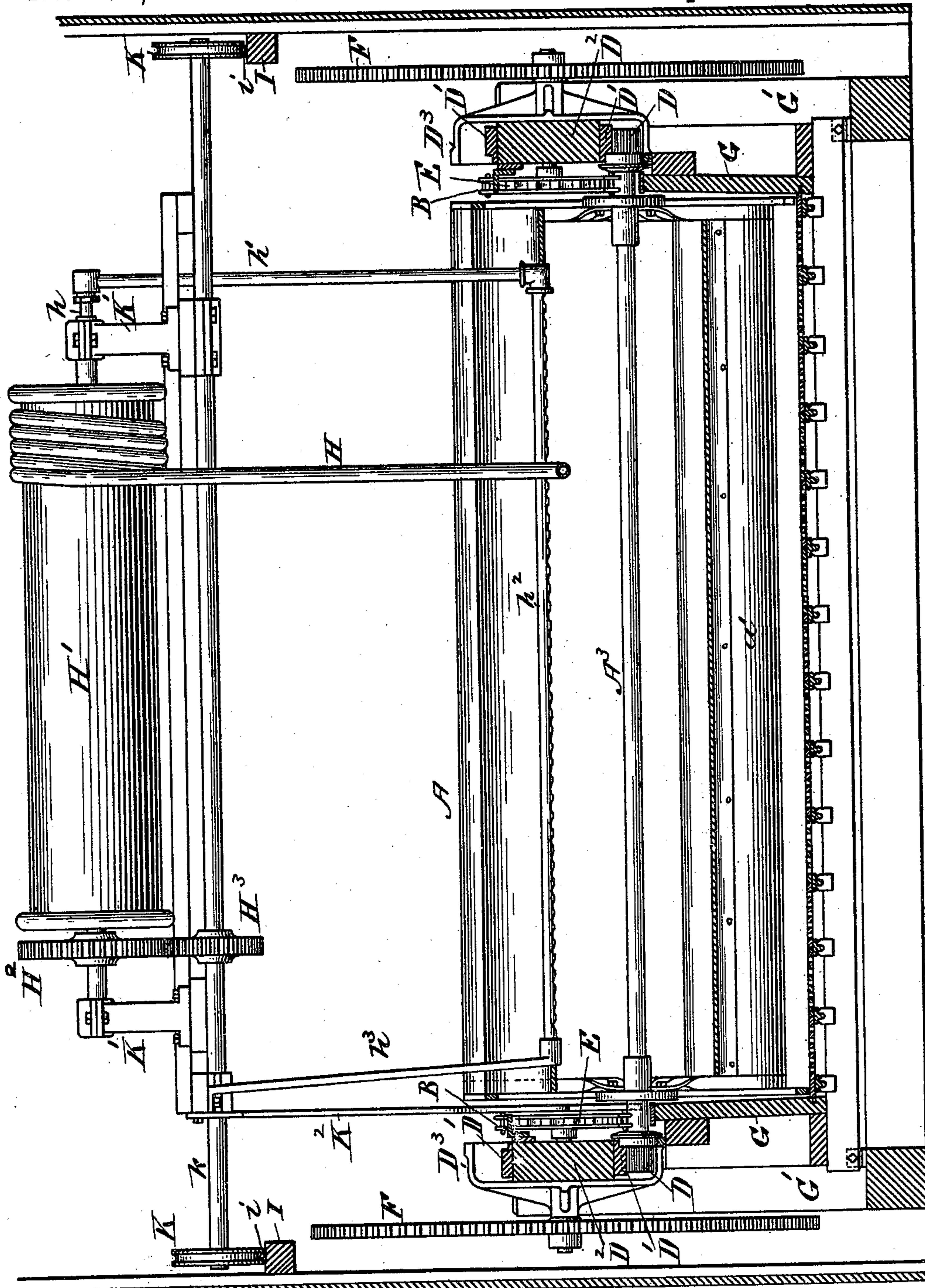
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FIG. 5.

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(No Model.)

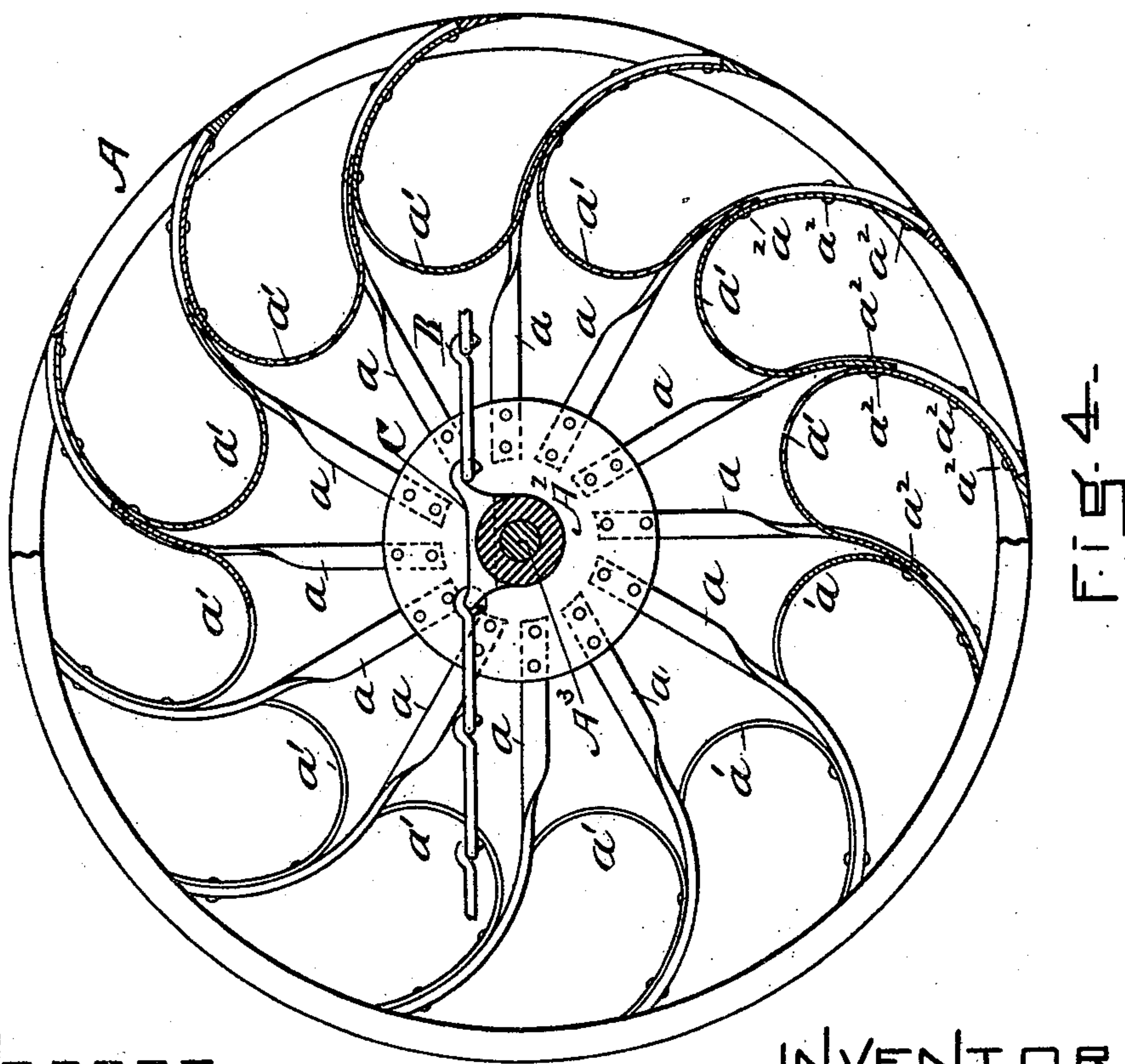
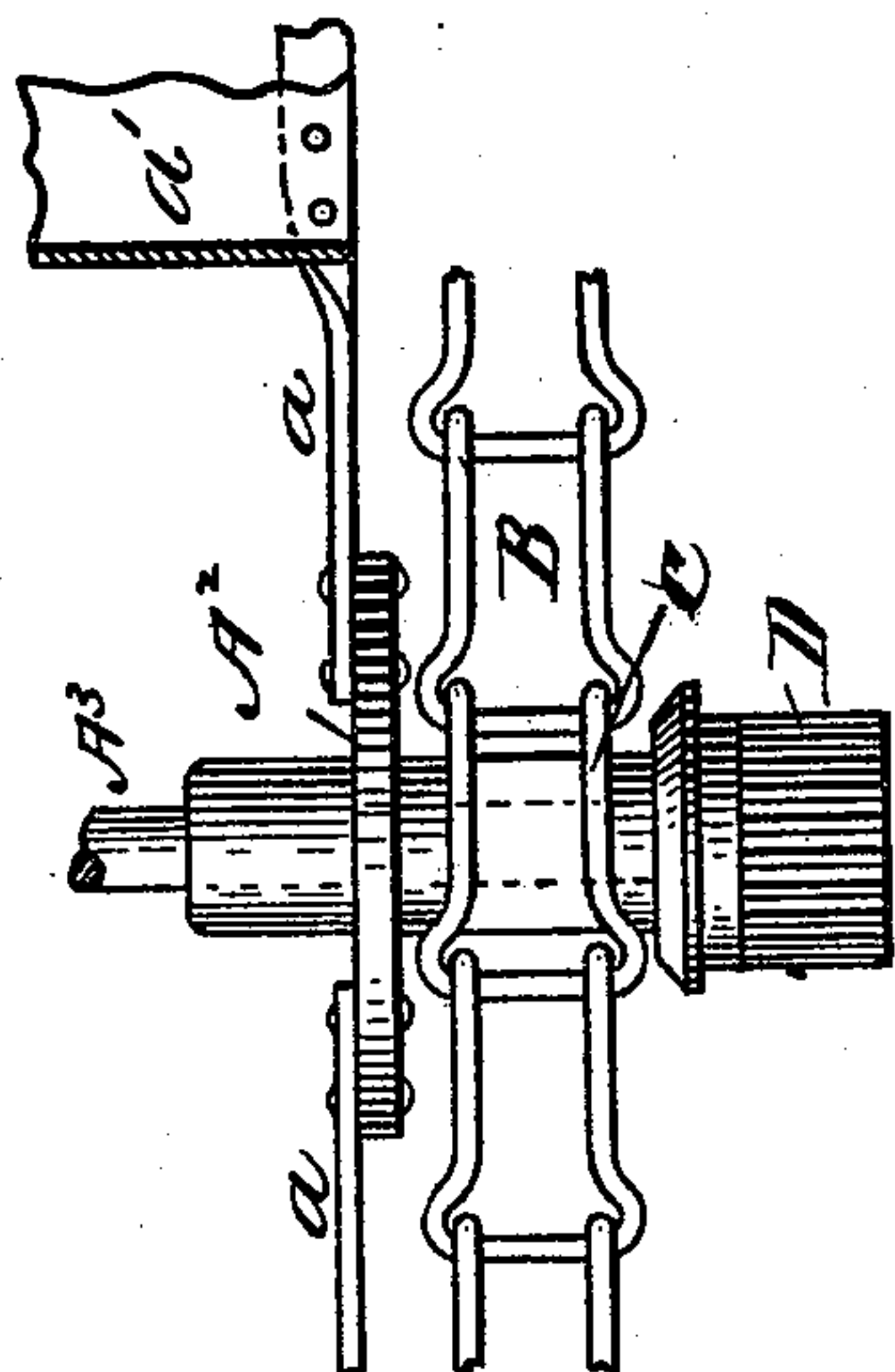
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WITNESSES.

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UNITED STATES PATENT OFFICE.

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MALTING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 496,335, dated April 25, 1893.

Application filed October 15, 1891. Serial No. 408,742. (No model.)

To all whom it may concern:

Be it known that we, HURBERT C. BAKER, of Hartford, in the county of Hartford and State of Connecticut, and JOHN W. FREE, of the city, county, and State of New York, both citizens of the United States, have invented certain new and useful Improvements in Malting Machinery, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention is an improvement in devices for stirring grain which is undergoing the malting process, and either while in the growing or the drying chambers or compartments of a malt-house.

Heretofore machinery has been employed for this purpose, but our present invention is an improvement on such devices and has for its object to provide a stirring device, automatic in its action, which when being impelled or operated by suitable motive power will pass in a direct line over a malting floor, stirring or turning the barley evenly and thoroughly in its progress, and which after each complete advance movement will return to its starting point without disturbing the grain. To accomplish this, we have devised,—and in this our invention broadly consists,—a malt-stirring or turning device which has (1) a rotary movement by which the grain is lifted up from the floor, turned over and deposited again on the floor; (2) a forward rectilinear movement bodily over or across the floor space, by which all the portions of the grain are successively lifted and turned, and (3) a retrograde movement bodily through a higher plane, by which after each advance the stirrer is returned to its starting point without disturbing the grain. By means of such an apparatus it is evident that all the grain on any floor may be evenly and perfectly treated whether during its germination or its drying, and the process of malting, which by the most approved appliances heretofore employed has been more or less uncertain, is rendered much more thorough and perfect.

Our invention also resides in certain details of mechanism which will be more fully hereinafter set forth.

In the accompanying drawings which illustrate our invention in detail: Figure 1 is a plan view of our improved machine as arranged in a chamber with a malt drying floor; but it may be here stated that the same machine arranged in a similar manner would be used for stirring the malt in the growing or germinating chambers, but the floor in such chambers would be imperforate. Fig. 2 is a side elevation, with some parts removed of one end of the machine. Fig. 3 is a transverse section of the machine on the dotted line 8. 7. 1. 2. 3. 4. 5. and 6 of Fig. 2. Fig. 4 is a transverse section of the stirring wheel on a larger scale. Fig. 5 is a plan of a portion of the shaft, hub, pinion and driving chain of the stirring wheel.

It will be understood that the barley to be malted after having undergone the preliminary process of soaking is spread on the floor of the growing chambers, or after germination in such chambers on the floor of the kiln or drying chamber, on either of which floors it is necessary to turn or stir it periodically.

Referring now to Fig. 1, A is the wheel which we prefer to employ as the device for effecting this turning or stirring, in connection with the other apparatus or parts which comprise the combination subject of our invention. This wheel, which is illustrated more in detail in Fig. 4, is mounted on a shaft A^3 to which are attached hubs A^2 . From these hubs radiate arms a which are twisted and bent forward as shown, and to these latter are attached sheet metal buckets a' . These buckets are made of bent sheet metal, and the leading end of each bucket is fastened about two-thirds of the way up the side of the next preceding bucket, as at a^2 ; it is then bent into a semi-cylindrical form on that portion of its perimeter which is nearest the hub and forms about a semi-cylinder in the part between the arms at this point. The nearest approach of the sheet metal bucket to the center of the stirring wheel is about one-third from the extreme circumference to the axis of the shaft. The outer edge of the rear portion of this bucket is formed upon a curve of greater diameter than the cylindrical portion just referred to, and the edges of this

bucket are fastened to the arms a , as shown. Arranged continuous with the outer edge or side of the bucket there is a metal scoop which extends out to the extreme periphery of the wheel. If this wheel be revolved in the direction of the edges of the scoops through a bed of grain, with a constantly progressive motion, it will lift the grain from its position on the bed, and will spill it again behind the wheel as it advances, and if the advance of the wheel and its rotation be properly regulated the grain will be lodged substantially on the same part of the floor from which it was gathered up.

As the means for revolving the stirring wheel and at the same time imparting thereto a progressive movement, we have devised and employ the means which we shall now proceed to describe.

The devices used in connection with each end of the wheel shaft being duplicates of each other, it will only be necessary to describe one set in detail.

At the end of the shaft A^3 of the stirring wheel is a pinion D which is cogged or toothed at its end, but provided with a smooth portion on the side of the stirring wheel and formed with a collar or flange, as shown. Between this pinion and the hub A^2 is a sleeve or block C which is loose on the shaft A^3 , permitting the free revolution of the same within it, and which is secured to one of the links of a chain B .

B is an endless lag chain which passes around two sprocket wheels E placed at opposite ends of the floor space upon which the grain is spread. One of these sprocket wheels is mounted on and fixed to a shaft that carries a gear wheel F which receives its motion from a pinion F' engaging therewith and mounted on a driving shaft carrying a belt pulley F^3 to which power may be applied. Inside the lines of the chains B and sprocket wheels E are the sides of the tank or receptacle which confines the germinating or drying grain that is to be stirred by the wheel A . The wheel A reaches across this tank and comes close to its sides so that ends to the wheel are not necessary.

The sprocket wheels and driving mechanism above described are supported on vertical posts G rising from the floor timbers of the chamber in which the machine is placed, and these posts also support the track stringers D^2 the width of which is approximately that of the diameter of the sprocket wheels E . These stringers have semicircular ends corresponding in radius with the sprocket wheels and to their upper and lower and end edges are applied racks D' with which the pinions D engage. At the ends of the stringers D^2 are secured curved guides in the forms of hoods D^3 the axes of which are coincident with the axes of the sprocket wheels.

Beneath the lower horizontal rack sections and parallel therewith are guide rails T' that

form together with the hoods D^3 a continuous track around the curved end and lower horizontal sections. Upon these tracks the smooth portions of the pinions D rest so that at all times during the progress of the stirring wheel A the pinions D will be held in engagement with the racks either by gravity, as when they are traveling along the upper horizontal sections of the rack, or at other times by the hoods D^3 and rails D' . At the same time the wheel is prevented from lateral displacement while doing its work by the engagement of the flanges on the pinions with the sides of the rails D' .

The operation of the machine is as follows: Power being applied to the driving pulley F^3 , rotation is imparted to the cog wheel F and the sprocket wheels on the shafts of the same. This sets in motion the endless chains B , which drag forward the shaft of the stirring wheel. The engagement of the pinions on this shaft with the stationary racks causes said shaft and wheel to revolve. The forward movement of the wheel A being along the lower rack section, the scoops and buckets of the wheel lift the grain and then deposit it again on the floor. The wheel on reaching the end of its forward course travels to the upper rack section and returns along the same to its starting point, being thereby raised so as not to reach the bed of grain. In germinating malt by this machine, we have found it necessary from time to time to sprinkle it, because the moisture is rapidly absorbed by the germination, or is carried off by ventilation, and should be maintained by a supply of fresh water. In order that this may be done regularly while operating the machine, track beams I are supported on posts some little distance above the top of the wheel F . On these beams are secured tracks i on which a carriage is mounted for carrying a sprinkling apparatus. This carriage has wheels K , two of which are on a shaft k , shown in Fig. 3, which shaft carries a cog wheel H^3 . In standards K' carried on top of the carriage is mounted the hose roller H' . This hose roller is hollow and has a hollow shaft at one end h , which communicates through a stuffing box with the pipe h' . This pipe communicates by an elbow with the perforated pipe h^2 , which extends across the machine and one end of which is carried in a bracket h^3 dependent from the carriage. Roll wheel H^2 which meshes into roll wheel H^3 is on the axis of the roller H' ; on the exterior of the roller H' is coiled a flexible hose H , one end of which communicates with the cavity of the roller H' or a pipe extending from the periphery to the hollow shaft, and the other end of which is attached to a source of water supply. It is obvious that water can be supplied through the hose to the radial pipe or interior of the roller H' and through the hollow bearing h and the pipe h' to the perforated pipe h^2 , and this perforated pipe

can, by moving the apparatus along the malt tank, be carried to any place and deliver its water to any portion of the length of the tank. It is desirable that this water shall be sprinkled upon the grain as it falls from the bucket of the stirring wheel A; consequently the pipe h' and the perforated pipe h^2 are arranged to be in the line of the vertical tangent of the wheel A, and in order that they shall always hold this position there are attached to the carrier two pendants K^2 which come together at or about the line of the axis of the wheel A, and there form a fork, one blade of which is shown at K^3 in Fig. 2, and the other blade of which is shown at K^4 in the same figure. These two members of the fork straddle the shaft A^3 of the stirring wheel, and when the wheel is moved from right to left in a machine in the position represented in Fig. 2, with the shaft of the stirring wheel below the track stringer D^2 , the member K^3 of the fork will be engaged and the carriage carried forward and the hose unwound from the roller H' . When the stirring wheel reaches the hood D^3 and rises up to the upper track D' of the machine represented in Fig. 2, it will rise through the long notch of the fork and finally reach the upper part of the fork, and as the stirring wheel begins to travel from left to right out of the grain, the member K^4 of the fork will be engaged with the shaft A^3 of the stirring wheel and will drive the carriage backward reversing the action of the gears H^3 H^2 and roll up the hose H upon the roll H' . The water can be readily shut off at any time desired.

It will now be understood from the nature of the mode of operation of the machine or combination of apparatus hereinbefore described, that the essential features of the invention, as recited above, are in large measure independent of the special means employed in connection with the stirring wheel or device for imparting to the same the desired movements, and that the details of the several mechanisms described as elements essential to the combinations of our invention may be varied in many particulars.

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

1. The combination with a malting floor, of a stirring wheel capable of rotation on its axis, of forward movement bodily in a plane parallel with the floor, and retrograde movement bodily in a higher plane, and mechanism for imparting and guiding such movements, substantially in the manner set forth.

2. The combination with a malting floor, of a rotary stirring wheel mounted on a shaft parallel with the floor, a track supporting said shaft and advancing and returning above the floor at different elevations, means for imparting rotation to the stirring wheel and

means for propelling it along the track, as set forth.

3. The combination with a malting floor, of a continuous track above the same advancing and returning at different elevations, a shaft traveling on and confined to said track, a stirring wheel carried by the shaft, and means for propelling the shaft along the track, as set forth.

4. The combination with a malting floor, of a continuous track advancing and returning above said floor at different elevations in the same vertical plane, a rack or racks along the line of the track, a pinion shaft traveling along the track and engaging with said rack or racks, a stirring wheel carried by the shaft and means for propelling the shaft along the track, as set forth.

5. The combination with a malting floor, of toothed or racked tracks one above the other, a pinion shaft engaging therewith, a stirring wheel carried by the shaft, an endless chain to which the shaft is connected with the capability of rotating, sprocket wheels supporting and driving the chain, whereby the shaft is propelled along the tracks in opposite directions, and means for confining the shaft to the tracks, as set forth.

6. The combination with a malting floor, of an endless track advancing and returning above the floor at different elevations and formed with cogs or teeth, a pinion shaft engaging with the tracks, a stirring wheel carried by the shaft, a driving chain by which the shaft is drawn along the track and a guide parallel to the track for maintaining the pinion shaft in engagement therewith.

7. The combination with a malting floor, of the track stringers D^2 provided along their edges with racks D^3 , the sprocket wheels E, chain B, pinion shaft A^3 and stirring wheel A, and hoods D^3 for the purpose described.

8. The combination with a malting floor, of stringers D^2 having circular ends, racks attached to the edges of the stringers, a shaft provided with pinions engaging with said racks, a stirring wheel carried by said shaft, the endless chain B, sprocket wheels E and means for imparting rotation to the same, as set forth.

9. The combination with a malting floor, of a stirring device capable of an advancing and retrograde movement in different planes above the floor, a sprinkling device mounted on a track parallel with the planes of advancing and retrograde movement of the stirring device and a connection between the said sprinkling device and the stirring device which is extensible vertically, as set forth.

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In presence of—

F. F. RAYMOND, 2d,
J. M. DOLAN.