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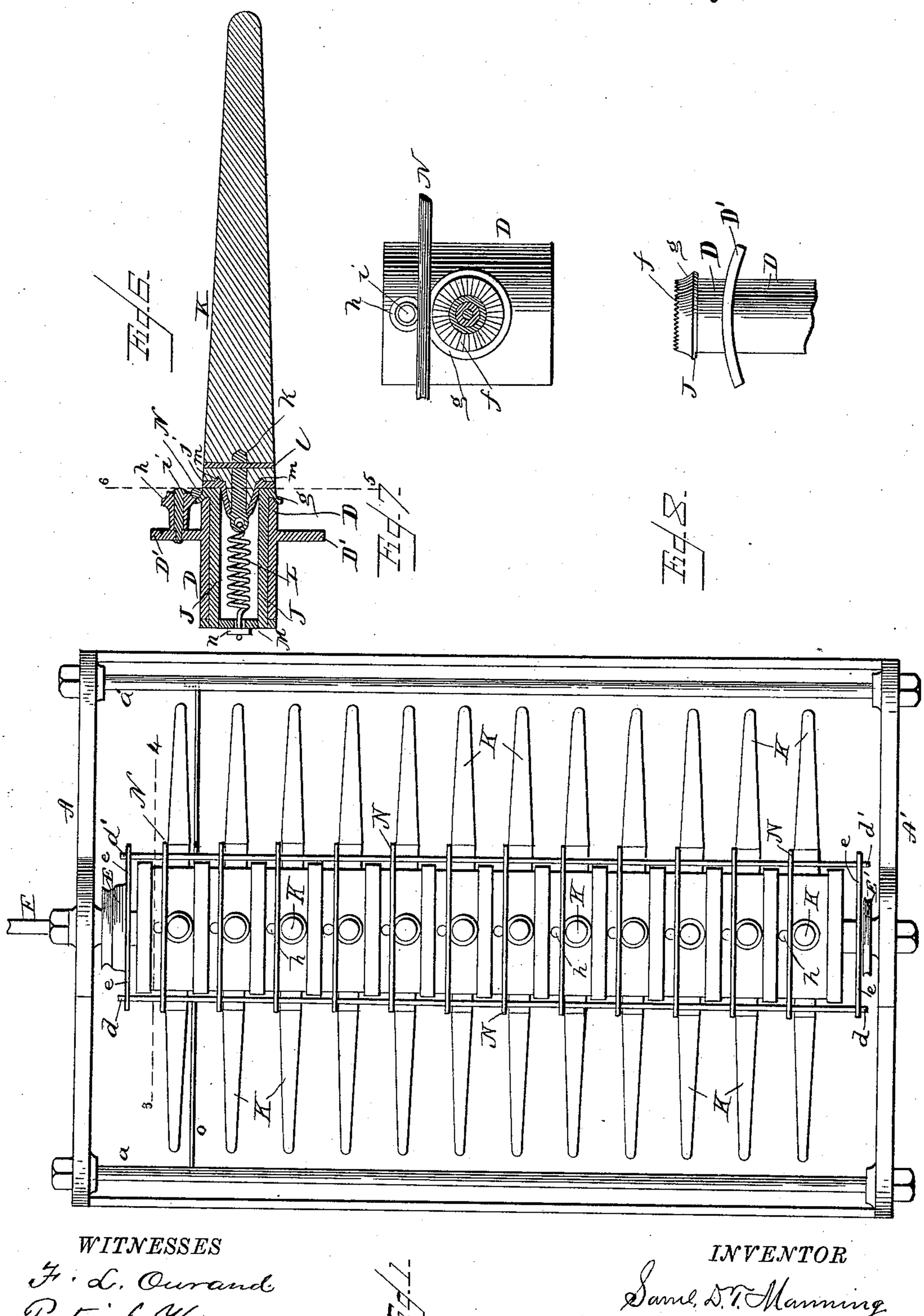
S. D. T. MANNING.

COTTON HARVESTER.

No. 407,360. Patented July 23, 1889.



WITNESSES

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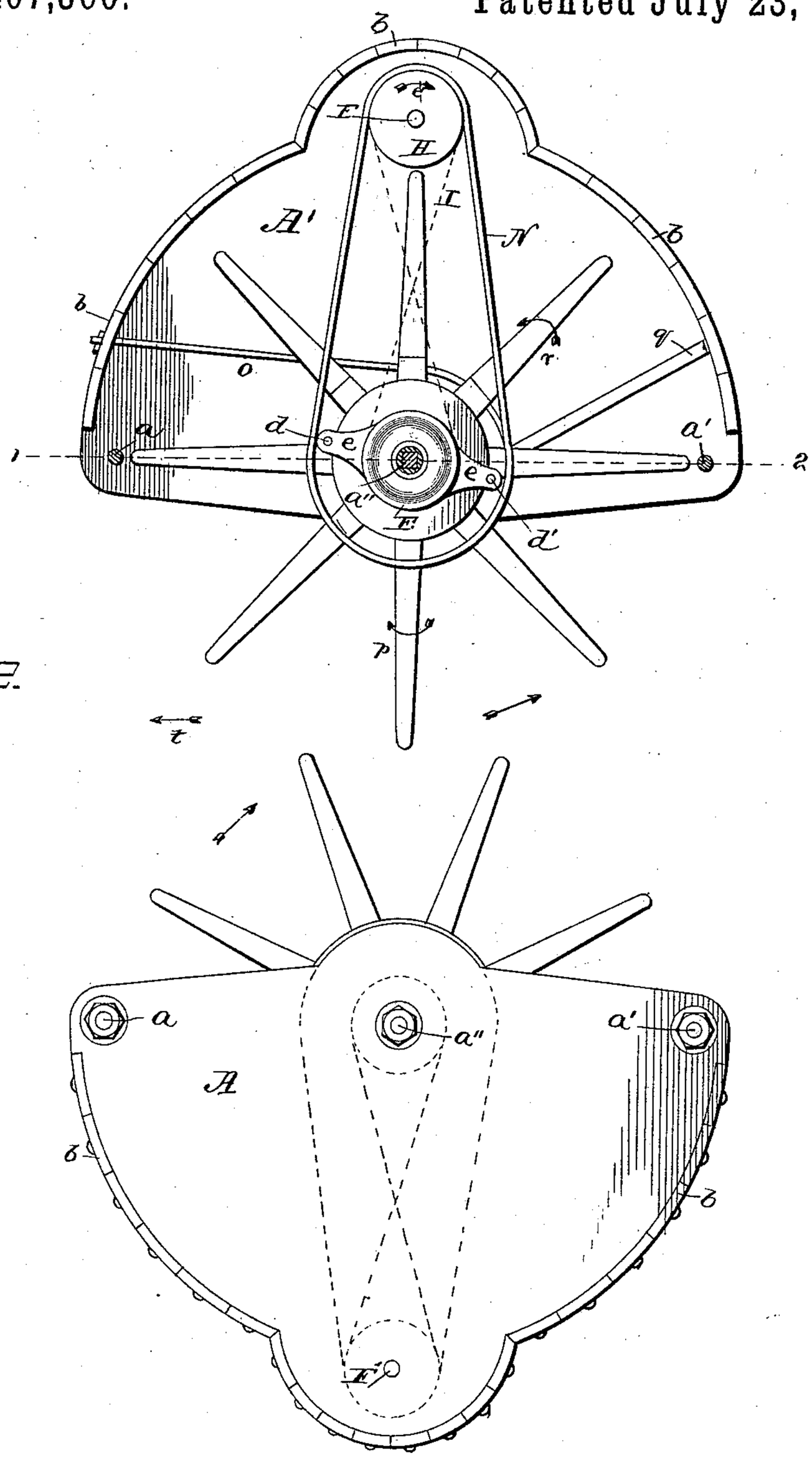

Fig. 2.

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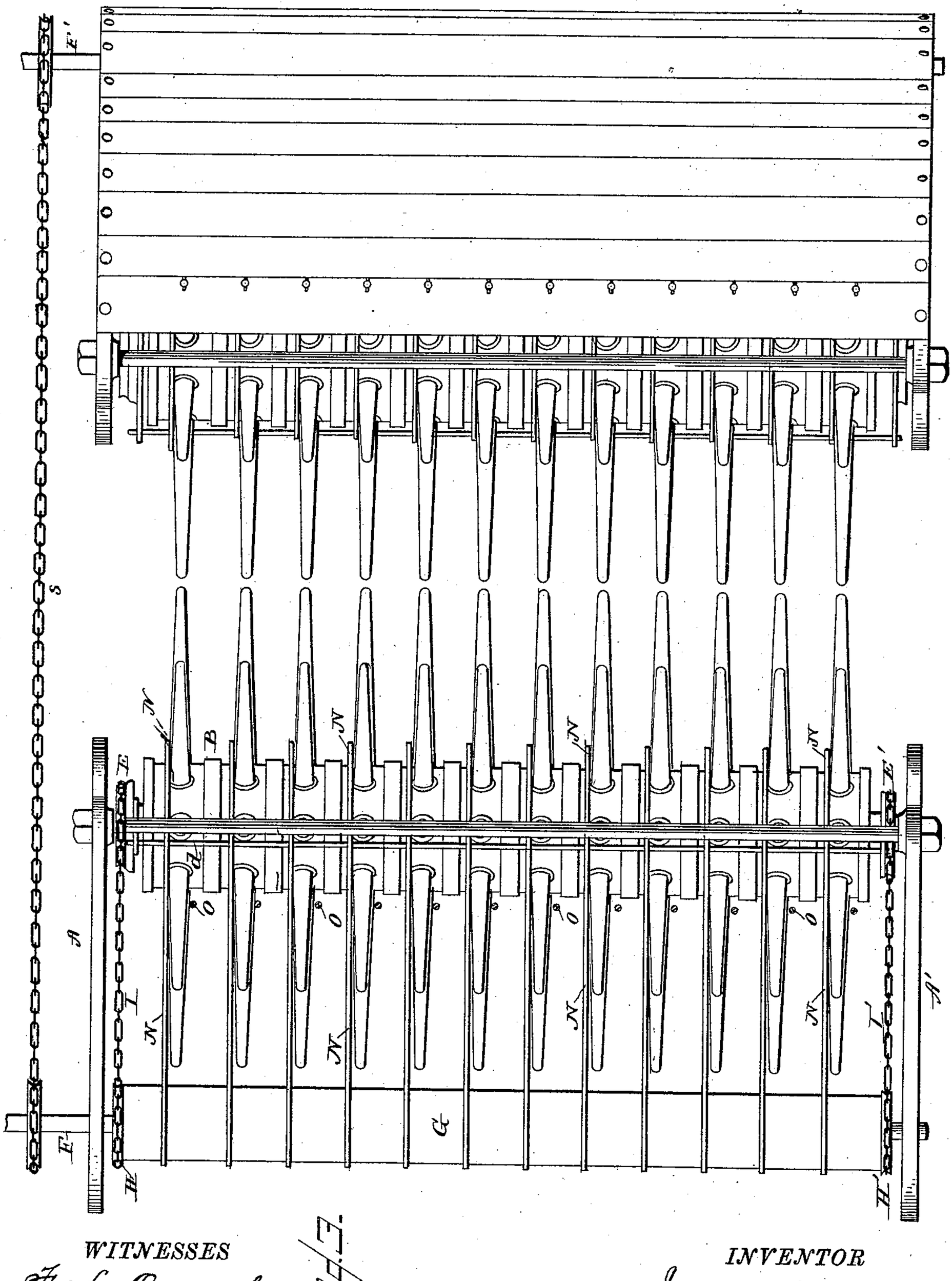

FIG. 1.

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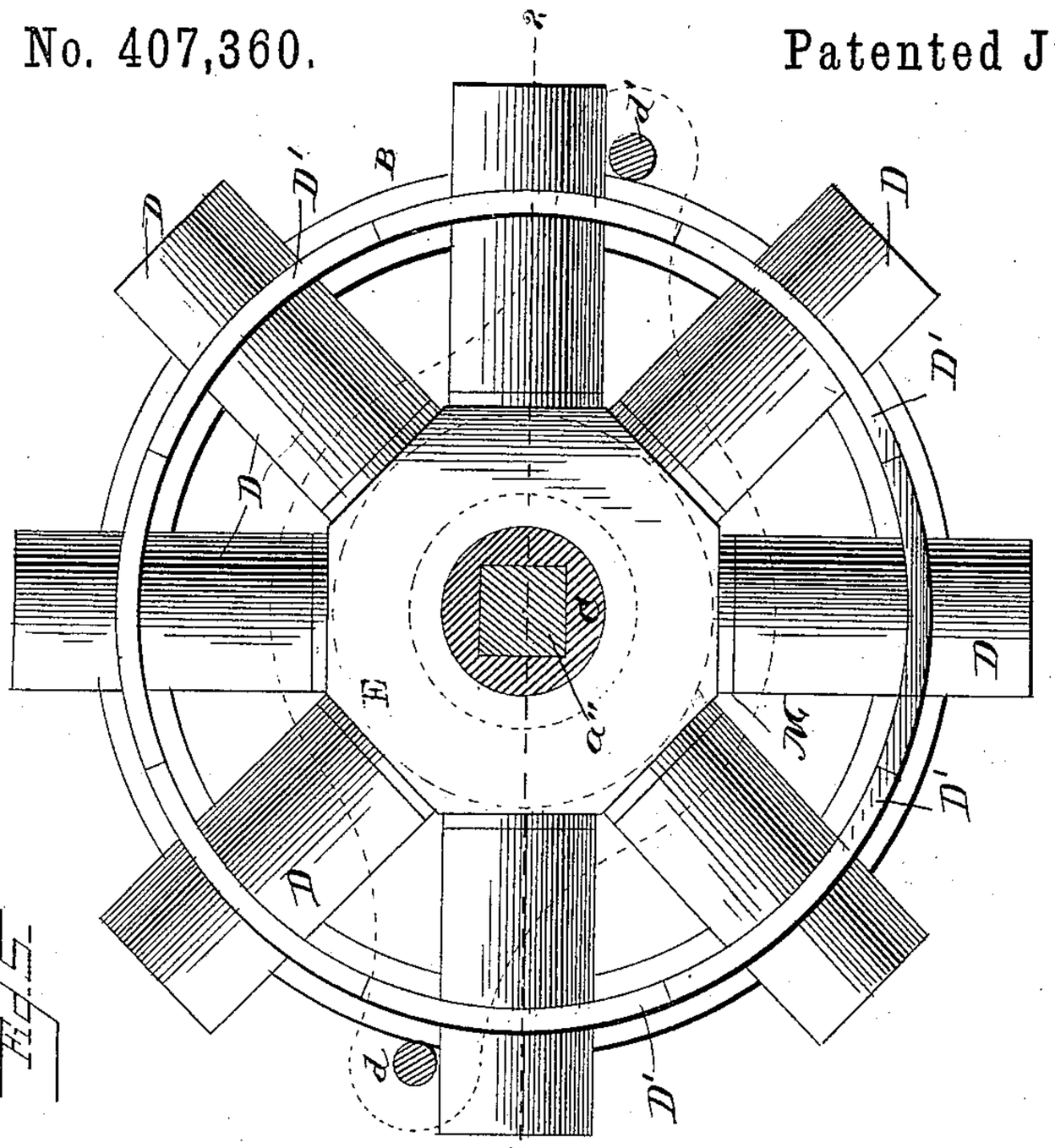

Fig. 5.

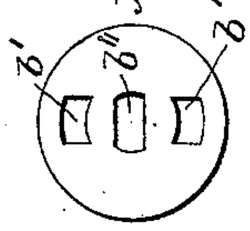

Fig. 6.

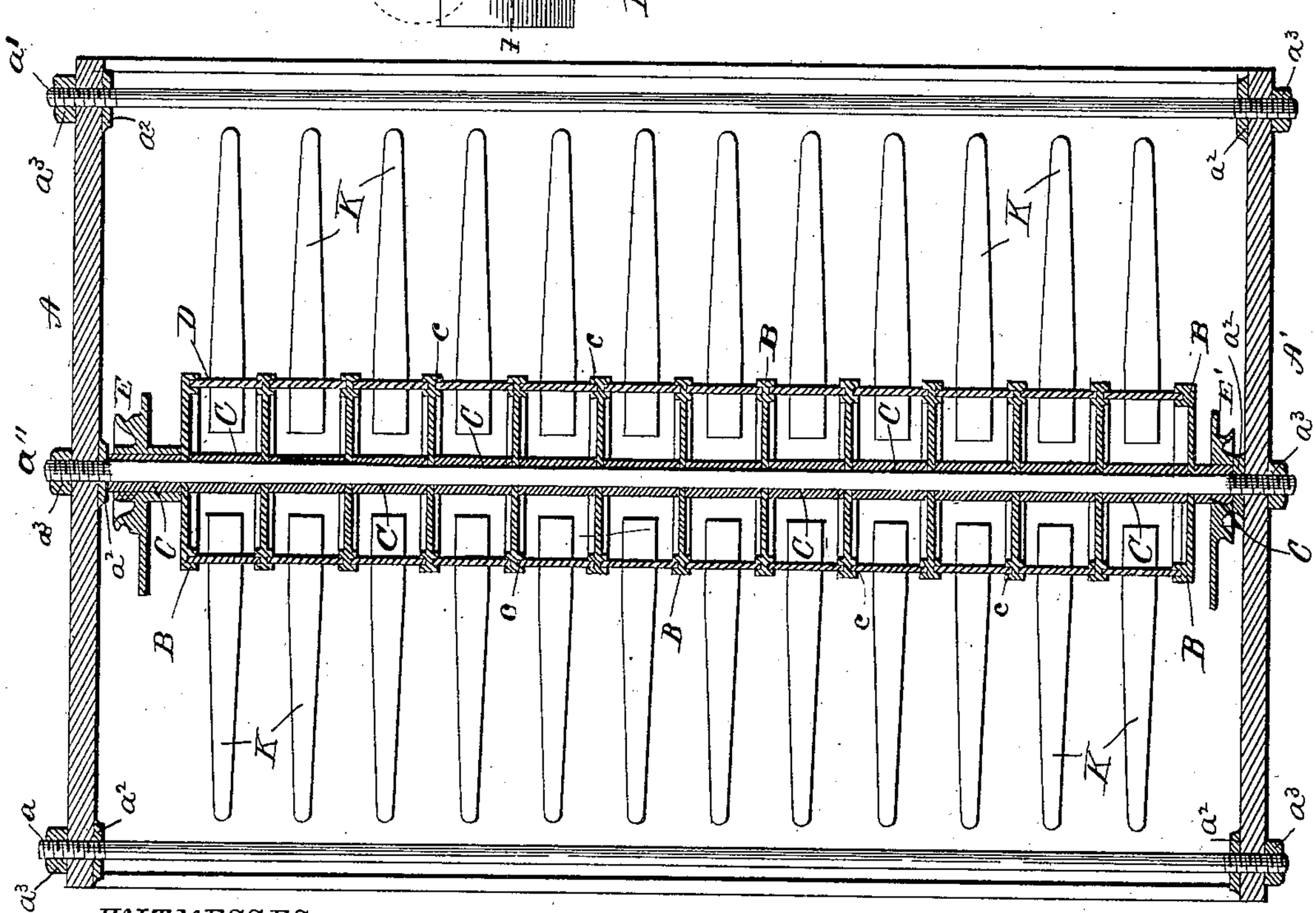

Fig. 7.

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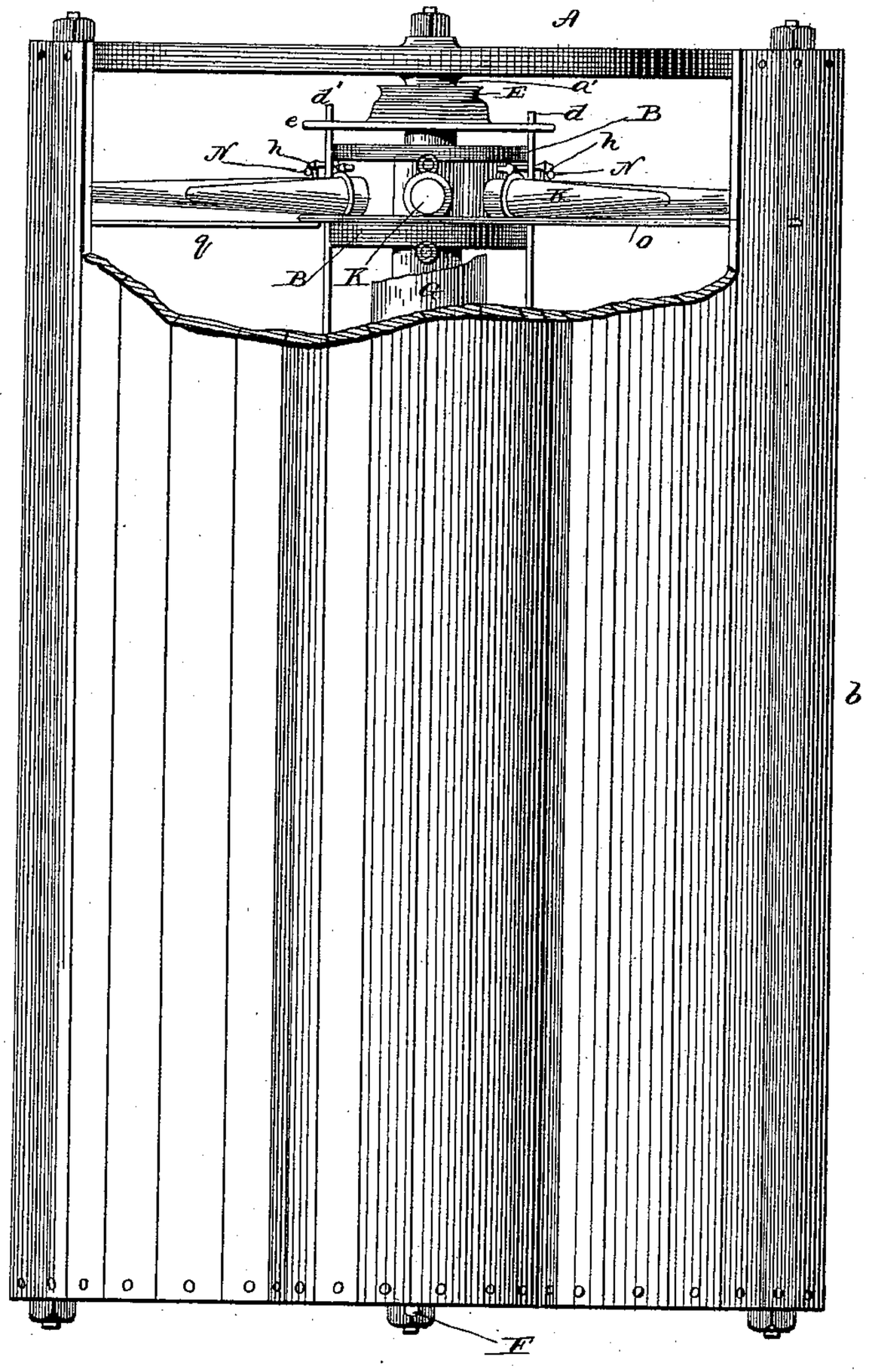
Fig. 10.



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UNITED STATES PATENT OFFICE.

SAMUEL D. T. MANNING, OF PORTSMOUTH, VIRGINIA.

COTTON-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 407,360, dated July 23, 1889.

Application filed May 21, 1888. Serial No. 274,623. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. T. MANNING, of the city of Portsmouth, county of Norfolk, State of Virginia, have invented new and useful Improvements in Cotton-Harvesters, of which the following is a specification.

My invention relates to improvements in that class of harvesters which gather the cotton from the standing plants by means of a system of rotating stems or spindles provided with teeth or barbs adapted to seize and extract the matured cotton from the bolls; and the objects of my improvements are, first, to provide a suitable and independent socket for the spindles; second, to provide a spindle with a movable joint; third, to furnish a proper support and track for the sockets; fourth, to provide suitable means to prevent circular movement of the supports; fifth, to provide means for propelling the sockets together with the spindles in their respective tracks around the supports; sixth, to furnish means for rotating the spindles on their axes alternately in opposite directions. I attain these objects by the mechanism illustrated in the accompanying drawings, of which—

Figure 1 is a side view of my invention secured in a suitable supporting-receptacle, the sides of which are removed in this view. Fig. 2 is a top view of my invention, with the top plate of one of the receptacles, of which there are two, removed to show the arrangement of the internal mechanism, the said receptacle being on the left with the figure in a horizontal position. The inclosed receptacle shown on the right in this view and the mechanism contained therein is a duplicate of that on the left, and is designed to operate in unison therewith. Fig. 3 is an end view of my invention, looking toward the rear, the figure being read in a horizontal position. The sides of the receptacle shown on the left in this view are removed to expose the location and arrangement of certain parts of the internal mechanism. Fig. 4 is a vertical section of the invention, taken on the line 1 2, Figs. 2 and 5. Fig. 5 is a horizontal section of the invention, taken on the line 3 4, Fig. 1. Fig. 6 is a longitudinal section of the improved spindle and socket. Fig. 7 is a front view of the socket, the spindle being detached at the line 5 6, Fig. 6. Fig. 8 is a sectional view of the socket containing the spindle-butt J, and showing particularly the radial projection on the face of the flange formed on the butt and the annular groove formed on the periphery of said flange. Fig. 9 is a detailed view of the circular plate secured at the opposite end of the butt J. Fig. 10 is a rear side view of my invention, showing more particularly the location of the reversing-cords O and the manner in which they engage the butts J, a portion of the inclosing side of the receptacle being broken away for the purpose.

Similar letters refer to similar parts throughout the several views.

A and A′ represent plates forming, respectively, the top and bottom of the vertically-disposed receptacle containing the picking mechanism, said plates being approximately semicircular in shape and apertured at suitable points on a line coinciding with their greatest diameters to receive the tie-rods *a*, *a′*, and *a″*, located between said plates, *a* and *a′* being situated, respectively, near their forward and rearward extremities, and *a″* equidistant from *a* and *a′*, and all suitably threaded. Circular shoulder-plates a^2 are securely screwed on said rods, and the plates A and A′ are held in rigid contact therewith and the rods by the nuts a^3. (See Fig. 4.) The approximately semicircular sides of the supporting-receptacles are inclosed by vertical strips *b*, secured to A and A′, the opposite sides being presented to the plants when the invention is in practical operation, and being open for the free action of the picker mechanism contained therein. The tie-rod *a″* is square in cross-section, (see Fig. 2,) and is encircled at proper intervals by a suitable number of circular disks B. The portions of the rod between the disks and between the top and bottom disks and the shoulder-plates a^2 are inclosed by cylindrical sleeves C, the sleeves and disks being formed with central apertures corresponding to the rod in cross-section to prevent circular movement thereon. (See Figs. 4 and 5.) The function of the sleeves is to support the disks in their respective positions on the rod *a″*, the top and bottom sleeves performing the additional

functions of journals for the chain-wheels E and E′, to be described later. Annular grooves *c* are formed on the upper and under sides of the disks B, near their peripheries, except the top and bottom disks, which have only one groove each, and that on the side next the adjoining disks. (See Figs. 1 and 4.) The spindle-socket is composed, essentially, of the cylindrical bearing D, which is the socket proper, and the curved plate D′, the cylindrical bearing D being formed partly on each side of the plate D′; but in the description of my invention I shall use the term "socket" as including both the socket proper D and the curved plate D′, upon which it is formed. The cylindrical bearing D is apertured longitudinally to receive the hollow cylindrical butt J, which is rotatively fitted therein. The said butt is formed with a flange on its anterior end, having radial projections *f* formed on its face, and an annular groove *g*, approximately semicircular in cross-section, on its periphery. The circular plate M, Fig. 9, corresponding with the socket proper D in diameter, is secured to the opposite end of the butt J to retain the latter within the socket, and for this purpose is formed with apertures *b′* and *b″*, *b′* being adapted to receive corresponding projections formed on the end of the butt and *b″* to receive a loop formed on the end of the spiral spring L, located within the butt, the spring being secured to the plate by the pin *n*, disposed in the loop transversely across the aperture *b″*. The spring, being properly secured at the opposite end, effectually holds the plate in contact with the butt, and thus prevents the latter moving longitudinally within the socket. A conoidal-shaped cap *j*, open at its apex and formed with a flange at its base, is rigidly secured to the base of the spindle K, the cap being suitably hollowed to receive the projection formed on the spindle at this point. The cap is secured to the spindle partly by means of the shouldered eye-pin *k*, introduced through the aperture at the apex of the cap into the spindle, and partly by means of the conical projections *m*, formed on the side of the flange next the spindle, which projections enter corresponding cavities formed in the spindle. The shoulder formed on the eye-pin *k* is intercepted by the cap, and thus prevents the latter receding from the spindle, while the conical projections *m* prevent circular movement of the cap thereon. The eye-pin is secured within the spindle by means of pin *l*, which passes transversely through the spindle and eye-pin. Radial grooves are formed on the side of the flange at the base of the cap next the butt J, corresponding to the projections on the flange of the butt, the grooves being designed to receive the projections, so that the cap will rotate with the butt when the two are properly secured in contact, such contact being secured by the action of the spring L, one end of which is secured to the eye-pin *k* and the other end to the plate M, as described above. By this construction is produced a spindle with a universally-movable joint, by which the spindle, whenever deflected from any cause from its normal position with respect to the butt J and socket D, will continue its axial motion with the butt and assume its normal position again whenever the deflecting cause is removed. The advantage of this feature will be pointed out later on. A guide-roller *h* is rotatively mounted on a stud *i*, secured to the plate D′ above the socket proper D. Each socket is provided with a guide-roller similar to that described above and similarly mounted. An annular groove is formed on the periphery of the said roller resembling and coinciding with that formed on the periphery of the butt J, the two grooves thus combined being almost semicircular in cross-section. The belts N, to be described later, are designed to travel in the semicircular groove thus formed between the roller *h* and butt J, for the purpose of rotating the latter, together with the spindles, on their axes, the function of the rollers being to guide and hold the belts in contact with the butts. (See Fig. 7.)

I deem it unnecessary to show the means by which the spindles seize and extract the cotton from the bolls, as they are fully described in my pending application, Serial No. 183,971, filed November 25, 1885, for a cotton-harvester, to which reference is made.

The spindle-sockets referred to above are disposed between the disks B, the annular grooves *c* receiving the upper and lower edges of the plates D′ of the sockets, which, when thus arranged, form a series of sectional rings around the disks. The disks B thus form supports for the sockets, and the annular grooves *c* tracks in which the sockets are rotated around the said disks, the means for accomplishing which will be described later.

Each of the spaces included between the several disks contains eight of the above-described sockets, which are arranged one above the other in a corresponding number of vertical columns. The chain-wheels E and E′, before referred to, are rotatively mounted, respectively, on the top and bottom sleeves C. (See Fig. 4.) The arms *e*, formed at opposite points on the peripheries of the chain-wheels, extend horizontally outward a suitable distance beyond the disks B, and are suitably apertured near their extremities to receive the vertically-disposed rods *d* and *d′*, which are firmly fitted therein. The said arms being of a suitable thickness have a width at their juncture with the wheels nearly equal to the diameter of the latter, whence they gradually diminish in width by curved lines toward their outward extremities, which are appropriately rounded. The outlines of the arms are more particularly shown in dotted line in the horizontal view, Fig. 5. The rods *d* and *d′* bear against opposite vertical columns of sockets, the point of contact being on the cylindrical bearing D near its junction with

the plate D′. The function of the said rods is to impel the sockets in their respective grooves *c* around the disks B when rotary motion is imparted to the chain-wheels E and E′. On the vertical shaft F, journaled in the plates A and A′, are mounted the drum G and chain-wheels H and H′, from which motion is transmitted through the crossed chains I and I′ to the chain-wheels E and E′, rotating them in the opposite direction.

The bands N, previously referred to, are preferably round in cross-section and encircle the drum G, by which they are driven, and the sectional rings formed by the curved plates D′ of the sockets. The bands are not in actual contact with the plates, but are disposed in the grooves formed between the guide-rollers *h* and butts J, as previously shown. One of the bands is shown entire in the top view, Fig. 2, and its position with respect to the guide-roller *h* and butt J, when in rotative contact therewith, is more particularly shown in Fig. 7. A metal bar *q*, secured to the interior side of the receptacle previously described, extends beneath the uppermost horizontal series of spindles to within a short distance of the butt J, where it connects with a flexible cord O, preferably round in cross-section. This cord extends horizontally across the receptacle to the opposite side, where it passes through a suitable aperture formed therein, in which it is secured by a pin passed transversely through the cord. (See Fig. 2.) The said cord is disposed so as to be brought in rotative contact with the annular groove *g* on the butt J, for the purpose of reversing the axial motion of the spindle. (See Fig. 10.) Each horizontal series of spindles is provided with one each of the rotating bands N and reversing-cords O, all being constructed and disposed with reference to the spindles like those described above. (See Fig. 3.)

The practical operation of my invention is as follows: The receptacles containing the mechanism described above, being suitably mounted on two traction-wheels, are drawn over the ground in the direction of the arrow *t*, Fig. 2, by horse or other suitable power, astride of a row of plants, the wheels running in the spaces between the rows and the plants passing in the open space between the two receptacles. The vertical driving-shaft F is rotated in the direction of the arrow *e′* by the traction-wheels through suitable connection therewith. Motion is transmitted from the chain-wheels H and H′ on the shaft F to the chain-wheels E and E′ through the driving-chains I and I′. The driving-chains I and I′ being crossed, the chain-wheels E and E′, with the rods *d* and *d′* secured to the arms *e*, will be rotated in the opposite direction to the shaft F, and as the rods *d* and *d′* engage opposite vertical columns of spindle-sockets the latter, together with the intermediate columns, will be impelled in the same direction in their respective grooves *c* around the disks B. It will be thus seen that the spindles during their contact with the plants move horizontally in the opposite direction to that in which the traction-wheels move, and as the backward movement of the spindles through the plants is equal to the forward movement of the traction-wheels the spindles will not be dragged against the plants, and consequently no injury will be sustained by either. The plants and spindles are further protected from injury by the peculiar construction of the spindles previously described, by which, if they should encounter any obstruction that would subject them to any undue strain—such as the body or large limb of a plant—as they are likely to do when being introduced in among the plants, or when the traction-wheels pass over very uneven ground, they would yield sufficiently in any direction to pass or adjust themselves to the obstruction without suffering any interruption of their axial motion and assume their normal position with respect to the socket when the obstruction was passed. During the time the spindles are in contact with the plants they are being rapidly revolved on their axes by the action of the rotating bands N, for the purpose of gathering the cotton. After the cotton has been gathered by the spindles it is conveyed within the receptacle referred to above, where it is disengaged by the sudden reversal of their axial motions by the action of the reversing-cords O, described above, the spindles coming in rotative contact with the cords immediately after their disengagement from the bands N, which occurs when the spindles are fairly inside of the receptacle. The bands N, besides rotating the spindles on their axes, assist in removing the cotton therefrom, as the bands pass sufficiently near the spindles at the point where their axial motion is reversed to intercept the cotton attached thereto, and thus aid in its removal. After the cotton is detached from the spindles it falls to the bottom of the receptacle, from which it is removed by means not shown in this application.

I am aware that previous to my invention cotton-harvesters have been constructed with sockets for the picking-spindles. I therefore do not claim this feature of my invention, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a cotton-harvester, a socket for the picking-spindles, composed of a cylindrical bearing D and a curved plate D′, the cylindrical bearing D being the socket proper and formed partly on each side of the plate D′ and apertured longitudinally to receive a hollow cylindrical butt J, rotatively fitted therein, substantially as set forth.

2. In a cotton-harvester, a socket for the picking-spindles, composed of a cylindrical bearing D and a curved plate D′, the cylindrical bearing D being the socket proper and formed partly on each side of the plate D′

and apertured longitudinally, a cylindrical butt J, rotatively fitted therein, the said butt having a flange formed on its anterior end with radial projections *f* on its face and an annular groove *g* on its periphery, plate M, secured to the opposite end of said butt, cap *j*, having a flange formed at its base with conical projections *m* on one side of the flange and radial grooves on the opposite side, shouldered eye-pin *k*, transverse pin *l*, spiral spring L, and guide-roller *h*, the said roller being mounted on the plate D′ of the socket, all substantially as set forth.

3. In a cotton-harvester, a spindle-socket composed of a cylindrical bearing D, formed upon a curved plate D′, apertured disks B, having annular grooves *c* formed on their sides near their peripheries, longitudinally-apertured sleeves C, vertical rod *a″*, secured to the plates A and A′ of the receptacle, said rod being square in cross-section, the disks B and sleeves C, mounted on said rod and closely fitted thereto, so as to prevent circular movement thereon, the sleeves located between the disks, one sleeve located between the top disk and the plate A and one between the bottom disk and the plate A′ of the receptacle, the sockets disposed between the disks in the grooves *c* and supported by said disks, all substantially as set forth.

4. In a cotton-harvester, a spindle-socket composed of a cylindrical bearing D, formed upon a curved plate D′, apertured disks B, having annular grooves *c* formed on their sides near their peripheries, longitudinally-apertured sleeves C, vertical rod *a″*, secured to the plates A and A′ of the receptacle, said rod being square in cross-section, the disks and sleeves mounted on said rod and closely fitted thereto, the sleeves located between the disks, one sleeve located between the top disk and the plate A and one between the bottom disk and the plate A′ of the receptacle, the sockets disposed between the disks in the grooves *c*, chain-wheels E and E′, rotatively mounted, respectively, on the top and bottom sleeves, arms *e*, formed on opposite sides of said wheels and apertured near their extremities, vertical rods *d* and *d′*, secured in said apertures and bearing against two opposite columns of sockets, vertical operating-shaft F, journaled in the plates A and A′ of the receptacle, chain-wheels H and H′, mounted on said shaft and secured thereto, and driving-chains I and I′, transmitting motion from the chain-wheels H and H′ to the chain-wheels E and E′, all substantially as set forth.

5. In a cotton-harvester, a spindle-socket composed of a cylindrical bearing D, formed upon a curved plate D′, the bearing D apertured longitudinally, hollow cylindrical butt J, rotatively fitted therein, having a flange formed on its anterior end, with an annular groove *g* on its periphery, guide-roller *h*, mounted on the plate D′, apertured disks B, having annular grooves *c* near their peripheries, longitudinally-apertured sleeves C, vertical rod *a″*, square in cross-section, secured to the plates A and A′ of the receptacle, the sleeves and disks mounted on said rod and closely fitted thereto, the sleeves located between the disks, one sleeve located between the top disk and the plate A and one between the bottom disk and the plate A′ of the receptacle, the sockets disposed between the disks in the grooves *c*, chain-wheels E and E′, rotatively mounted, respectively, on the top and bottom sleeves, arms *e*, formed on opposite sides of said wheels and apertured near their extremities, vertical rods *d* and *d′*, secured in said apertures and bearing against two opposite columns of sockets, operating-shaft F, journaled in the plates A and A′ of the receptacle, chain-wheels H and H′, mounted thereon and secured thereto, driving-chains I and I′, transmitting motion from the chain-wheels H and H′ to the chain-wheels E and E′, drum G, mounted on the shaft F and operated thereby, rotating bands N, encircling the columns of sockets and the drum G and operated by said drum, reversing-cords O, located within the receptacle and between the bands N, and metal bar *q*, secured to the side of the receptacle, the said cords secured at one end to the said bar and at the other to the receptacle, and disposed so as to engage the flange of the butt J from the under side, all substantially as set forth.

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