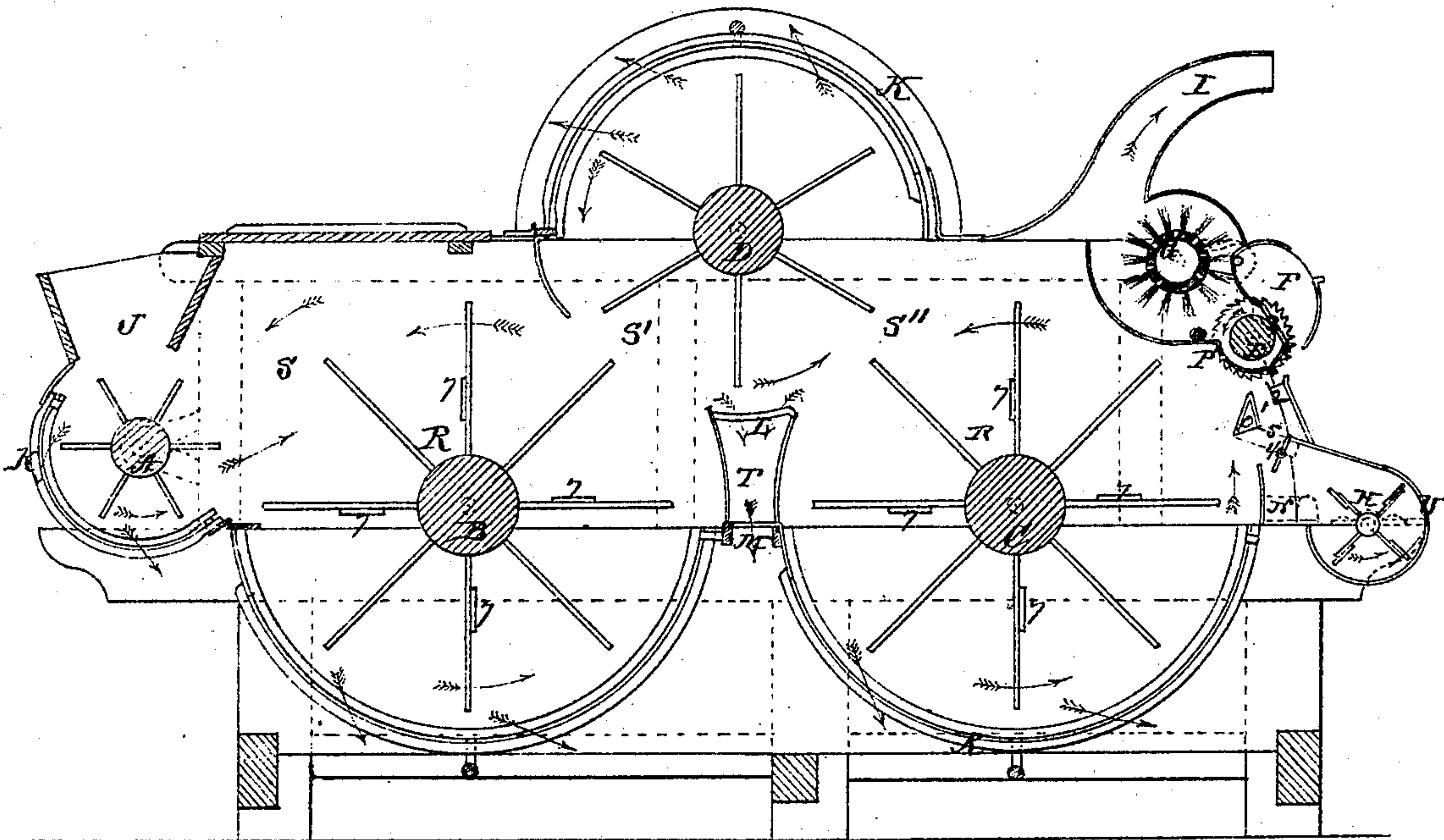
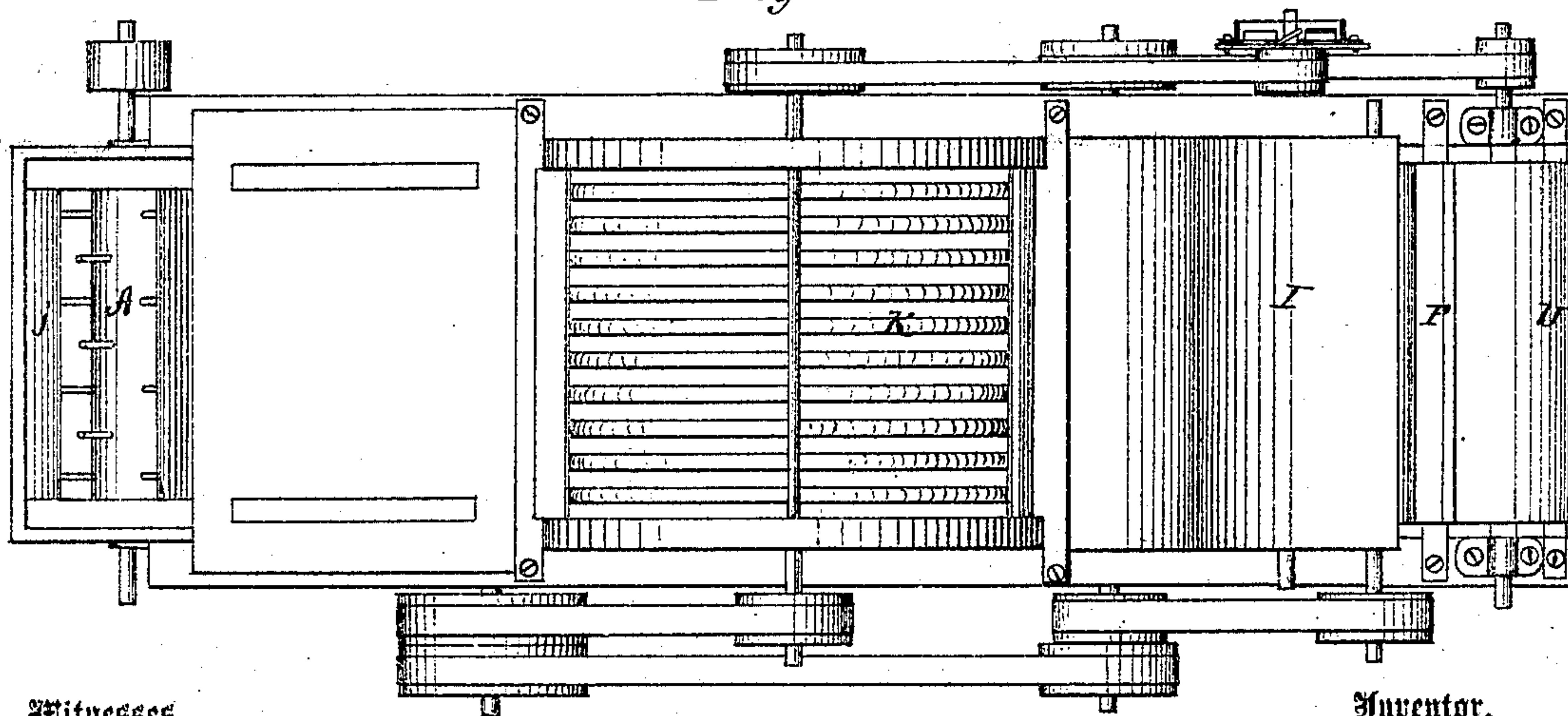


DR. C. N. ANDREWS.*Separating Cotton Gin.*

119,001.

Patented Sep. 19, 1871

Fig. 1.*Fig. 2.*

Witnesses.

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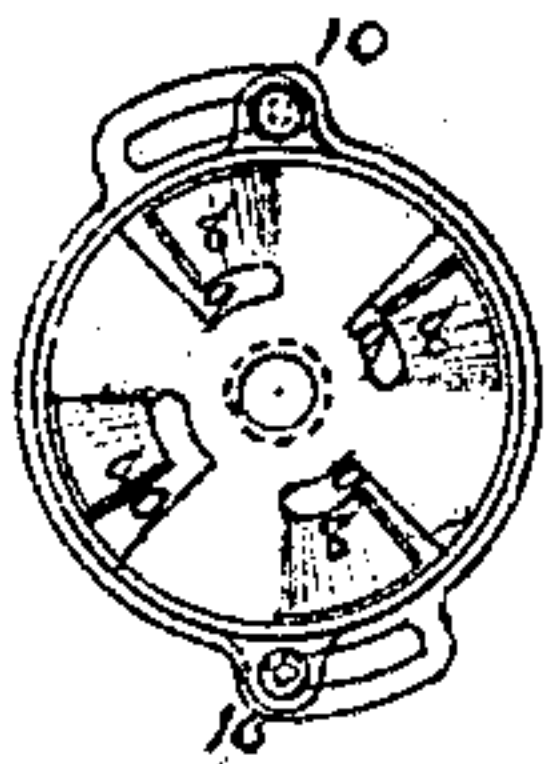
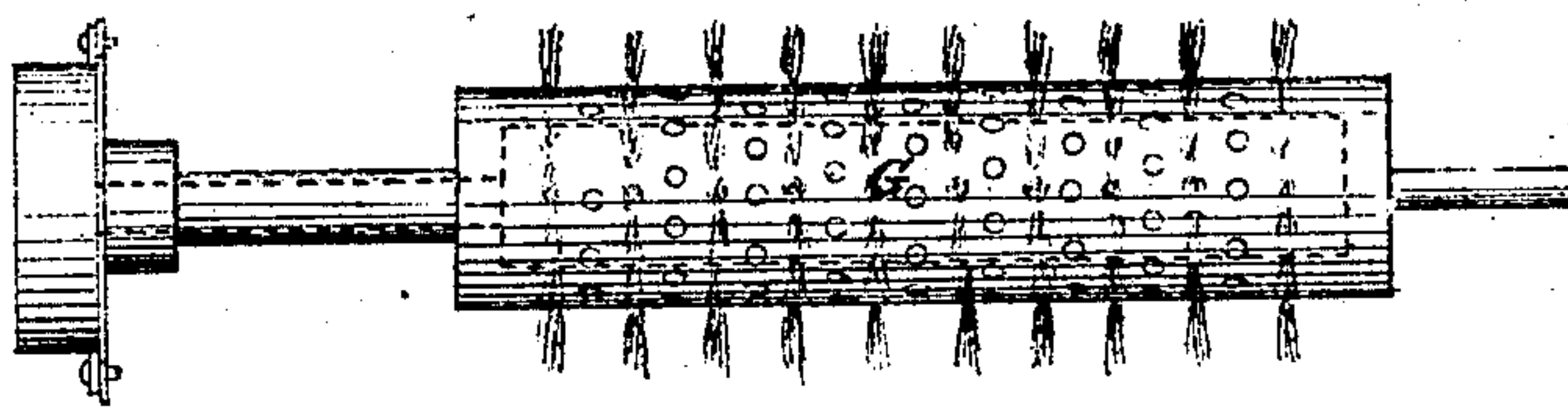
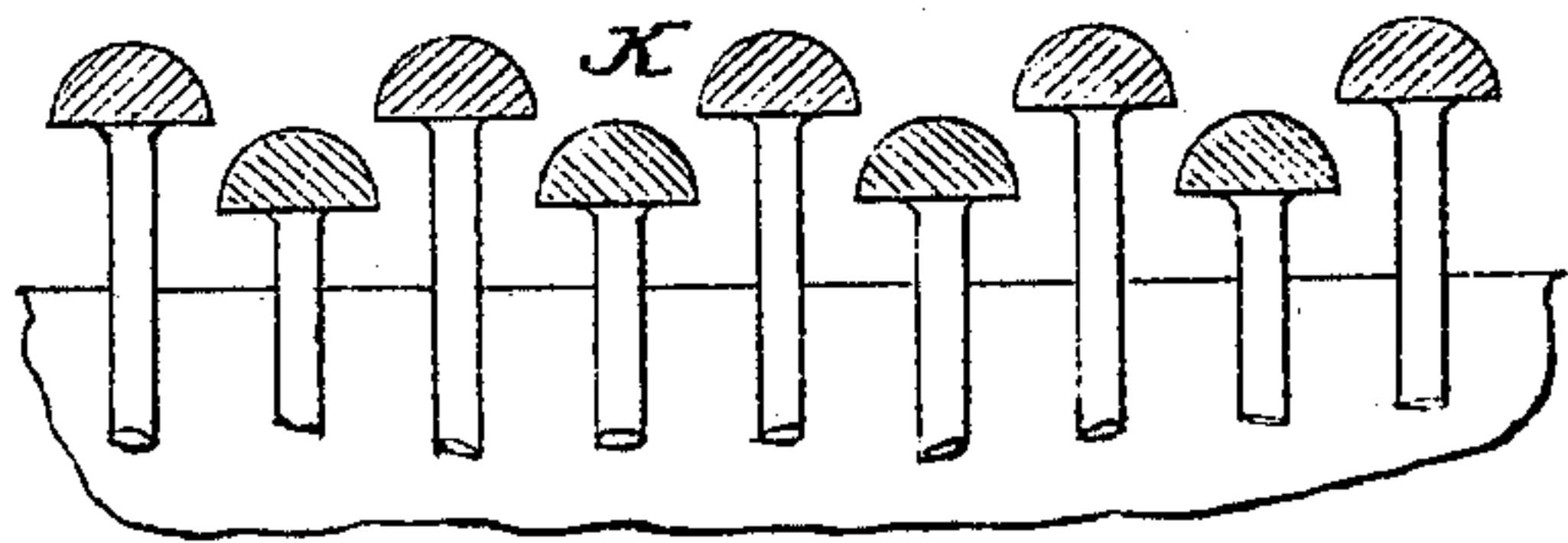
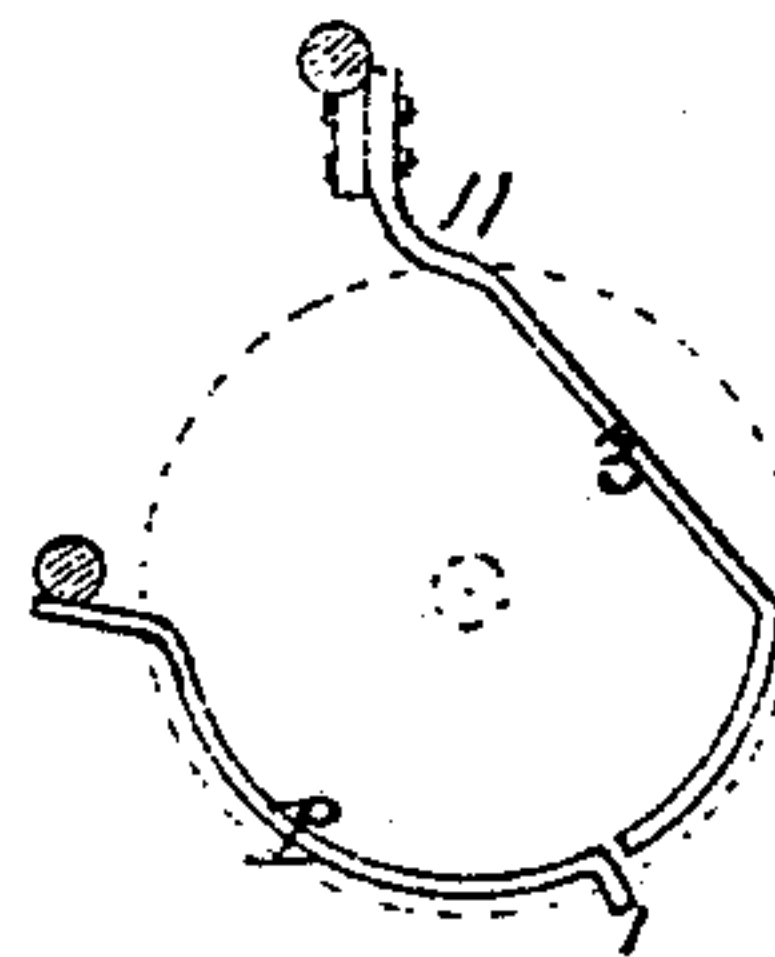
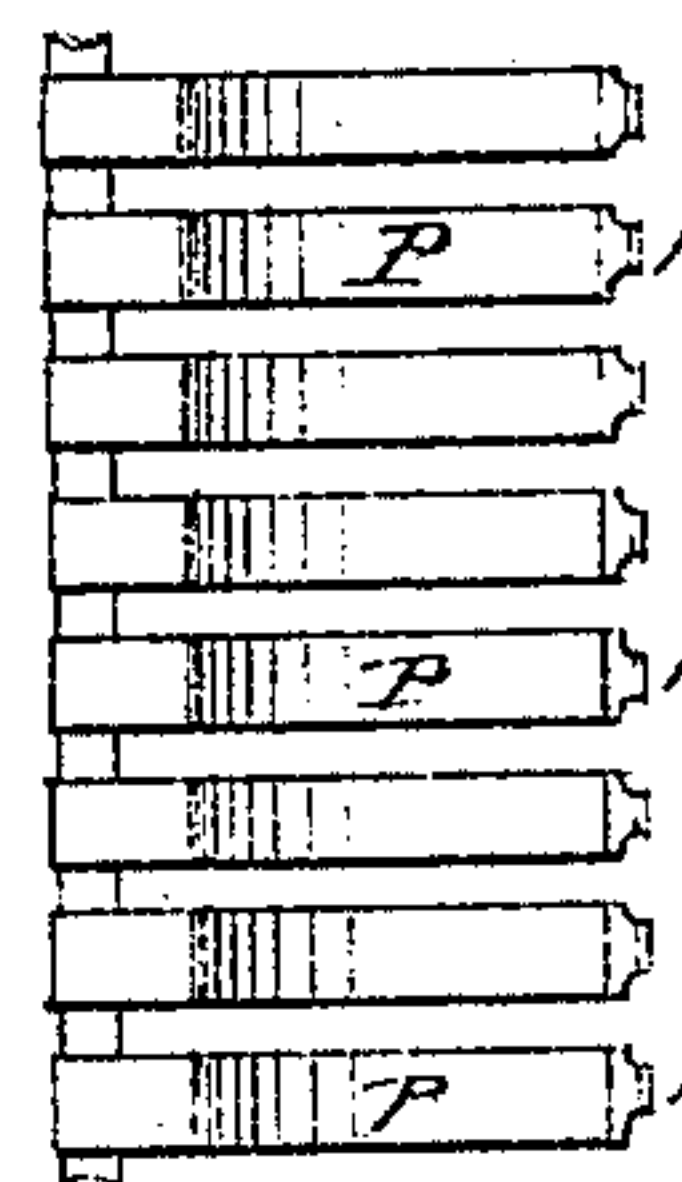
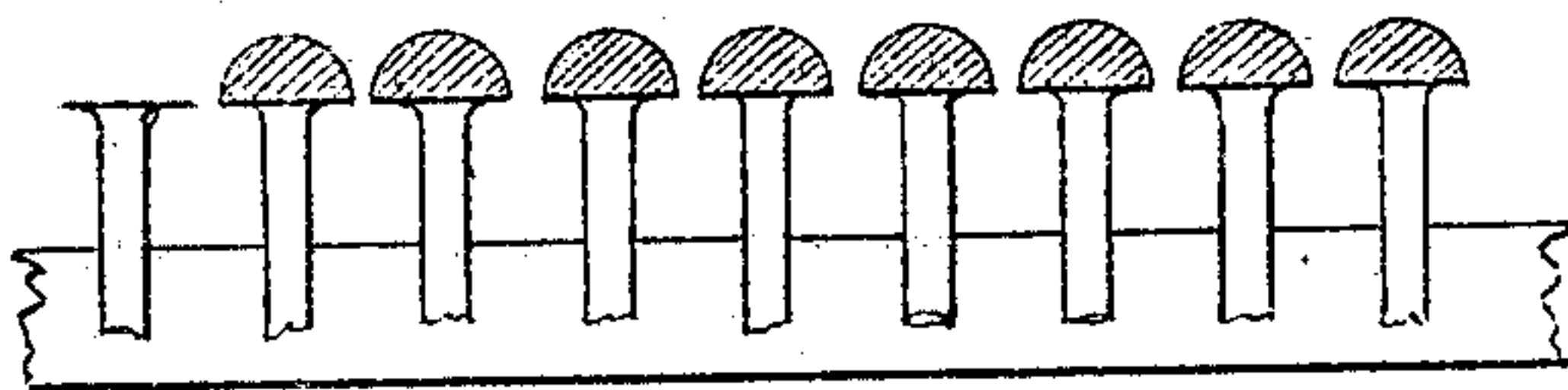
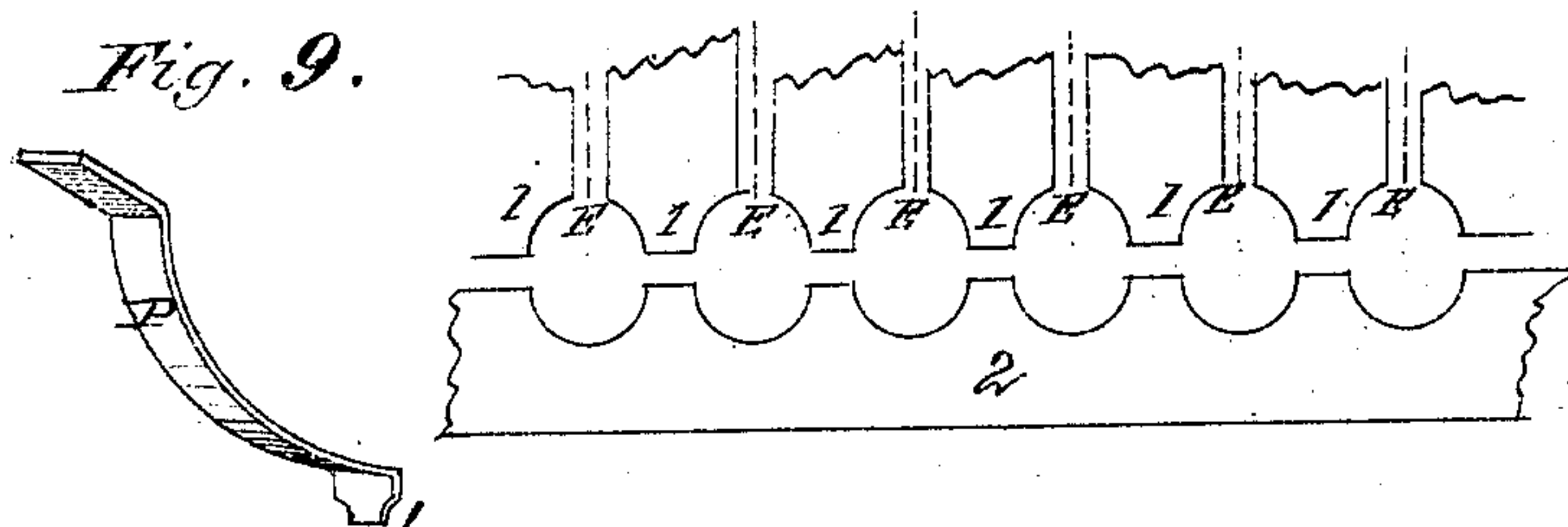
C. N. Andrews
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Dr. C. N. ANDREWS.*Separating Cotton Gin.*

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Fig. 4.*Fig. 5.**Fig. 5.**Fig. 7.**Fig. 6.**Fig. 10**Fig. 8.**Fig. 9.*

Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES N. ANDREWS, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN COTTON-GINS.

Specification forming part of Letters Patent No. 119,001, dated September 19, 1871; antedated September 2, 1871.

To all whom it may concern:

Be it known that I, CHARLES N. ANDREWS, of the city and county of St. Louis and State of Missouri, have invented certain Improvements in Cotton-Gins, of which the following is a specification:

My invention relates to a novel construction and arrangement of several of the different parts of the saw cotton-gin, and to the combining therewith of cylinders armed with beaters and fans and grates, constructed and arranged in such a manner that by the operation of the several parts of the machine trashy seed-cotton or cotton in the boll is first separated, opened, and cleaned from all sand, dirt, leaves, and hulls, then fed to the saws in a clean, open, flocculent state, and the lint stripped from the seed with increased rapidity, a lessened expense of power, without being napped, and without the staple being cut. An additional grate adjusted to the saw-cylinder aids in the separating and cleaning process, and protects the saws from being damaged by the cotton-hulls or foreign bodies; and the stripping-brush is so constructed that it may be set so that it will not nap the cotton, and so that it cannot be worn or damaged by the saws.

In the annexed drawings, Figure 1 is a longitudinal vertical section, and Fig. 2 is a plan view of my machine. Fig. 3 is a front view of the stripping-brush cylinder. Fig. 4 is a view of a suction-fan and register combined, forming the heads of the brush-cylinder. Fig. 5 is a cross-section of the double-tier grate. Fig. 6 is a cross-section of the single-tier grate. Fig. 7 is a view showing the shape of the ribs or bars of the gin-grate and their position relative to the periphery of the saws. Fig. 8 is a view of the fender-grate. Fig. 9 is a perspective view of one bar of the fender-grate, and Fig. 10 is a cross-section giving a front view of the discharge-ends of the fender-grate and the hull-bar, and showing their relation to each other.

The following is a general description of my invention: J is a feed-hopper. A B C D are cylinders armed with beaters, B and C having also fans 7 7 7, &c., upon them. These cylinders are operated with belts and pulleys in the direction of the arrows on their arms. The object is, first, to knock the cotton out of the bolls; secondly, to separate the seed from each other, and to open and straighten out the fiber, so that it shall be

in a light, expanded, flocculent state; thirdly, to beat and blow all the sand, dirt, leaves, and other trash out of the cotton; fourthly, to spread the cotton evenly across the machine, and to form it into a light, open, uniform stream, so as to facilitate the separation of the hulls from it; and, fifthly, to convey the cotton to the hull-arrester, the fender-grate, and the gin-saws. The cylinder A is placed in the feed-hopper, and its axis is placed higher than that of B that it may force the cotton into the body of the machine and against the returning beaters and backward air-currents of the latter cylinder at S. D is placed higher than B and C, and the partition T is placed between them for the purposes, first, that the direction of the cotton as it is forced through the machine shall be directly against the returning beaters and backward air-currents of all the cylinders; and, secondly, for the purpose of changing the direction of the forward air-currents on the under side of the cylinders and forcing them out through the grates above and beneath them, and also around backward toward the feed-end of the machine, that the dirt and trash which these air-currents take from the cotton may not pass on with the latter to the saws, but shall be carried backward and centrifugally out of the machine in the direction of the arrows seen passing out above and below the cylinders. K K K K and L are concave or semicircular grates extending across the inside of the machine above and below the cylinders. The bars of these grates run lengthwise of the machine and are entirely disconnected from each other, each bar resting upon standards of its own about two inches in length, except their feed-ends, which are fastened directly to cross-bars. The objects of the longitudinal direction of the bars of these grates, and of their being disconnected from each other, are, first, that the centrifugal air-currents which the cylinders force through them shall be continuous and unbroken; secondly, to give facility to the passage of trash out of the machine; thirdly, that the cotton may glide over them smoothly, and not be rolled, napped, or broken; fourthly, that the spaces between them may not fill up with cotton or trash; that anything that may dip down between them as it is being forced along may find no lodging-place, but have a free chance to pass out at their discharge-ends. The bars of these grates, except L, are arranged in

two tiers, as seen in Fig. 5. The objects of this arrangement are, first, to break the direct outward force of the air-currents which pass out between them; secondly, to obtain a greater number of discharge-openings than single tiers would give; thirdly, to facilitate the discharge of broken fragments of cotton-hulls and other trash. The grate L has but one tier of bars, as seen in Fig. 7. All these grates should be made of half-round or half-square iron, with the round or the angular faces of the bars, as the case may be, toward the interior of the machine, for the purpose of giving facility to the passing out of trash. The dotted circles R R represent openings in the sides of the machine for a free central admission of air to the cylinders B and C. M is a transverse opening below the hollow partition T for the discharge of trash that may fall through the grate L. O is a triangular bar extending across the machine, and which bar may be made adjustable to and from the cylinder C, and also so as to turn on pivots, there being one in each end. The object of this bar is, first, to arrest the cotton-hulls and cause them to rebound down the chute N; secondly, by its broad surface toward the interior of the machine to direct the cotton to such point on the fender-grate P and the saws E as may be desired. It is designated the hull-arrester. P is a grate adjusted to the saw-cylinder in such a manner that its bars occupy the spaces between the saws at their periphery. It is adjustable, so that it can be thrown out from the saws and back at will. The bars of this grate are fastened at one end to a cross-bar having trunnions on its ends, which rest in journals. On the end of one of these trunnions there is a lever, by means of which and a set-screw the grate is adjusted. The other ends of the bars of this grate are free and disconnected, and form segments of circles corresponding with the periphery of the saws. On their extreme ends there are projections downward, 1, about half an inch in length. Both edges of this projection are concaved, as seen in Fig. 9, so that the space between any two of them forms a semicircular notch, as seen in the upper part of Fig. 10. Directly through or over the upper part of these notches the gin-saws pass, as seen at E E E E, Fig. 10. When the gin is being operated this grate should be adjusted a little below or out from the points of the saw-teeth, so as to prevent the latter from catching hold of the cotton-hulls or other coarse trash, and also from being struck or damaged by foreign bodies that may get into the machine. This grate is designated the fender-grate, and the object of it is, first, to prevent cotton and hulls from being forced into the spaces between the saws; secondly, to prevent hulls and coarse trash from being caught by the saws and carried by them into the gin-hopper; thirdly, to prevent the saws from being damaged by hulls, coarse trash, or foreign bodies; fourthly, to cut off the feed of cotton from the saws, whenever from any cause it may be desirable or necessary to do so, by merely dropping it out further from them; fifthly, to lessen or increase the feed of cotton to the saws by adjusting it out from or in

toward them, so that they will take either more or less cotton, as may be desired, for the purposes of either increasing or diminishing the roll in the gin-hopper, or for taking the cotton from the interior of the machine either more or less rapidly; and, sixthly, by means of their projecting ends 1 1 1 1, Fig. 10, to force off from the cotton any hulls that may be hanging loosely to it. 2 is a thin bar fixed across the machine about two inches in advance of the fender-grate and about half an inch from the saws. It has semicircular notches in its upper edge corresponding with those formed by the ends of the bars of that grate, as shown by 2, lower part of Fig. 10. This bar is designated the hull-bar, and the object of it is to arrest hulls that may be hanging loosely to the passing cotton and those thrown off by the centrifugal force of the saws, and cause them to drop or rebound downward out of the machine. The hull-bar 2 may be made adjustable, so that it can be moved out from or in toward the saws, or rotated on pivots at its ends. H is a fan for the purpose of blowing back into the machine any cotton that may chance to drop with the hulls in the direction of the chute N. 4 is a damper or valve to regulate the force and also the direction of the air from the fan H. In each end of the fan H may be a slide, for the purpose of regulating the quantity of air admitted into its ends. E are the gin-saws. F is the gin-hopper. 3 is the ribs or gin-grate. The bars of this grate are fastened only at one end, and that their upper ends, their lower ends being free and disconnected, and shaped and adjusted so as to be entirely within the periphery of the saws. Fig. 7 exhibits the method of fastening, the shape, and adjustment of the bars of this grate. At 11 in this figure is seen a convexity in the face of the bars of this grate, which rises immediately above the point at which the saw-teeth pass out as they strip the cotton-lint from the seed. The object of this convexity is: First, that the cotton-seed, as their lint is being stripped off by the saw-teeth, shall slide from the latter on the grate at a more acute angle, and hence made to part with their lint with less power; and this being done gradually instead of instantly they are not so liable to be torn to pieces and drawn through the grate in the form of motes, and the staple of the cotton is much less cut. Secondly, to prevent the roll in the gin-hopper from breaking, choking, or clogging. The objects of fastening the bars of this grate at their upper ends only, and of adjusting their lower ends within the periphery of the saws, are: First, that seed-cotton may be fed to the gin-saws outside of the gin-hopper by machinery, and that when thus fed it shall meet with no obstruction from this grate in passing into the hopper. Secondly, that the idle portion of the saws outside of the hopper may be used for the purpose of feeding themselves, and also for the purpose of separating seed cotton from hulls and other coarse trash, and for carrying it around into the hopper and supplying feed to the roll in an even and uniform manner. Thirdly, that the saws may be combined with cleaning apparatus that shall first clean the cotton and

then feed it to them to be ginned, and thus save the necessity of rehandling it from the cleaning apparatus to the gin, and also the labor of feeding it to the latter by hand. The bars 3 extend downward and forward, as shown in Fig. 7, and are then curved, following parallel with but inside of the periphery of the jaws, until they are close to the ends of the fender grate-bars P, thus closing up the spaces between the saws and preventing the cotton from passing in between the saws and clogging up the machinery. G is the stripping or gin-brush cylinder. The bristles forming the brush on the surface of this cylinder are set in continuous lines around it, as seen in Fig. 3, and there is one line of bristles to and corresponding with each saw. The stools or bunches of bristles in these lines are set not more than one inch apart from center to center. The objects of these lines of bristles being made continuous are: First, to draw the cotton-lint from the saws continuously as fast as it is brought to the brush-cylinder instead of sweeping it off by sections and rolling it across the points of the saw-teeth into naps, as the sectional lag-brushes now in general use do. Secondly, that the brush-cylinder may be so set that the brushes shall touch only the extreme points of the saw-teeth, or even so as to just miss them, and yet strip the cotton from the saws perfectly, and thus entirely avoid napping it, and also prevent the brushes from ever being worn or cut by the saws. The brush-cylinder is made hollow, and its heads are so constructed that, as the cylinder is made to revolve, they act as suction-fans and force air into its interior and out through openings made between the lines of bristles on its surface, which openings are seen in Fig. 3. 9 9, Fig. 4, are openings in the cylinder-heads proper, in and through which air is forced by the oblique flanges 8 8. These flanges are formed on a disk which is loose on the shaft. Four equal sections of the disk, composing half its area, lie flat on the head. The flanges project obliquely out over the spaces between these sections, and compose the other half of its area. The disk is put loose on the shaft that it may be made to act not only as a suction-fan but also as a register to regulate the amount of air forced into the cylinder by turning it back and forth, so as to increase or diminish the size of the openings in the cylinder-heads. 10 10 are slots and set-screws, by which it is held in adjustment. The object of thus constructing the heads of the brush-cylinder is that this cylinder may supply itself with a sufficient quantity of air from the outside of the machine to carry the cotton out through the lint-flue, and not have to draw it, with necessarily more or less trash, from its interior, and also that it may have blast enough in every direction to repel any air-currents bearing dust or trash toward it. I is the flue through which the ginned cotton is carried out of the machine. It is constructed on the top of the machine, and is reverted back over the gin-hopper or grate-fall. The objects of its being thus constructed are: First, that it may be above all the falling dirt and litter of the machine. Secondly, that it may carry the cotton away from the ma-

chine in a direction opposite to its feed-end, and opposite to that of the air-currents which carry away the dust and trash.

In the process of cleaning and ginning cotton the latter is dropped into the feed-hopper j, when it immediately becomes subject to the action of the revolving armed cylinders. It is first beaten out of the bolls and the seed gradually separated from each other. When this separation has taken place, as each individual seed is hit by a beater its momentum carries it forward through an opposing air-current to the next succeeding cylinder. As the cotton is thus forced forward from one cylinder to another, at the several points S S' S'' it enters opposing air-currents and is hit by beaters at the same instant of time, and thus all the leaf and fine trash is beaten and blown out of it in a very rapid manner and discharged out of the machine through the grates. The cotton is thus forced by the cylinder A to B, by B to D, and by D to C. C delivers it to the fender-grate P and to the gin-saws E, these being placed above and in a tangent line from that part of its periphery which delivers the cotton. The cotton and hulls in passing up to the fender-grate and saws meet no opposing air-currents. Most of the hulls take a tangent a little outside of the cotton, strike against the hull-arrester O, and rebound downward out of the machine through the chute N. A continuous unbroken current of air is produced by C entirely around its periphery, with a strong centrifugal pressure outward, and in this air-current a broad uniform stream of cotton is continually floating. From this stream of cotton the saws take their feed. The air presses the cotton-fiber into the spaces between the bars of the fender-grate P onto the saw-teeth, which catch hold of it and carry it, with the seed to which it adheres, forward and upward to the gin-hopper F. Any hulls which may adhere to the cotton and pass up to the fender-grate with it are forced off as it is carried forward by the projecting ends of the grate 1 or the hull-bar 2, or are hurled off by the centrifugal force of the saws, and drop into the space 5 and down out of the machine through the chute N. Any cotton that may chance to drop with the hulls toward the chute N is blown back into the machine by the fan H. The cotton, when it reaches the gin-hopper F, is in a clean, open, flocculent state, in consequence of which the lint is stripped from the seed with less power, is not napped by the saws, and the staple is much less cut by them than when fed to them in the ordinary condition and manner. As the lint is stripped from the seed the brush G strips it from the saws continuously without napping it, and forces it through the reverted flue I to the lint-room, and the cleaned seed drops through the space 6, as in ordinary gins.

I claim as my invention—

1. The bars of the gin-grate 3, constructed as shown and described, with a convexity, 11, at the point where the saw-teeth pass out, and fastened at the upper ends, while the lower ends are placed within the peripheries of the gin-saws and extend close to the ends of the fender-grate P, all substantially as and for the purposes herein set forth.

2. The holly brush-cylinder G, provided with circumferential continuous lines of bristles, with holes through the cylinder between said lines of bristles, and the heads of the cylinder provided with openings 8 8, and loose disks or registers with oblique flanges 9 9, and slots and set-screws 10 10, all substantially as shown and described and for the purposes herein set forth.

3. The combination of the hull-bar 2 and fender-grate P, when constructed and arranged substantially as and for the purposes herein set forth.

4. The combination of the fan H with the hull-arrester O, the hull-bar 2, the chute N, and the cylinder C, substantially as and for the purposes hereinbefore set forth.

5. The combination of the triangular hull-arrester O, hull-bar 2, fender-grate P, and gin-saws E, all constructed and arranged substantially as shown and described and for the purposes herein set forth.

6. The combination of the cylinders A B C D, grates K L, and hollow partition T, all constructed and arranged substantially as shown and described, and for the purposes herein set forth.

7. The concave or semicircular grate-bars L L, constructed as shown and described, and arranged in a single tier under the cylinder D and between the cylinders B C, substantially as and for the purposes herein set forth.

8. The concave or semicircular grate-bars K K, constructed as shown and described, and arranged in two tiers, substantially as and for the purposes herein set forth.

9. The arrangement of the fender-grate P, hull-bar 2, fan H, and hull-arrester O with the space 5 between them, substantially as and for the purposes herein set forth.

10. The combination of the hopper J, cylinders A B C D, grates K L, hollow partition T, saws E, fan H, brush-cylinder G, flue I, hull-arrester O, hull-bar 2, chute N, damper 4, gin-grate 3, and fender-grate P, all constructed and arranged substantially as and for the purposes herein set forth.

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Witnesses:

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