

No. 655,167.

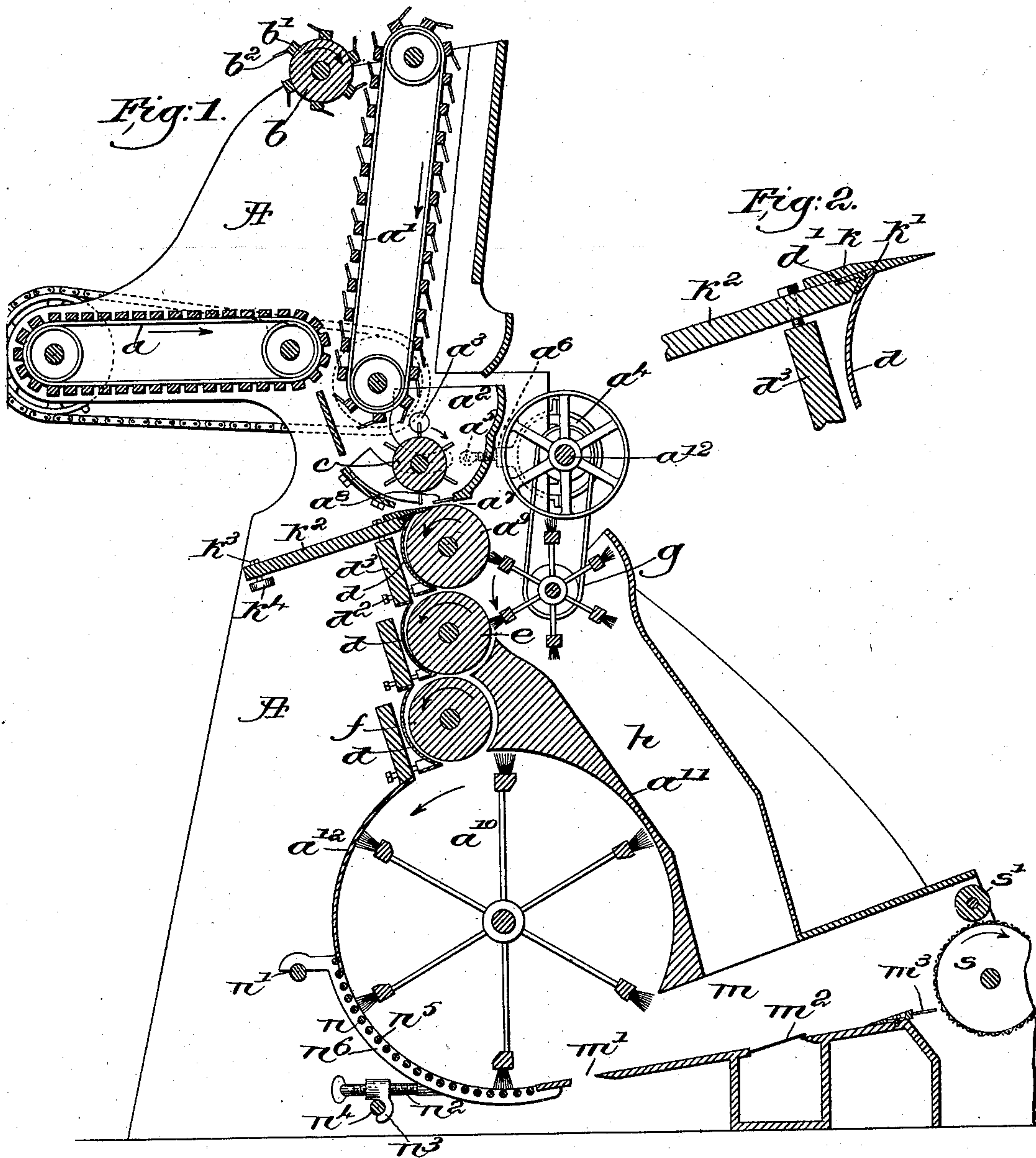
Patented July 31, 1900.

M. PRIOR.
COTTON GIN.

(Application filed July 23, 1896.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
Edward F. Allen.

Thomas Drummond.

Inventor:
Matthew Prior:
by Leroy & Gregory
attys.

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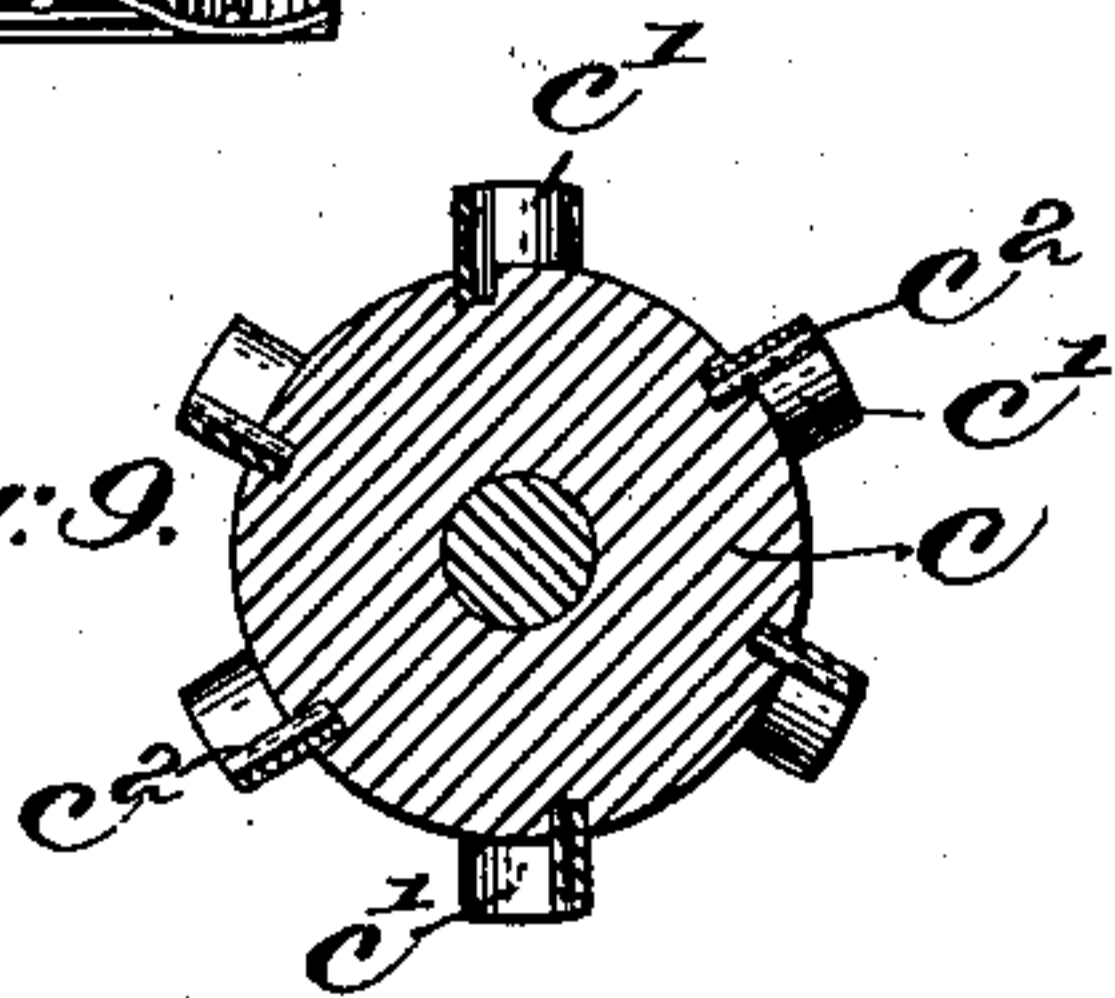
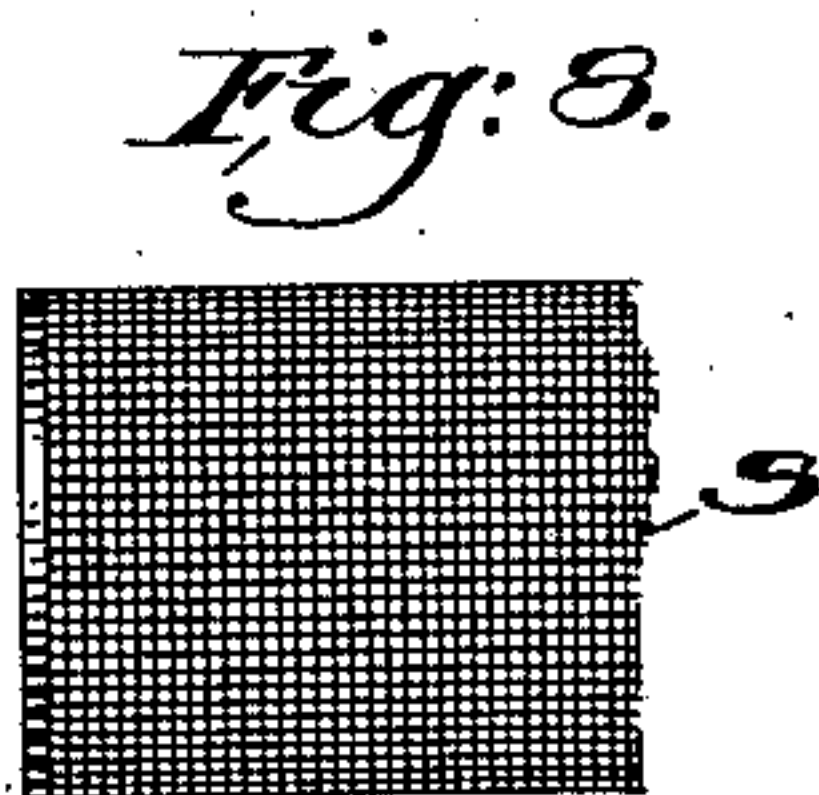
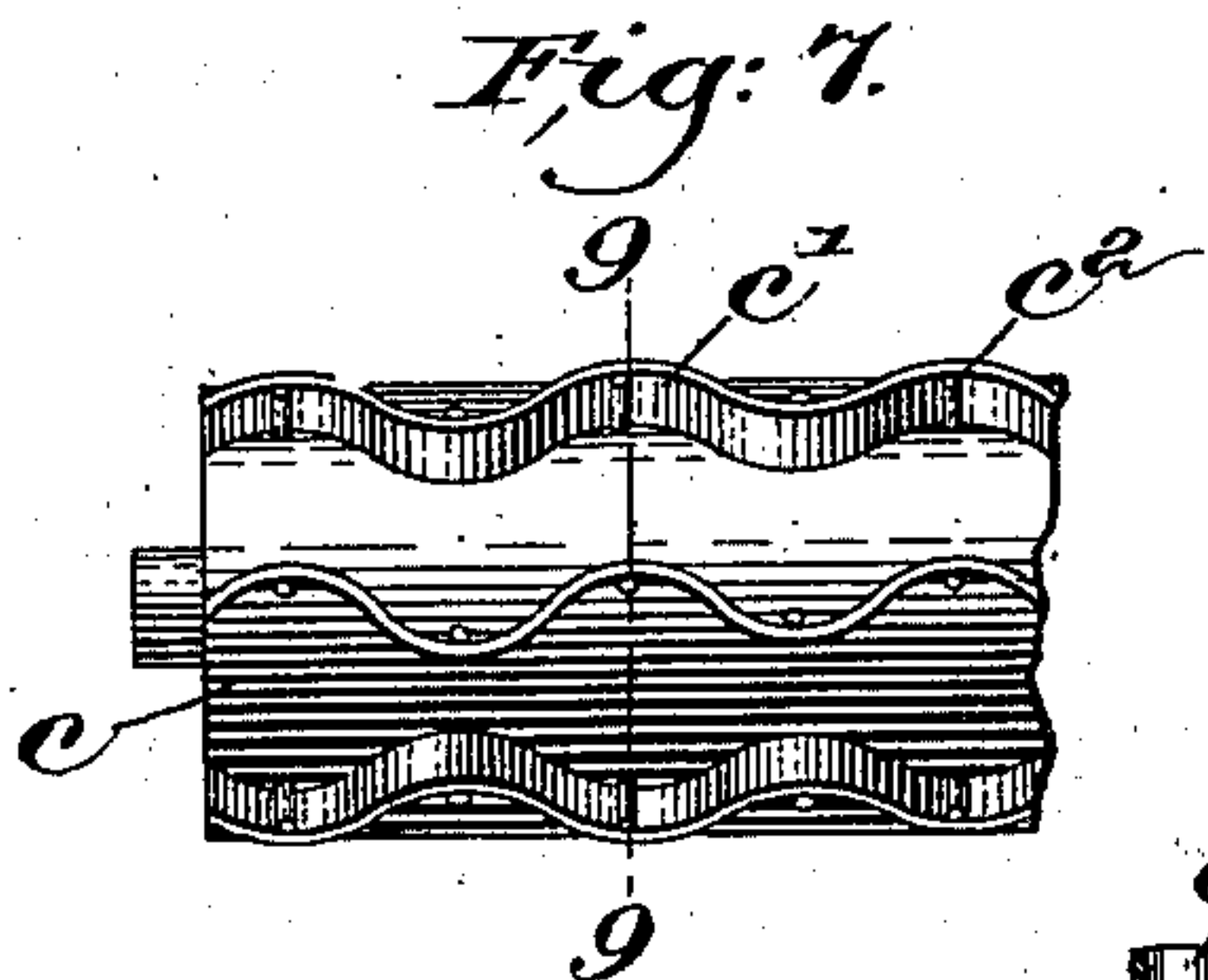
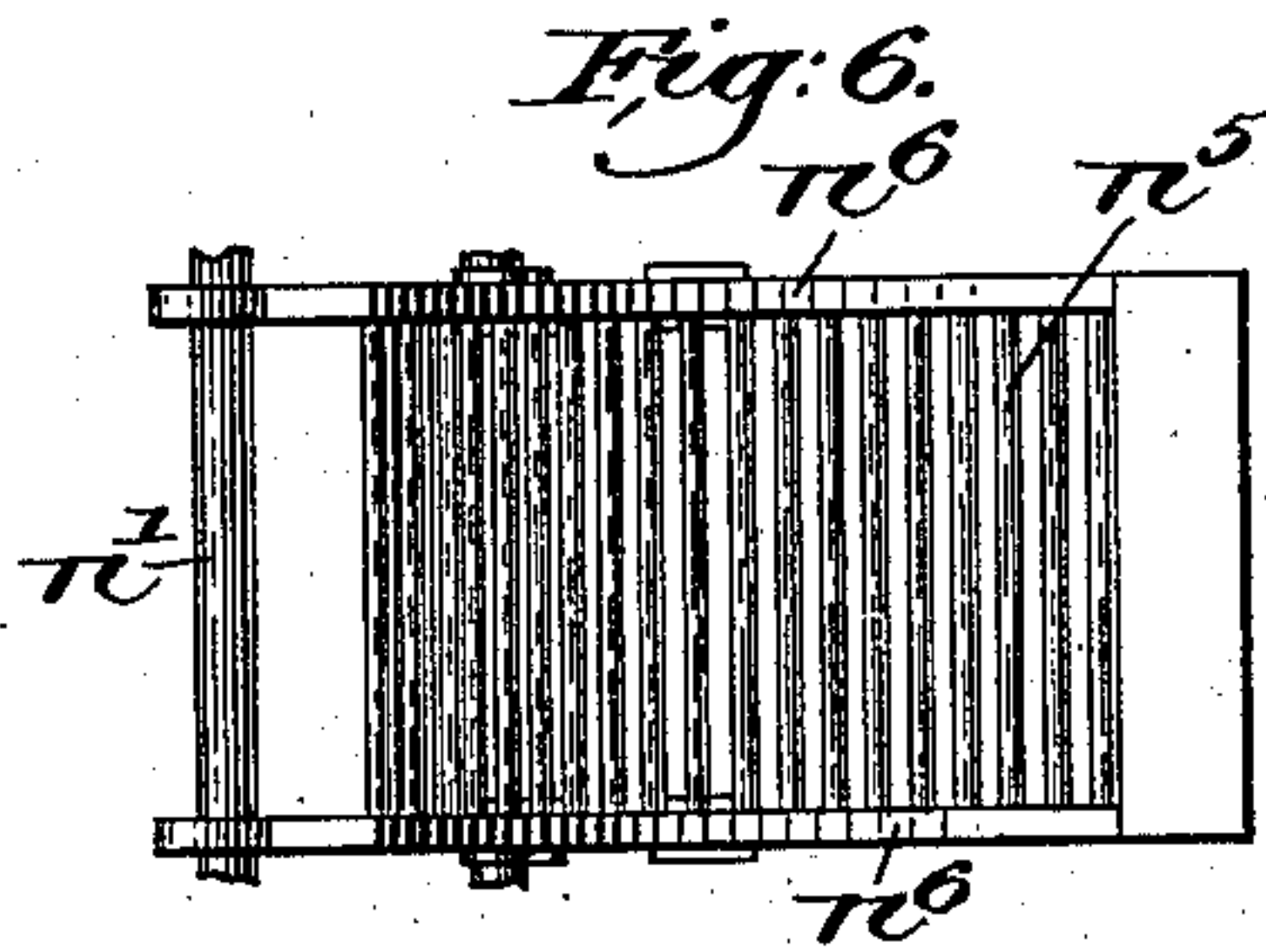
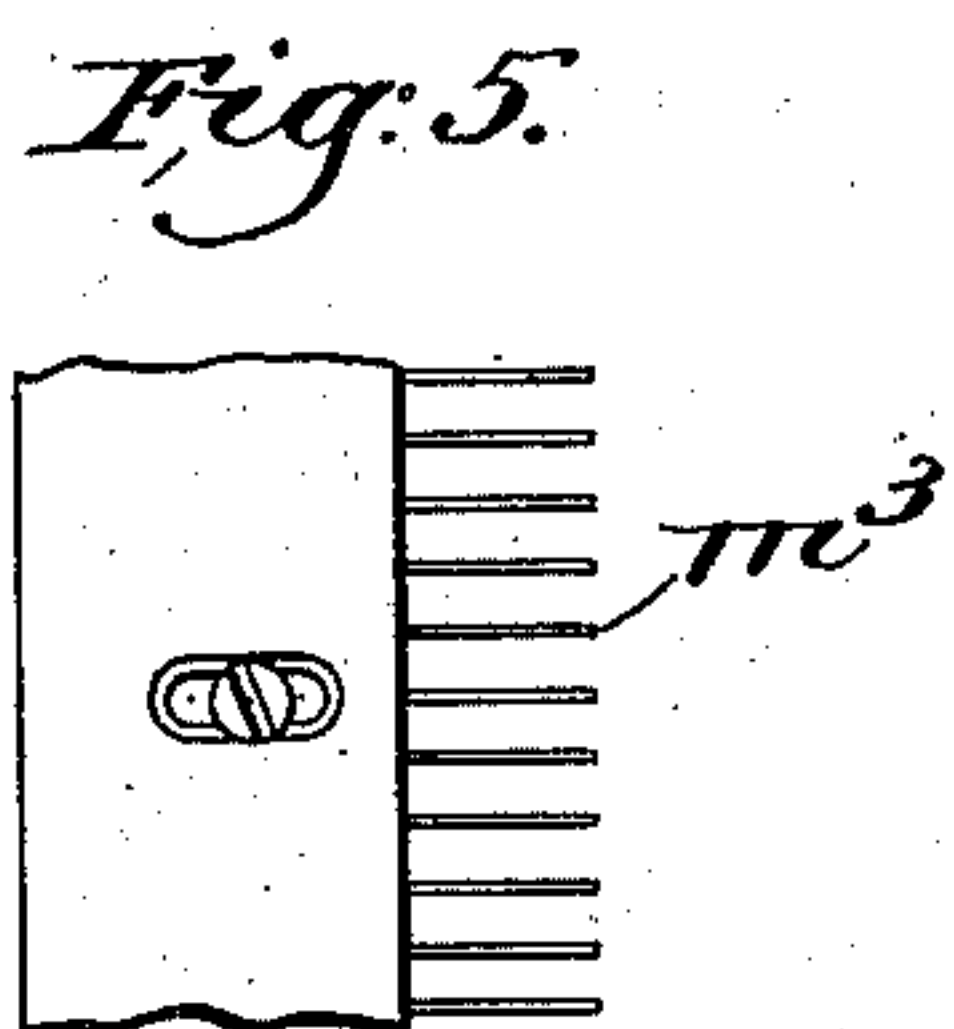
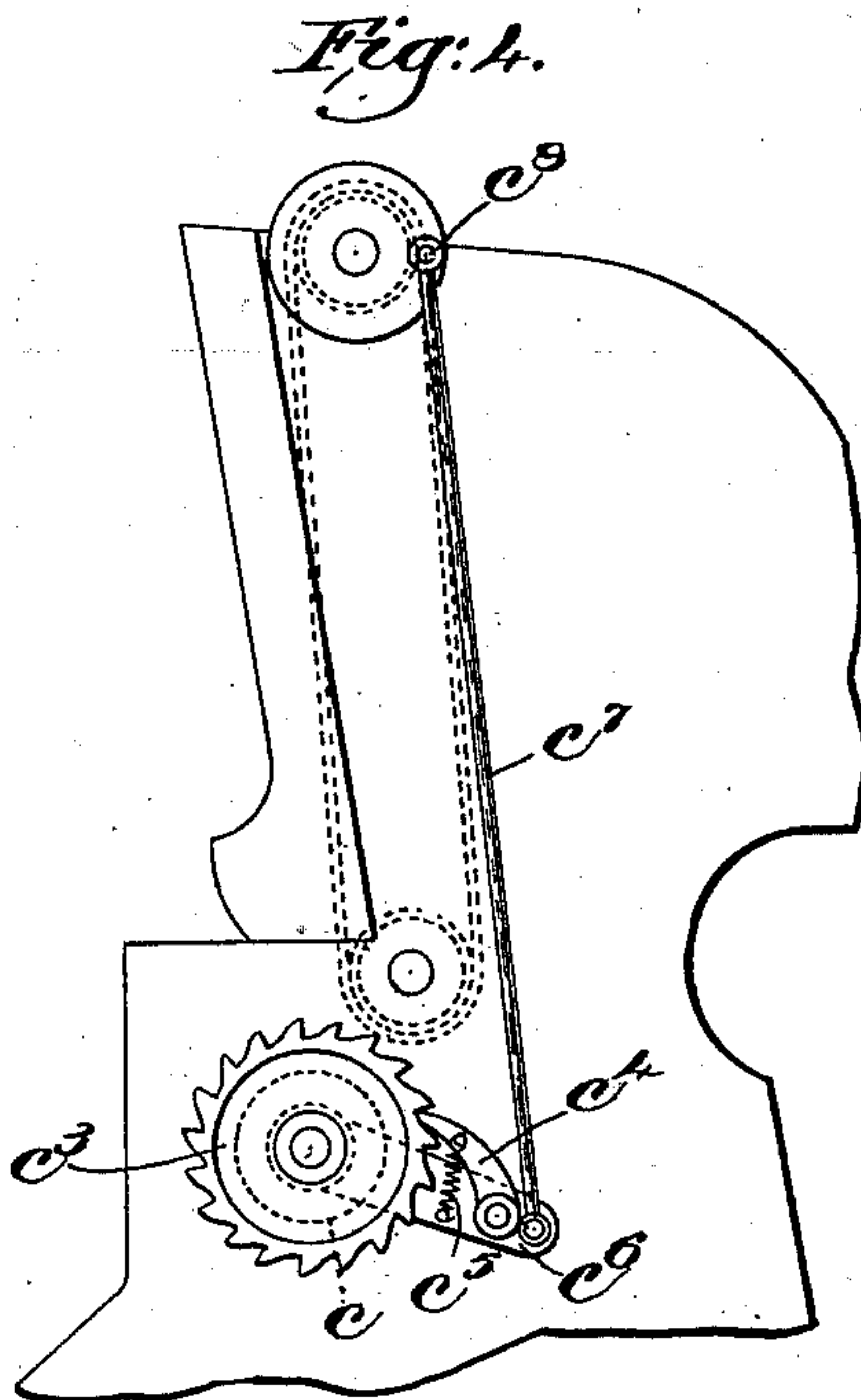
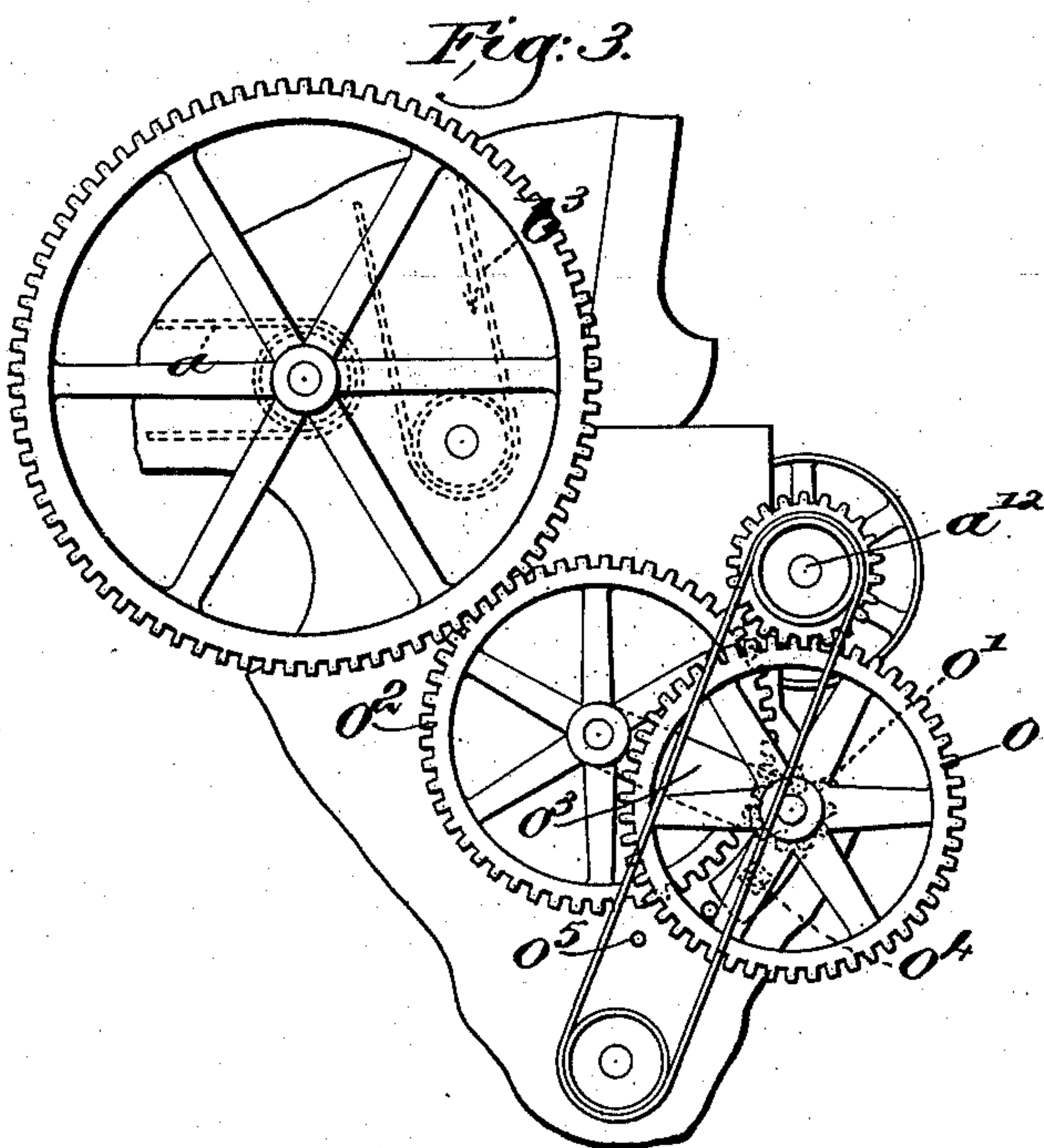
Patented July 31, 1900.

M. PRIOR.
COTTON GIN.

(Application filed July 23, 1898.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses.
Edward G. Allen.

Thomas Drummond.

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UNITED STATES PATENT OFFICE.

MATTHEW PRIOR, OF WATERTOWN, MASSACHUSETTS.

COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 655,167, dated July 31, 1900.

Application filed July 23, 1896. Serial No. 600,205. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW PRIOR, of Watertown, county of Middlesex, State of Massachusetts, have invented an Improvement in Cotton-Gins, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

It is the aim of my invention to provide means especially adapted to gin the dirty cotton and so-called "cotton-waste." This cotton and the corresponding sorts of wool are full of seeds, motes, dirt, and various forms of debris and tangled and stuck-together masses of cotton which it has been next to impossible heretofore to gin from the cotton or wool, as the case may be. Accordingly I have devised improvements in the feeding mechanism whereby a constant and uniform feed of the cotton or wool is assured, and in the ginning mechanism whereby the most obdurate fiber is straightened out and ginned almost perfectly, and in the further details of the machine whereby the particles of dirt which may have been carried through the gin proper are effectually removed before the fiber has passed entirely through the machine.

The details of the mechanism and further advantages of my invention will be fully pointed out in the complete description hereinafter, reference being had to the accompanying drawings, illustrative of the preferred form of my invention.

In the drawings, Figure 1 is a central vertical section of the complete machine. Fig. 2 is a fragmentary detail in section showing the means of securing the upper end of the card-case. Fig. 3 is an enlarged detail, in side elevation, showing the means for varying the speed of the roller relatively to the feed-regulator. Fig. 4 is a rear side elevation of the mechanism for transmitting intermittent motion to the feed-regulator. Fig. 5 is a detail in plan of the draft separator or grating for removing the finer particles of dirt from the cotton after it has been ginned. Fig. 6 is a top plan view of the dirt-grid. Fig. 7 is a similar view of the feed-regulator. Fig. 8 is a similar view of the dirt-screen. Fig. 9 is a cross-section of the feed-regulator, taken on the line 9 9 of Fig. 7.

I have herein shown the improvements which constitute my present invention as applied to a gin having in general the same features which have been heretofore patented to me in my Patent No. 511,711. My invention, however, is in no wise restricted thereto, inasmuch as it may be applied to any usual or preferred cotton or wool gin.

The cotton is thrown on the endless-belt table a , whence it is delivered to the carrier a' , herein shown as an endless belt armed with forwardly-slanting pins or teeth set in the slats of the belt. This carrier seizes the cotton and carries it to the hopper a^2 , pivoted at a^3 and vibrated by means of the eccentric a^4 , adjustably connected thereto at a^5 by means of the screw connection a^6 , whence the cotton is fed through the opening a^7 over the comb-like clearer a^8 to the roller a^9 .

All the features above enumerated may be and are of the usual kind found in roller cotton-gins and are mounted in suitable relation in the frame A of the gin.

In order that the feed of the cotton as it is carried around by the carrier a' may be uniform, I have mounted adjacent the upper end of the carrier a feed-controller b in the form of a rotating roll having slats or ridges b' peripherally secured longitudinally thereof and each carrying a multiplicity of light pins or teeth b^2 slanting rearwardly. This feed-controller is rotated by means of the chain b^3 , Fig. 3, so as to move the teeth b^2 forwardly adjacent the carrier opposite to the movement of the latter. The teeth being rearwardly inclined, as stated, keep themselves cleared of cotton, so that it is impossible that the controller can get clogged with cotton, and accordingly the controller works perfectly to insure an even feeding of the cotton as it is conveyed by the carrier. Heretofore the carrier has conveyed the cotton to the hopper a^2 , and unless the roller seized the cotton instantly the carrier tended to remove the same from the hopper, the result being that the feeding of the cotton to the roller was irregular and unsatisfactory. Accordingly I have herein provided the feed-controller c , mounted at either end in the frame A and consisting in the present instance of a roll having a roughened surface, said surface being shown in Fig. 7 as formed by strips of sheet metal c' sprung back and

forth over a staggered arrangement of pins c^2 in a serpentine manner from end to end of the roll. As thus made there are no projecting points to catch the cotton and carry it up again. On the contrary, the operation is simply to continually move the cotton downwardly toward the roller and hold it there until the latter can catch hold of the fiber of the cotton and pull it in over the edge of the knife k in the usual manner. In order that the feed-regulator c may produce still further uniformity of feed, I prefer that the same shall have an intermittent motion, one means for providing the same being shown in Fig. 4, in which c^3 designates a ratchet on the end of the roll c , and c^4 is a pawl held, by means of spring c^5 , in constant engagement with the teeth of the ratchet, the pawl being mounted on the outer end of the arm c^6 , pivoted at its inner end on the trunnion of the roll c and operated by means of a link c^7 , pivoted to an eccentric-pin c^8 on the upper drive-wheel of the feed-carrier. This intermittent feed is of particular advantage in ginning extremely dirty and knotty and bunched-up cotton. The cotton is held down by the feed-regulator c against the roller, and as the regulator hesitates between the intermittent movements thereof the roller is given a complete opportunity to catch the cotton and pull the same in under the knife with certainty. This hesitation of the regulator c also gives a better opportunity to the clearer a^8 to pick out the seeds and motes as the latter is rapidly vibrated with a slightly-uplifted action against the cotton as the latter is being pulled in by the roller.

The roller a^9 revolves in the direction of the arrow and is partially inclosed at its front side by means of a card-case d . I regard this feature (the card-case) as a very important part of my invention. The card-case consists, preferably, of a piece of sheet metal bent in a curve about the roller and held at its upper end against a shoulder k' of the knife k and having a rearwardly-extended flange d' clamped between the knife and the adjusting-lever k^2 , the latter being preferably adjustable, by means of a bolt k^3 , bearing against a lug k^4 on the frame A . The lower end of the card-case d is adjustable to and from the roller by means of a set-screw d^2 , working in the plate d^3 . The card-case will ordinarily be adjusted at its lower edge against the roller, so as slightly to pinch the cotton between itself and the roller as the latter carries the cotton around from the knife downward. The result is that the fibers of cotton are straightened out and nipped between the lower edge of the card-case and the roller until the succeeding roller or doffer, as the case may be, catches the projecting ends of the cotton fibers and picks them off in the process of further ginning or doffing, as presently described. By this means I am enabled to straighten out the most obdurate cotton, and

in fact wool and picker waste can be readily ginned by means of my improvements.

A further feature of my invention, and one which is of especial advantage in ginning wool or picker waste, consists of interposing one or more additional rollers between the master-roller a^9 and the doffer a^{10} . I have herein shown two of these auxiliary or card rollers, (designated as e, f), and have provided each of the rollers with a card-case d , adjustable to and from the roller, the same as that provided for the upper or master roller a^9 . If found necessary, another roller may be added, or one of these may be omitted, and when it is not desired to use the gin for especially-dirty cotton or for picker-waste it may be found desirable to omit the card-rollers altogether. These rollers are preferably similar to the master-roller a^9 , being composed of a hard-brush periphery or of composition, as is usual in rollers, it being preferable, however, that the card-rollers should be softer and slightly more yielding than the master-roller.

When I employ a series of rollers, as is indicated in Fig. 1, I prefer to also employ an auxiliary doffer g in order to clean off from the rollers a^9 and e any cotton that may adhere thereto and be carried around beyond the point of contact of the roller below the same. It is essential that this cotton should be removed from the respective rollers, as otherwise it would tend to clog the same and interfere with the proper working thereof. The cotton removed by the auxiliary doffer g is preferably delivered to an auxiliary chute h , whence it passes into the main chute m . The cotton having been picked and straightened successively by the rollers a^9, e, f is nipped between the last roller and its card-case d , whence it is caught by the brushes of the doffer a^{10} and whipped around over the dirt-grid n into the chute m . The dirt-grid is preferably pivoted at its upper end by suitable means, as on a transverse rod n^1 , and is adjustable by means of a hand-screw n^2 and a nut n^3 , working over a transverse rod n^4 . The grid is herein shown as consisting of a series of transverse wires or rods n^5 , mounted at either end in curved frames n^6 . The coarser dirt that has been brought down with the cotton through the rolls in the ginning process will drop through the dirt-grid n as the cotton is whisked over the same by the brushes of the doffer. It has been found, however, that in ginning extremely-dirty cotton, and especially in ginning the picker-waste, &c., which it is the special aim of my present invention to successfully clean and gin, there will still be in the cotton considerable dirt, and accordingly I have provided the closed chute m , and have also provided a closed rear portion a^{11} and front portion a^{12} for the doffer, so that the latter operates as a brush-fan to create a current of air, driving the cotton up the chute, the latter having, preferably, an inclined bottom, as shown. This

bottom is open at various places, a narrow opening m' being provided near the doffer to constitute a gravity-separator. As the cotton is blown into the chute m the heavier particles of dirt and debris are carried by gravity through the opening m' , the latter, however, being narrow, so as to prevent the cotton from passing through the same. At m^2 I have provided a second gravity-screen in which an open-work fender, upwardly inclined at its forward end, is arranged to slightly jog the cotton in its passage up the chute, and thereby further remove the dirt, &c., held in the cotton. At the end of the chute I have interposed a revolving screen s , consisting of a light drum having an open-work covering (see Fig. 8) to permit passage of the dirt. The cotton strikes this screen and passes out in the direction of the arrow. A grating m^3 is provided adjacent the screen s to constitute a draft-separator for still further removing whatever dust and dirt may have continued with the cotton up to that point. This grating m^3 may be adjusted toward or from the screen s , and is shown in enlarged detail in Fig. 5. The current of air from the doffer a^{10} is deflected by the screen downwardly through an opening provided for that purpose in the chute below the grate m^3 , so that as the cotton lodges momentarily on the grating and the screen the current of air is forced through the fluffy mass of cotton with considerable force and serves effectually to remove the least remaining particles of dust and dirt as the revolving screen carries the cotton out between itself and the roll s' .

I have found that a change in relative speed of the roller and the hopper and clearer makes a great difference in the quality and amount of work done in different grades of cotton and picker waste, particularly in the latter, and accordingly I have provided means, one form thereof being shown in Fig. 3, for varying the speed of the roller relatively to the hopper and clearer. The roller receives its rotation from the power-shaft a^{12} by means of intermediate gearing, a gear-wheel o meshing with a gear on the power-shaft, and the gear o giving motion to a similar gear o' , meshing with the gear o^2 of the roller, the two intermediate gears o o' being journaled on the swinging end of an arm o^3 , pivoted at its opposite end on the trunnion of the roller a^9 . In order to change the speed, I substitute a larger or smaller gear o for the one shown, the free end of the bracket o^3 being correspondingly adjusted by means of a bolt o^4 in one of the holes o^5 .

In operation the cotton is delivered by the moving table a to the carrier a' , which carries the same up beneath the feed-controller b , which automatically levels down any bunches and tangled masses of cotton which may have been carried up to that point on the carrier, and thence the even feed of cotton is delivered to the hopper a^2 , where it is

caught and fed with perfect regularity to the roller by means of the feed-regulator c . Heretofore it has been almost impossible to obtain even feed, particularly when dirty and matted cotton was being ginned, and this has been especially true in the case of wool or picker waste. The carrier would carry down the cotton or wool in irregular masses to the hopper, and unless the roller grabbed the fiber instantly the carrier would carry the cotton back again. With the feed-regulator of my present invention, however, the cotton can be fed as fast as desired and the hopper can be filled entirely. If there is too much cotton, it will be taken back by the carrier, and the pins of the latter being full when they reach the endless table a will not take up any more until the cotton with which they are loaded is deposited in the hopper. The intermittent feed which I prefer to use is also particularly adapted for feeding wool or picker waste with perfect regularity to the rollers, and it is especially with a view to the successful ginning of this extremely-obdurate class of cotton and wool that I have provided in the preferred form of my gin a plurality of rollers arranged in series, so that they pick the cotton from one to the other, and thereby straighten out even the worst masses thereof with certainty before the cotton has reached the end of its travel. The cotton having been seized by the roller a^9 is straightened out in its passage around the same between the roller and the card-case d . I regard the card-case as the leading feature of my invention. It operates to hold the fiber against the brushes or covering of the roller until the cotton is whipped out and straightened. The lower end of the card-case is adjusted against the roller, so as to nip the cotton and hold the same temporarily until the doffer or roller below catches the projecting ends of the fiber and picks them off from the card-case in the opposite direction, this serving to still further separate and straighten the fiber. The card-cases are slightly springy, so that they yield to any unevenness of cotton that may occur, and thereby tend to aid in drawing out lengthwise the fiber of the cotton. The auxiliary doffer g keeps the rollers clean and prevents them from clogging. I do not in any way intend to limit myself to a series of rollers, inasmuch as the card-rollers and the auxiliary doffer may be dispensed with, if desired, these being intended particularly for use in connection with the ginning of picker-waste, &c., as stated. The cotton having reached the main doffer a^{10} is caught by the brushes thereof as it projects from the last card-case d and is whisked around over the dirt-grid n , so as to remove the coarser dirt that may have come down through the gin embedded in the cotton, the cotton being thence blown through the chute against the screen s , the heavier dirt rolling by gravity down the separator m' and further dirt being screened by the fender m^2 and the

remaining debris being blown and separated from the cotton over the grate m^3 as the cotton is carried away by the revolving screen.

The chute m , if desired, may be longer or shorter than I have shown it, and certain of the separators may be omitted, or others may be added, if desired.

Various other changes in detail of construction and in arrangement and combination of parts may be resorted to besides those which I have above indicated without departing from the spirit and scope of my invention, inasmuch as I do not limit my invention otherwise than as set forth in the accompanying claims.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a gin, the combination with a roller, and its knife, of an adjustable card-case fixed at its upper side adjacent the knife, and partially surrounding the roller, and means to adjust the lower side of said card-case to and from said roller, substantially as described.

2. In a gin, the combination with a roller for ginning the cotton, of a card-case partially surrounding and eccentric to the roller, and adapted to retard the cotton and straighten the fibers thereof, as the cotton is carried around by the roller, said card-case gradually approaching close to and substantially in contact with the roller at its lower edge, substantially as described.

3. In a gin, the combination with a roller, provided with a ginning or carding surface, of a yielding smooth card-case mounted in a stationary support held against and partially surrounding the roller, and arranged to nip the cotton as the latter is carried by the carding-surface of the roller, substantially as described.

4. In a gin, the combination with a roller, of a stationary card-case partially surrounding the roller, means to hold said card-case at its lower edge against the roller, thereby to nip the cotton between the roller and case, and means to pick said cotton from the lower edge of the card-case, substantially as described.

5. In a gin, a plurality of rollers arranged in series, said rollers being journaled tangentially to each other and arranged to pick the loose cotton fibers from each other and to pass them from one to another throughout the series, and a card-case for each roller, each card-case being eccentric to its roller and having its forward edge against the roller, substantially as described.

6. In a gin, a roller, and a doffer, combined with a dirt-grid mounted adjacent the doffer, said grid being pivotally supported at its rear upper end, a fixed rod beneath it, said grid having a screw n^2 mounted thereon adjacent said fixed rod, and a hook-nut n^3 carried by said screw, said nut having its hook turned to engage the forward side of said fixed rod, being held in engagement therewith by the gravity of the grid, substantially as described.

7. In a gin, the combination with a knife, a vibrating clearer cooperating therewith, and means to vibrate it, of a roller, means to rotate the latter, and means to vary the relative speed of vibration and rotation, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MATTHEW PRIOR.

Witnesses:

GEO. H. MAXWELL,
FREDERICK L. EMERY.