

(No Model.)

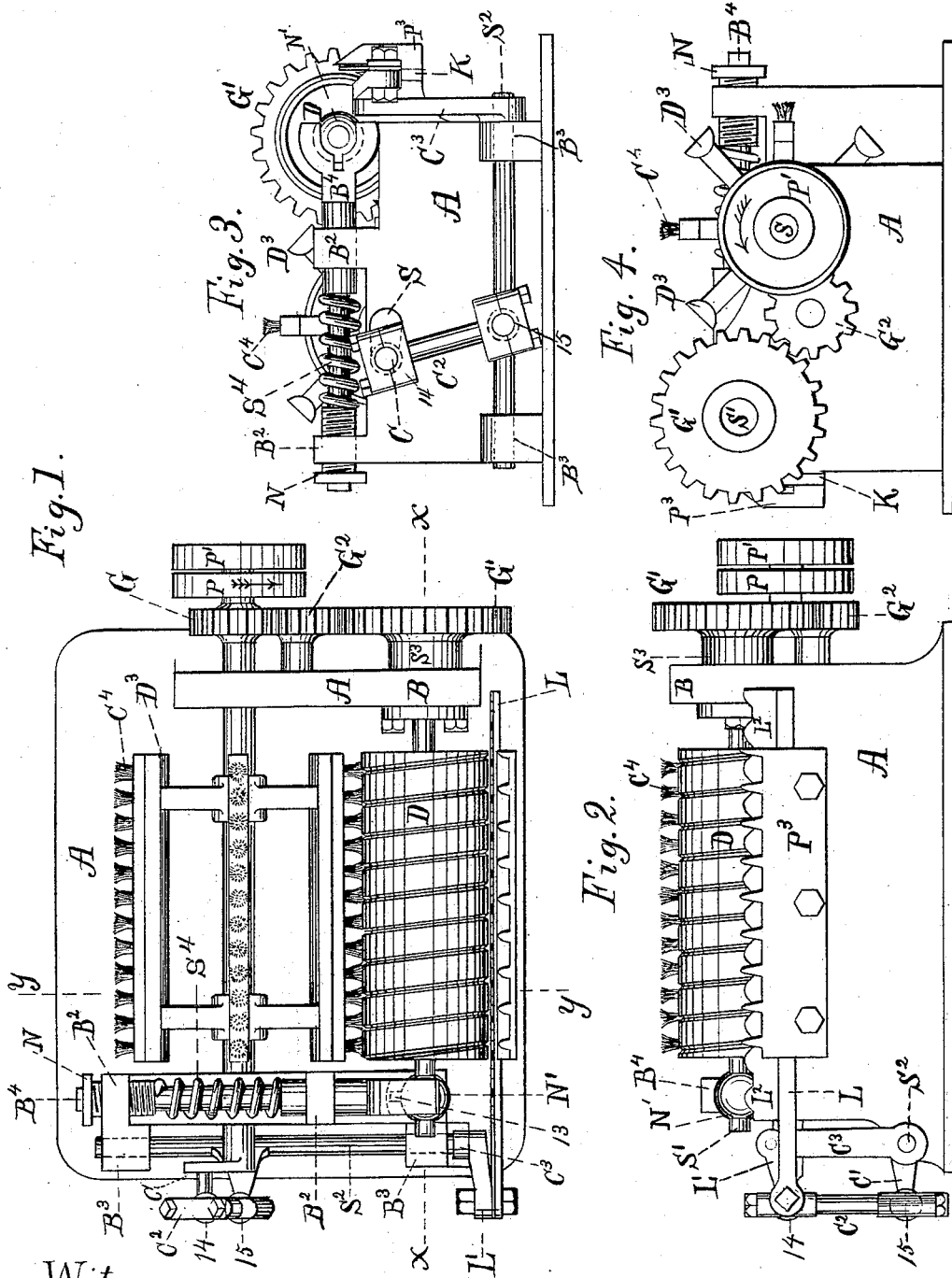
2 Sheets—Sheet 1.

F. H. RICHARDS.

COTTON GIN.

No. 305,228.

Patented Sept. 16, 1884.



Witnesses;
H. W. Faulkner
Chas. O. Palmer.

Inventor.
Francis H. Richards.

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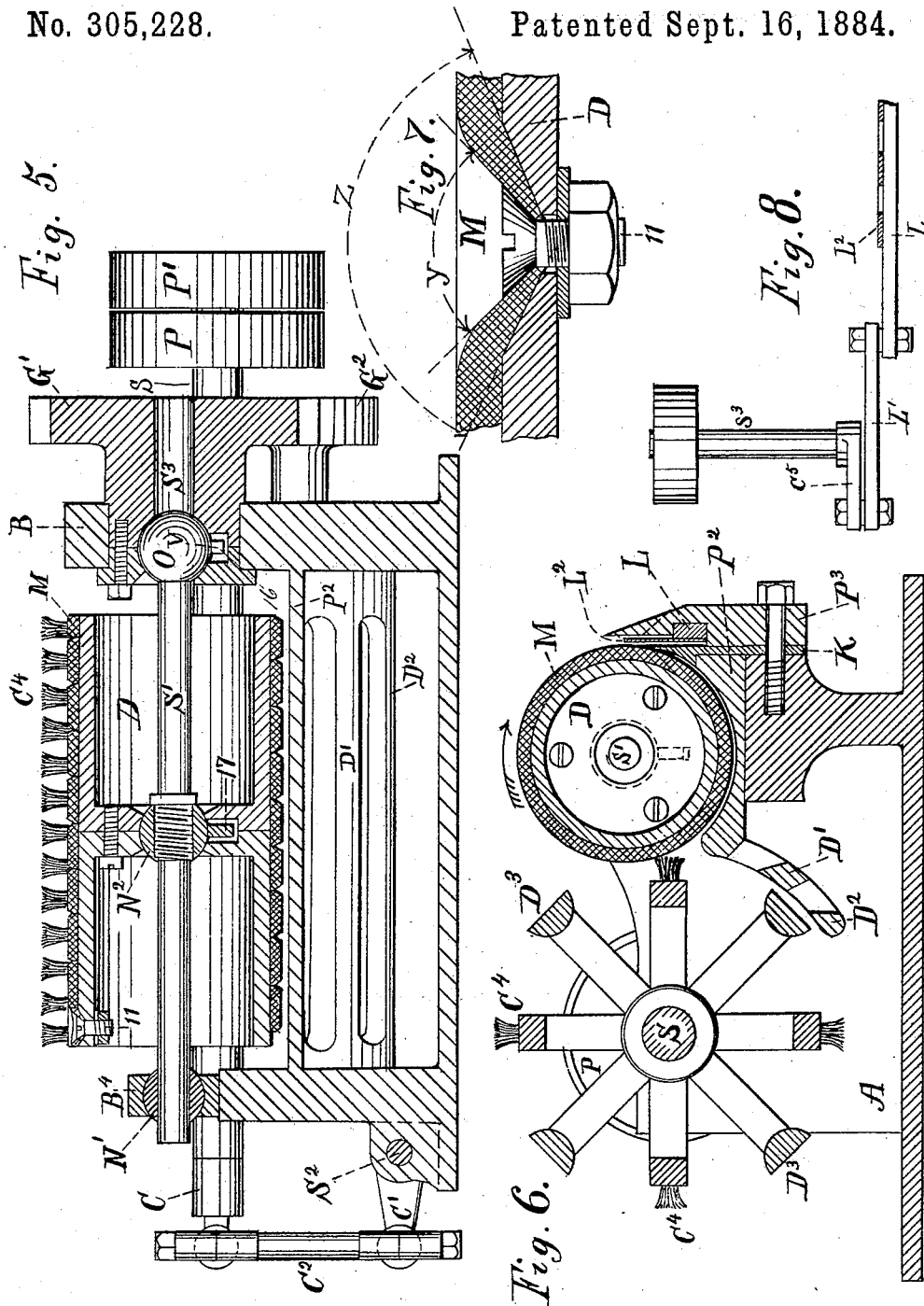
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO
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COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 305,228, dated September 16, 1884.

Application filed December 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Cotton-Gins, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to that class of cotton-gins known as "roller-gins;" and it consists in a combination of mechanism, substantially as described, for supporting, rotating, and pressing the friction-roll against the doctor-knife; also, in a combination of mechanism with the friction-roll to clear said roll of the ginned cotton, that would otherwise adhere to it, and reduce the fiber to a loose condition; also, in combination with the friction-roll and its movable shaft, and with the doctor-knife, of a device or devices for limiting the vertical oscillation of said roll; also, in the combination, with the friction-roll described, and with its driving and controlling devices, of a seed-clearer and devices for supporting the same.

In the drawings, Figure 1 is a plan view of a cotton-gin embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is an elevation of that end of the machine at the left hand in Figs. 1 and 2. Fig. 4 is an elevation of that end of the machine at the right hand in Figs. 1 and 2. Fig. 5 is a vertical longitudinal section of the machine in line *x x*, Fig. 1. Fig. 6 is a vertical transverse section in line *y y*, Fig. 1. Fig. 7 is an enlarged view of a part of Fig. 5, showing the means for securing the roll-cover. Fig. 8 shows an alternative construction of a part of the machine.

Similar letters refer to similar parts throughout the several views.

The frame A is shown formed in one piece, which I prefer on account of the greater rigidity thereby secured. In the frame are formed bearings for the driving-shaft S, a bearing, B, for roll-shaft S' and its driver S², bearings B² for the sliding bearing-holder B⁴, and two bearings, B³, for rock-shaft S². The driving-shaft S, which is driven by pulley P¹, (being a loose pulley,) carries a suitable pinion, G, for driving an intermediate gear, G², and thereby a

large gear, G', which is secured on roll-shaft driver S², a series of brushes, C', and beater-bars, D³, for acting upon the cotton delivered from the friction-roll, and a crank, C, for operating the clearer-slide L by means of intermediate mechanism. This mechanism consists of the rock-shaft S², having arms C' and C², connecting-rod C² from crank-pin 14 to pin 15 on arm C', and connecting-rod L', all suitably interposed. The roll-shaft driver S² is formed with a spherical socket adapted to receive one end of the roll-shaft S', which is formed to fit said socket, thus making a universal joint, to which motion is communicated from the driver S² to the shaft S by means of a driving-pin, 16. At its opposite end this shaft is supported and pressed forward by the sliding bearing-holder B⁴ by means of a spring, S', (shown best in Figs. 1 and 3,) and a tightening-screw, N, or by means of their equivalents—a weighted lever.

Within the bearing-holder B⁴ is a loosely-fitted bearing, N', which is prevented from turning in said bearing-holder by a pin, 13, and within which the shaft S' is adapted to be revolved. At about the center of shaft S' is secured the hollow friction-roller D, by means of the bushing N², which is externally of a spherical form, and fitted to a thread or key on S'. (See Fig. 5.)

The manner in which I prefer to form the friction-roll D to receive the bushing N², as shown in Fig. 5, is in two parts, merely as a convenient way to construct the same. A driving-pin, 17, in the bushing-N² serves to communicate rotary motion from shaft S' to friction-roll D. Roll D is covered externally with a strip of friction-producing material, M, usually of leather, preferably wound spirally thereon and secured by bolts 11. (Shown best in Figs. 5 and 7.) The friction-roll has holes therein for bolts 11, which are countersunk at an angle, Z, more obtuse than the angle Y of the head of the bolt, (see Fig. 7,) so that the bolt-head can be drawn considerably below the surface of the roll-cover and still hold it securely. The friction-roll being free to oscillate upon the bushing N², except as held in one direction laterally by the doctor-knife, requires to be prevented from undue vertical

oscillation. I prevent any such undue oscillation by means of a guide-plate, P^2 , situated either above or below the roll, the latter position being preferred, in which case the said plate is situated at a sufficient distance from the said roll to permit the passage between them of the cotton-lint as fast as it is separated from the seed. Upon the rear side of the guide-plate, either formed thereon, secured thereto, or independently secured in the machine, as may be preferred, are one or more bars, D' D^2 , between which and the brushes C^1 and bars D^3 on shaft S the cotton lint passes, to be acted upon for the purpose of reducing it from the matted condition in which it is delivered from the friction-roll. The back edge of the guide-plate answers a similar purpose as the bars, and may even serve instead of them whenever a moderate beating only of the cotton-lint is desired.

Upon the front of frame A is secured a doctor-knife, K , and upon the front of the latter a guard-plate, P^3 . In a channel between them, formed preferably in the latter, a clearer-slide, L , having a clearer-blade, L^2 , attached thereto, is arranged to be reciprocated longitudinally. Upon the upper edge of the blade L^2 is formed a series of undulations or elevations, substantially as shown, arranged to project a part of their height above the doctor-knife.

The object of the construction of the clearer, as hereinbefore described, is to permit the elevations on the same to be made thin enough to properly perform their function of beating the cotton-seed off from the lint, and to secure at the same time sufficient rigidity of the clearer, as a whole, to properly sustain without injury the rapid reciprocation required. Motion is imparted to the clearer-slide by means of a crank, rock-shaft, and connections hereinbefore described, the length of stroke being preferably equal to the length of several of the elevations of the clearer-blade.

The adjustment of the several parts of the machine should be such that the brushes C^1 will touch the roller D and bars $D' D^2$, and that of the bars D^3 , while not touching that roll, or the said bars $D' D^2$ shall still pass very close to the latter.

Owing to the method by which roller-gins operate, it is necessary, when a rigid doctor-knife is used, to support the friction-roll upon a movable, adjustable, or yielding shaft, so that it may accommodate the varying quantities of lint which at different times and at different points in its length are drawn between it and said knife, and so that it may be moved toward the said knife as it is reduced in size by the wearing away of its cover. By making the roll-shaft movable at one end only, as described, I obtain the required adjustability of the roll relative to said knife, while the gearing for driving it remains in a fixed position, which in practice is very desirable, and by supporting the roll centrally of its length, so as to oscillate laterally upon said shaft, the means for pressing said roll against

said knife are made to always act upon each end thereof, through said shaft as a lever, with equal force.

The operation of my improved cotton-gin is as follows: Power is applied to the machine by means of a band upon pulley P , thereby causing the driving-shaft S to revolve rapidly in the direction of the arrow in Fig. 4, and by means of the gearing hereinbefore described a slower rotary motion in the same direction is communicated from said shaft to the friction-roll D , and by means of crank C and the intermediate connecting mechanism a rapid reciprocating motion is given to clearer-blade L^2 . The exact relative velocity of these several motions I do not consider essential; but they should approximate, respectively, those now generally employed in similar cases. The screw N is turned up until the friction-roll D presses with sufficient force against the doctor-knife, and seed-cotton is then presented against that roll immediately above the edge of said knife. The friction-roll bears against the doctor-knife, and as it revolves draws the lint in between it and said knife, while the seeds are loosened therefrom by the rapid blows given them by the elevated portions of the clearer-blade. The mass of cotton lint is then carried backward under the roller and upon the guide-plate until it meets the brushes and beater-bars, by which it is reduced from its matted and twisted condition to a form better adapted to the succeeding operations of the cotton-manufacture. The brushes also act to prevent the lint from adhering to the friction-roll and being carried over the top of the roll.

For convenience in feeding the seed-cotton to the friction-roll some suitable form of feed-board is to be employed, having the usual grating for the escape of the ginned seed. That feed-board, not being a part of the present invention, is not shown in the drawings.

The cotton may be fed to the roll by hand, or an automatic feeding device may be used therefor.

In Fig. 8 I have shown another form of simple crank-motion—such as commonly used for similar purposes—adapted to drive the seed-clearer L . This device consists of a shaft, S^3 , driven by a pulley or otherwise, having a crank, C^5 , and connecting-rod L^1 .

In practice a series of brushes, C^1 , may be used on shaft S , or a series of bars, D^3 , or both together, as shown in the drawings, as the nature or condition of the cotton being ginned may require.

I have described the roller-shaft S' as being "jointedly" connected to its driver S^3 and to the friction-roll D , as the nature of the machine, when constructed as herein shown, requires a laterally-movable motion of the said shaft relative to the said driver, and of the said roller upon said shaft at all times during their rotation. Any kind of universal joint that can be applied within the available space may be used for that purpose, and there are

numerous well-known forms of such joints adapted for such use.

I have adopted the ball-and-socket form shown, because of its general simplicity and utility, and to show one form of such jointed connection suitable for that purpose.

Having thus described my invention, I claim—

1. In a cotton-gin, the combination, with a suitable roll-shaft driver, a roll-shaft having one end jointedly secured thereto, and means for supporting the movable end of said roll-shaft, of a hollow friction-roll jointedly secured to said roll-shaft, substantially as described.

2. In a cotton-gin, in combination, a hollow friction-roll, D, a bushing, N², within said roll, means whereby said roll is driven by said bushing, a movable shaft adapted to carry and drive said bushing, and means for supporting and driving said shaft, substantially as described.

3. In a cotton-gin, in combination, a roll-shaft driver, S³, a roll-shaft, S', a friction-roll, D, means whereby said friction-roll is driven from said shaft, a doctor-knife, K, and a movable bearing, B⁴, whereby said friction-roll is pressed against said doctor-knife, substantially as described.

4. A friction-roll jointedly supported, means for supporting and driving said roll, a doctor-knife, means whereby said roll is pressed against said knife, a seed-clearer in front of said knife and roll, and means for imparting a reciprocating motion to said clearer, combined and operating substantially as described.

5. In a cotton-gin, a friction-roll jointedly supported, a guide-plate, a doctor-knife, and a suitable seed-clearer, combined and operating substantially as described.

6. In a cotton-gin, a friction-roll jointedly supported, a guide-plate, a doctor-knife, and a suitable seed-clearer, in combination with a shaft, S, having a series of brushes, C⁴, substantially as described.

7. In a cotton-gin, a friction-roll jointedly supported, a guide-plate, a doctor-knife, and a suitable seed-clearer, in combination with a shaft, S, having brushes C⁴ and beater-bars D³, substantially as described.

FRANCIS H. RICHARDS.

Witnesses:

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