

(No Model.)

F. H. RICHARDS.

4 Sheets—Sheet 1.

COTTON GIN.

No. 306,105.

Patented Oct. 7, 1884.

Fig. 1

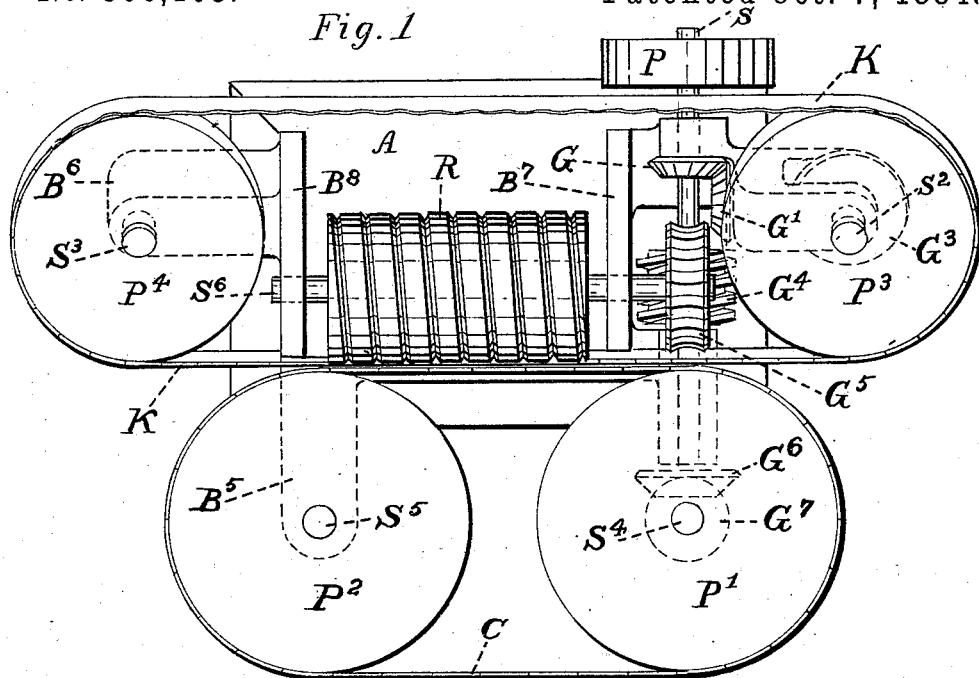
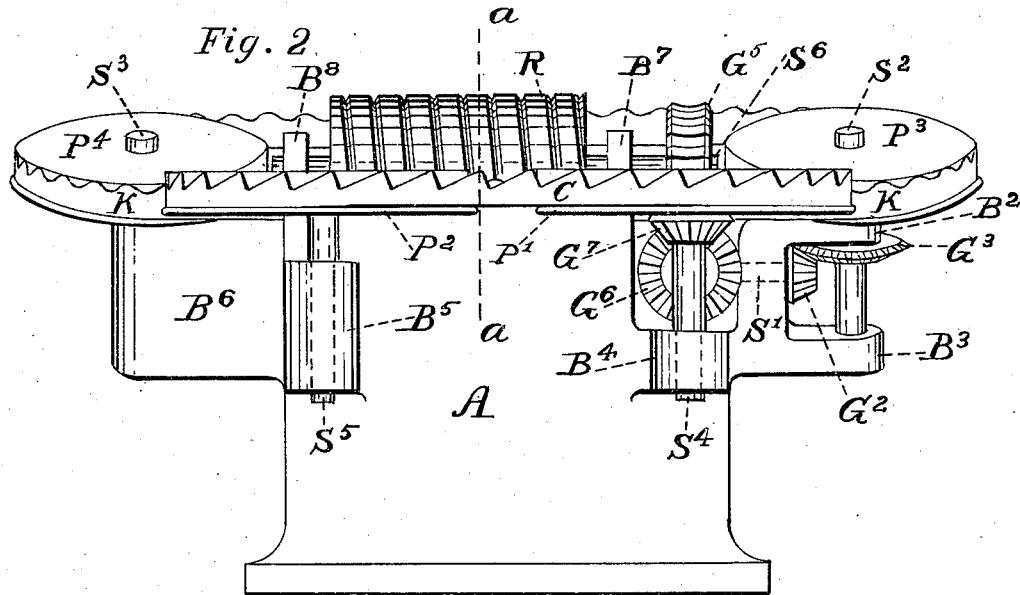


Fig. 2



Witnesses;

C. O. Palmer

J. W. Faulkner.

Inventor;

Francis H. Richards.

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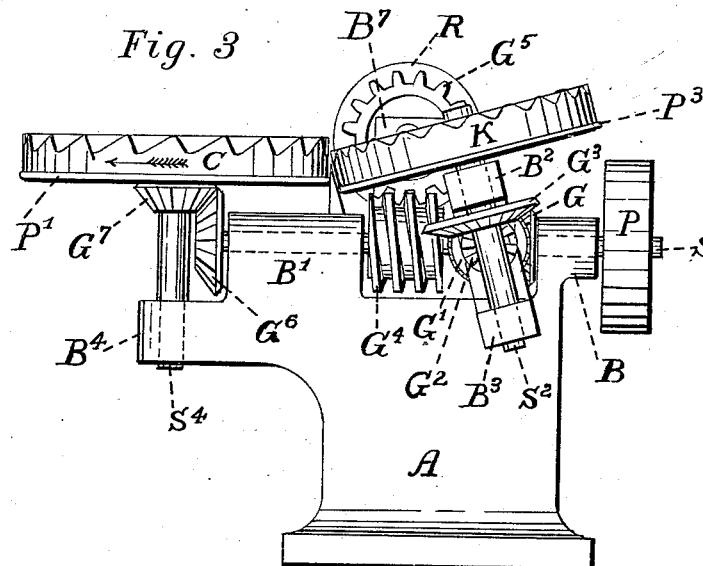


Fig. 4

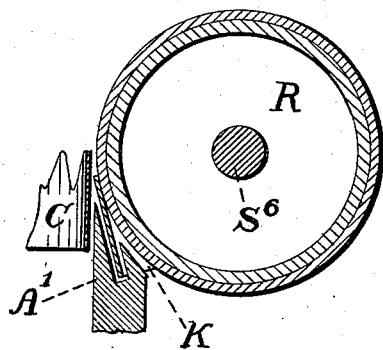
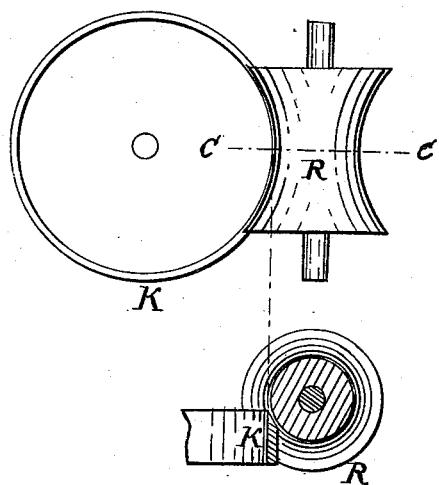


Fig. 11



Section in line CC.

Witnesses;

C. O. Palmer.

H. W. Faulkner.

Inventor:

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Fig. 5

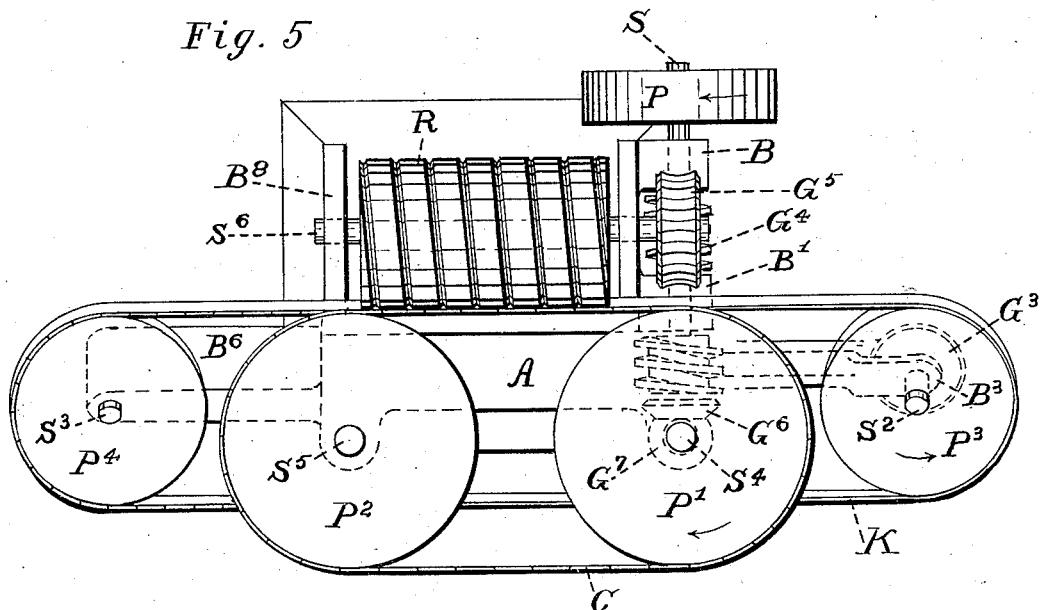
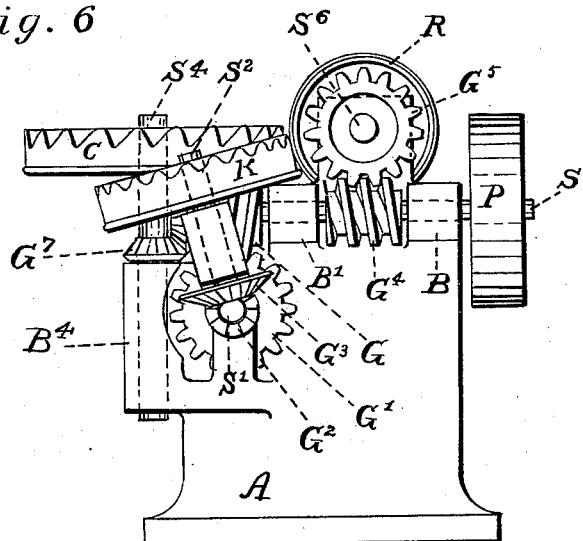


Fig. 6



Witnesses;

b. o. Palmer

J.C. Faulkner.

Inventor;

Francis H. Richards

(No Model.)

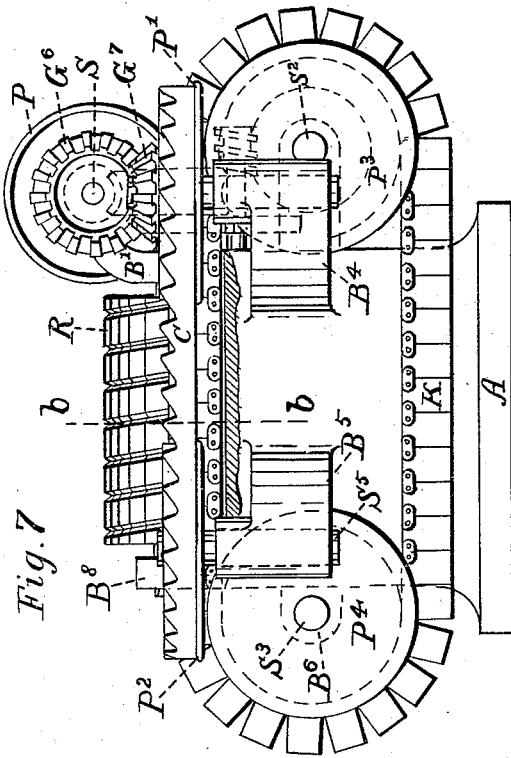
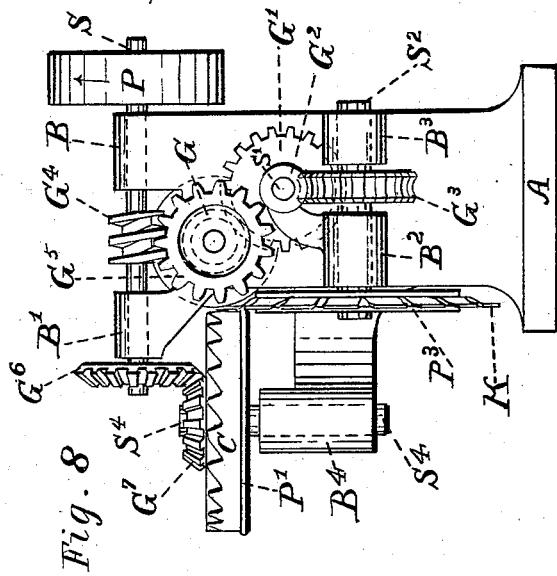
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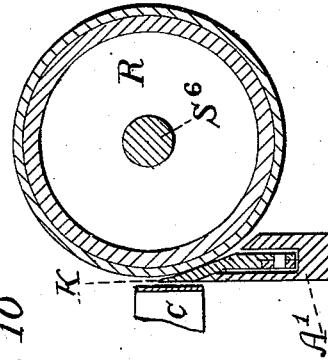


Fig. 10

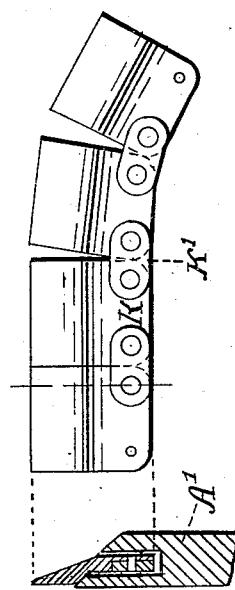


Fig. 9

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF SPRINGFIELD, MASSACHUSETTS.

COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 306,105, dated October 7, 1884.

Application filed January 14, 1884. (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.

10 This invention relates to that class of cotton-gins known as "roller-gins;" and it consists of a new and improved doctor-knife, and in combinations of mechanism hereinafter described and claimed.

15 Referring to the drawings, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is an elevation of that end thereof at the right hand in Fig. 2. Fig. 4 is a partial section on line *a a*, Fig. 2. Fig. 5 is a plan view of a similar machine, having the doctor-knife situated in a different position therein. Fig. 6 is an elevation of that end of the same at the right hand in Fig. 5. Fig. 7 is a front 25 elevation of another similar machine, having my improved doctor-knife constructed in a different manner from those in the preceding figures. Fig. 8 is an elevation of that end of the same at the right hand in Fig. 7. Fig. 30 9 shows a part of the doctor-knife in Figs. 7 and 8 somewhat enlarged. Fig. 10 is a partial section on line *b b*, Fig. 7. Fig. 11 shows a modified form of the endless doctor-knife.

Similar letters refer to similar parts throughout the several views.

Referring to Figs. 1, 2, 3, and 4, *A* is the frame of the machine, having bearings adapted to carry the several operative parts, and is shown as made integral. The principle driving-shaft *S* is carried in bearings *B* and *B'*, and carries three pinions, *G*, *G'*, and *G''*, of which the first drives an endless doctor-knife, *K*, the second drives the friction-roll *R*, and the third drives the seed-clearer, which, in 45 the present instance, is an endless one, *C*. This seed-clearer is carried upon two band-wheels, *P'* and *P''*, which are carried by shafts *S'* and *S''*, running, respectively, in bearings *B'* and *B''*. The former shaft *S'* carries the 50 gear-wheel *G'*, gearing with the aforesaid pinion *G''*. The friction-roller *R*, of the usual description, is carried upon a shaft, *S''*, which

runs in bearings *B'* and *B''*, and carries a gear-wheel, *G*, gearing with the aforesaid pinion *G'*, whereby it is driven. The endless doctor-knife *K* is carried upon two wheels, *P'* and *P''*, which are carried by shafts *S'* and *S''*, running, respectively, in bearings *B'*, *B''*, and *B'''*. The former shaft *S'* is driven by means of gears *G''* *G'*, shaft *S'*, and gears *G* and *G'*, or some equivalent mechanism.

I do not limit myself to the arrangement of gearing shown, nor to such as will drive the parts *C*, *R*, and *K* from one pulley, because each of those parts may be driven by an independent means equally well.

The seed-clearer *C* is preferably a flexible steel band, such as previously used in this kind of roller-gins, and is to be run in the direction of the arrow in Fig. 3. The proper 70 operation of the friction-roll and my improved doctor-knife does not require this kind of seed-clearer, and the old form of a vertically-reciprocating one may be used therewith, but owing to the greater efficiency of 75 the former, I greatly prefer it. The doctor-knife I also prefer to be of the form of an endless band, arranged and operated substantially as shown. It is supported and held against the roll *R* by means of a part, *A'*, of 80 the frame, (see Fig. 4,) suitably constructed therefor. The upper edge of this knife is preferably formed undulating, substantially as shown, for the purpose of increasing its efficiency to roll over the seeds during the ginning operation, and thus enable the seed-clearer to beat them off with greater facility.

During the operation of the machine, when a tuft of cotton fiber is drawn down between the friction-roll and the doctor-knife at a low 90 point of the undulations of the latter, the motion of the knife slides the high part of said undulations over the said tuft, thereby enabling the roll to act more effectually to draw in the fiber.

I prefer that the driving mechanism of the machine shall be so constructed as to drive the doctor-knife about one-sixteenth as fast as the surface of the friction-roll, while the seed-clearer may travel about ten times as fast as the latter; but these proportions may be greatly varied. As shown in Figs. 1 and 2, the doctor-knife runs each side of the friction-roll; but this is not necessary. By a suitable modi-

ification of the frame and gearing it may be arranged to run each side of the seed-clearer, band-wheel, shafts S^4 and S^5 . Figs. 5 and 6 are respectively a plan and end view of a machine having this knife so arranged, but in other respects substantially the same as the machine first described, as indicated by the reference-letters.

In Figs. 7, 8, 9, and 10 I have illustrated both another arrangement and another construction of the endless doctor-knife. It is therein formed of sections K, jointedly connected by means of links K', preferably on each side thereof, and carried upon two band-wheels adapted therefor, revolving in vertical planes below the seed-clearer. I do not limit myself to such a knife formed of any particular kind of sections, nor to these sections joined together by any particular means, as neither of these particulars is an essential part of my invention. This form of machine is also substantially the same as that one first described, as indicated by the reference-letters, the frame and gearing being of course somewhat modified. I have thus far in my present application confined the description of my improved doctor-knife to such as have either the form of an endless flexible band or a continuous chain formed of sections jointedly connected, substantially as shown, and adapted to have a continuous motion in a fixed circuit, which consists of two semicircular and two straight sections. I do not limit myself to a doctor-knife adapted to move only in that kind of a fixed circuit, and in Fig. 11 I have illustrated one adapted to have a continuous motion in a circular circuit, the friction-roll being made concave, as shown, to coincide therewith. I do not claim herein this particular form, but have described and claimed the same in separate applications filed January 14, 1884, Nos. 117,574, 117,575, and 117,576, to which reference may be had.

The operation of my present machine, with the exception of the doctor-knife, the operation of which I have already hereinbefore described, is substantially the same as that of other roller-gins of the same class.

A feed-board (not shown) is to be provided for convenience in handling the seed-cotton, which is fed to the friction-roll R, ginned thereby, and delivered from the machine in the usual manner.

Having thus described my invention I claim—

1. In a cotton-gin, in combination, an endless doctor-knife adapted to have a motion in a fixed circuit, and means for imparting motion to said knife in said circuit, substantially as described.

2. In a cotton-gin, in combination, an endless doctor-knife having an undulating edge and adapted to have a motion in a fixed circuit, and means for imparting motion to said knife in said circuit, substantially as described.

3. In a cotton-gin, an endless doctor-knife, substantially as described.

4. In a cotton-gin, a doctor-knife formed of an endless flexible band, substantially as described.

5. In a cotton-gin, in combination, a friction-roll, R, an endless doctor-knife, K, and a suitable support or part, A', for said knife.

6. In a cotton-gin, a frame-work having a support or part, A', a friction-roll, an endless doctor-knife, and a seed-clearer, combined and operating substantially as described.

7. In a cotton-gin, a suitable frame-work, a friction-roll, an endless doctor-knife, a suitable seed-clearer, a driving-shaft, and suitable operative mechanism, all combined substantially as described.

FRANCIS H. RICHARDS.

Witnesses:

C. O. PALMER,
H. W. FAULKNER.