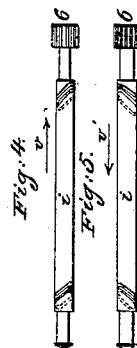
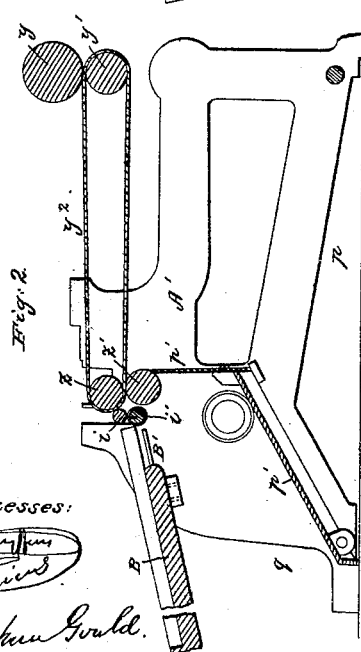
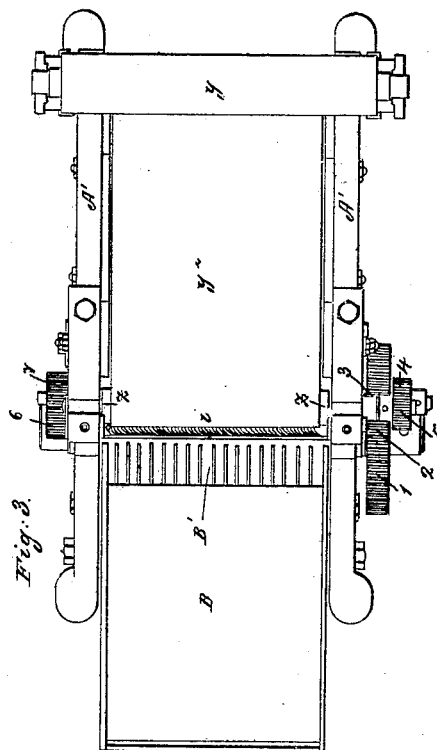
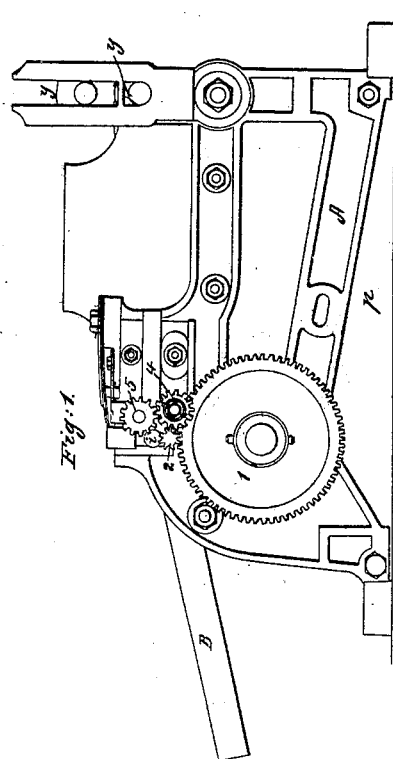


F. DURAND.

Cotton Gin.

No. 50,080.

Patented Sept. 19, 1865



Witnesses:
Edmund Gould.

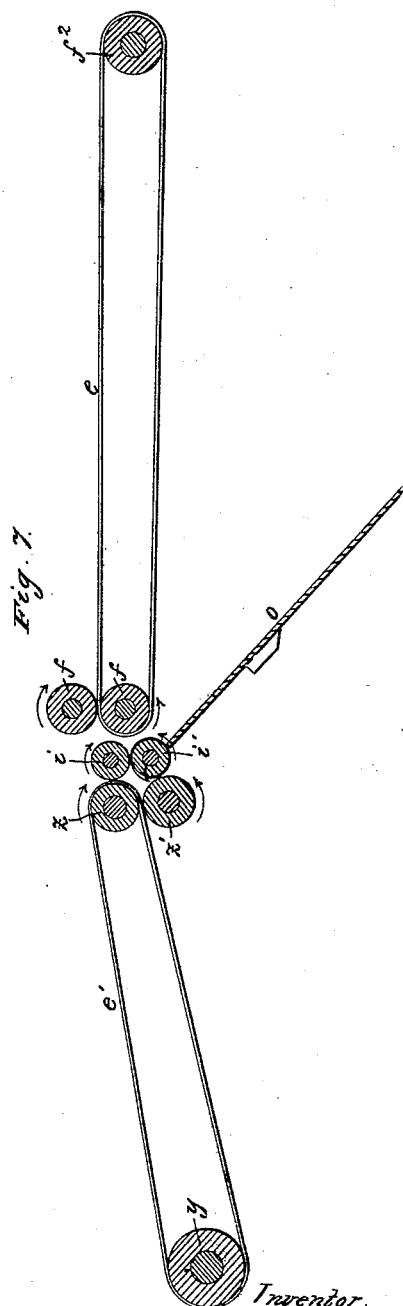
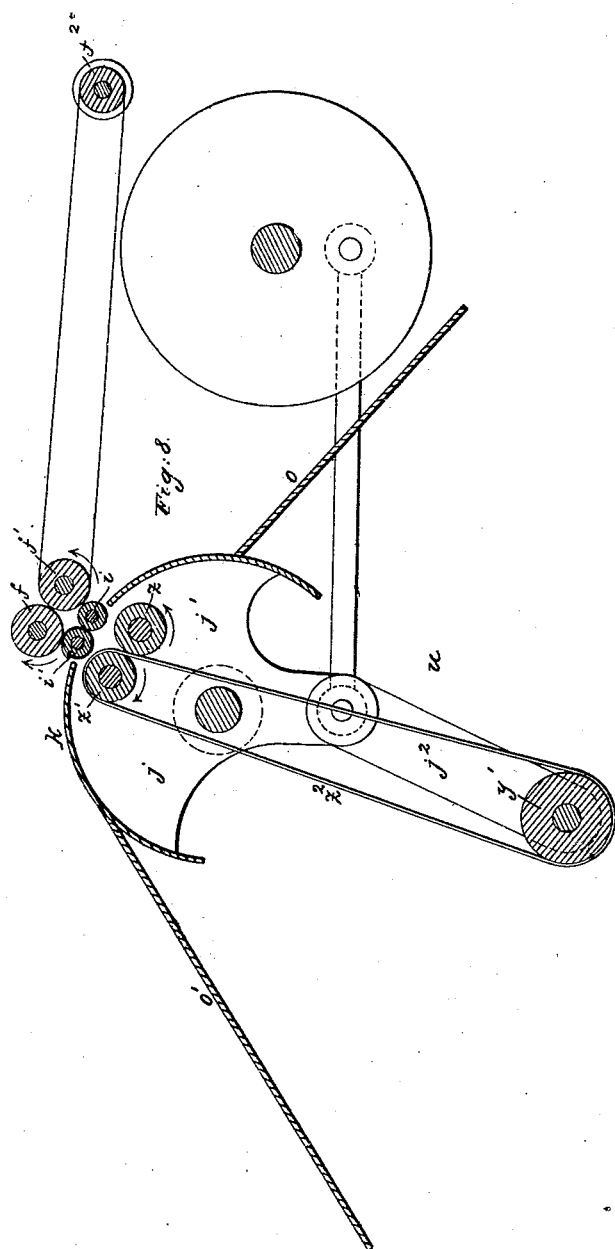
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Witnesses:

Received
by
E. S. Gould.

Inventor

J. H. Durand

UNITED STATES PATENT OFFICE.

FRANÇOIS DURAND, OF PARIS, FRANCE, ASSIGNOR TO E. P. H. GONDONIN,
OF SAME PLACE.

IMPROVEMENT IN COTTON-GINS.

Specification forming part of Letters Patent No. **50,080**, dated September 19, 1865.

To all whom it may concern:

Be it known that I, FRANÇOIS DURAND, of Paris, in the Empire of France, have invented certain new Improvements in Cotton-Gins; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The invention relates to certain improvements in that description of cotton-gins in which the separation of the seeds from the cotton is obtained by means of proper rollers or cylinders; and their principal object is to obtain this separation and at the same time procure a suitable opening and drawing of the cotton fibers without breaking them.

The invention further relates to certain modifications in the arrangement and mode of working of the cotton-gin described in my United States Patent of 24th of February, 1863.

In the annexed drawings, Figure 1 shows a longitudinal side-elevation view of one of my improved cotton-gins, of which Fig. 2 represents a longitudinal vertical sectional, and Fig. 3 a top or plan view, while the Figs. 4 and 5 show two separate views of one of the two ginning-rollers—viz., the corrugated one, hereinafter to be described—the particular arrangement of the corrugations of which roller forms one of the conspicuous or novel parts of the present improvements, and which description of corrugated rollers I intend to apply to any description of cotton-gins in which the separation of the seeds from the cotton fibers is effectuated by means of rollers or cylinders.

In these three figures the same letters of reference refer to corresponding parts.

The apparatus consists of a strong frame of cast-iron, wood, or any other suitable material. The same is formed of two vertical cheeks or side parts, A and A', connected and kept at the required distance apart by screw-bolts or suitable cross-stays, boxes being provided for the journals of the various rollers and wheels to revolve in.

i and *i'* are two ginning rollers or cylinders, of wrought-iron, steel, or any other suitable metal, one of which rollers, by preference the lower one, *i'*, has a smooth surface and is provided with a slip or narrow sheet of parchment, shown by a red line in the Figs. 2 and 6, the

latter figure representing the roller *i'* and slip of parchment on an enlarged scale, said parchment being for the purpose of allowing the fiber to be taken off without breaking it. One end of the said slip or narrow sheet of parchment is inserted in and fixed over the full length of the roller, whereas the remainder of the sheet remains free and will consequently during the revolution of the roller revolve with and apply itself over the surface of this latter, and thus make a smooth surface, from which the fiber can be drawn or moved. The other ginning-roller, *i*, is corrugated over its entire surface in the manner as shown in part in the Figs. 3, 4, and 5. The roller itself being of a cylindrical shape, a series of endless or annular elliptical grooves or corrugations is cut, on the lathe or by any other suitable means, in the surface of the cylinder, the said grooves or corrugations being cut parallel to each other and in an inclined or slanting direction in respect to the axis of the cylinder, so as to form a series of parallel inclined elliptical annular incisions of sufficient depth in the surface of the roller, and in such manner that if Fig. 4 shows a front view of the roller during one-half of an entire revolution, Fig. 5 will represent the same view of the roller during the remainder half of the said revolution. The effect produced by these corrugations will be that during the revolution of the rollers *i* and *i'* the cotton acted upon by them will during one-half of each revolution be drawn laterally in the direction of the arrow *v*, whereas during the remainder half of the revolution the cotton will be drawn in the opposite direction, consequently, while advancing between the two ginning-rollers *i* and *i'* in a direction perpendicular to the axes of the said rollers, will also be submitted to a lateral reciprocating motion, which will aid the revolving motion of the rollers for expelling the seeds from the cotton, while at the same time a proper opening and drawing of the cotton fibers will be obtained.

Various descriptions of corrugated rollers have been proposed for cotton-gins. Thus, for instance, I had a ginning-roller made provided with helical grooves extending over the entire, or at least over the greater part of the surface of the roller, but these helical grooves caused the cotton to be drawn in a continuous man-

ner toward one end of the roller. In order to prevent this, I had similar helical grooves cut in the opposite direction with the first one—viz., crossing these latter—and thereby forming facets or lozenges on the surface of the roller, but this arrangement neither gave the desired result. I also tried rollers the surface of which was corrugated in the manner of a file—viz., provided with zigzag grooves; but none of these arrangements produced the effect obtained by the above-described inclined elliptical or annular corrugations of Figs. 3, 4, and 5.

In operating on long fibrous cotton it is preferable that the ginning-rollers *i* and *i'* should be of about the same diameter, whereas for short fibrous cotton the diameter of the smooth roller *i'* ought to exceed that of the corrugated one; but the apparatus is to be arranged in such manner as to allow of replacing one corrugated roller by another of a larger or of a smaller diameter.

The cotton to be cleansed or deprived of the seeds is presented to the ginning-rollers *i* and *i'* by an inclined feeding-board, *B*, the part *B'* of which is to form an open grating for the seeds, husks, or other impurities to fall through after their having become separated from the cotton, which latter thus cleansed is, after having passed between the two rollers *i* and *i'*, taken hold of by a pair of drawing or stripping rollers, *Z* and *Z'*, over the upper one, *z*, of which and the lower one, *Y'*, of another pair of rollers, *Y* and *Y'*, travels an endless cloth, *Y²*, for carrying the cleansed cotton out of the apparatus and cause the same to fall into the open part *p*. The upper roller, *Y*, serves for preventing the cleansed cotton from returning again toward the roller *Z Z'*, which latter ought to turn with different speed, in order thereby to give rise to a proper drawing of the fibers. The part *p* for the cleansed cotton, is separated by a partition, *p'*, from that, *q*, for the seeds and other impurities to fall in.

Motion is transmitted from any suitable prime mover to the wheel 1. When acting on long fibrous cotton this wheel drives the pinion 2, fitted on the arbor of the lower or smooth ginning-roller, *i'*. The wheel 1 also drives a similar pinion, 3, fitted on one end of the arbor of the roller *Z'*, which arbor also carries another pinion, 4, in gear with one, 5, of the same diameter fitted on the arbor of the upper roller, *Z*. The pinion 6, fitted on the end of the corrugated ginning-roller *i*, is driven by the pinion 7, the diameter of which latter exceeds that of the pinion 6, and which pinion 7 is fitted on the arbor of the roller *Z*. When acting on short fibrous cotton the corrugated ginning-roller *i* is replaced by another one of a larger diameter, and the pinion 6 is set in gear with the one 2.

A modification of the above-described apparatus is represented by its principal working parts in vertical longitudinal sectional view in Fig. 7 of the annexed drawings.

The cotton to be ginned or cleansed from the seeds and husks is carried toward the ginning-

rollers *i* and *i'* by means of an endless cloth, *e*, stretched over the roller *f²*, and over the lower one, *f'*, of a pair of rollers, *f* and *f'*, one or both of which are covered with india-rubber or other suitable elastic material for allowing the seeds to pass between them without in any manner becoming crushed or impaired. These rollers *f* and *f'* carry the cotton to the ginning-rollers *i* and *i'*, constructed and acting in a similar manner to the ginning-rollers *i* and *i'* of the apparatus described in Fig. 1, and by the effect of which latter the unimpaired seeds are separated or expelled from the cotton fibers, the seeds falling on an inclined board, *o*, whereas the cleansed cotton is carried forward by a pair of drawing-rollers, *Z Z'*, over the upper one, *Z*, of which and over the roller *Y* is stretched an endless cloth, *e'*, by the effect of which rollers *Z Z'* a suitable drawing or stretching of the fibers is obtained. The arrows show the direction in which the various rollers revolve, motion being imparted to them from any suitable prime mover and by suitable gearing, in the details of which it would be superfluous to enter here.

Another part of the invention relates to a modification of the cotton-gin forming the object of my patent of 24th of February, 1863.

Fig. 8 shows a vertical longitudinal sectional view of the principal working parts of the apparatus, the frame and gearing of which are not represented, in order to allow of better observing the internal parts and avoid confusion.

In this improved apparatus, the same as in those described in Figs. 1 and 2 of this description, the seeds are expelled from between the cotton fibers in the unimpaired state by the effect of the two ginning-rollers *i* and *i'*, arranged in the manner as has been described above in Fig. 1—viz., one of them provided with my inclined elliptical corrugations and the other with a slip of parchment. The seeds thus expelled in the unimpaired state from between the cotton fibers fall on the boards *c* and *c'*, and from thence are carried out of the apparatus, whereas the cleansed cotton, after having passed between the two ginning-rollers *i* and *i'*, instead of being acted upon, as in the apparatus described in my patent of February 24, 1863, by the blades *t* of the revolving drum *r*, which parts in the present improved apparatus are entirely done away with, is taken hold of by a pair of drawing-rollers, *Z* and *Z'*, situated in the inside of the drum *k*, which rollers *Z* and *Z'* revolve in suitable bearings provided in the arms *j* and *j'*, and consequently, while revolving, partake at the same time of the circular reciprocating motion imparted to these arms. The roller *Z'* is connected by an endless cloth, *Z²*, to a roller, *Y'*, which latter revolves in bearings provided in the prolongation *j²* of the arm *j*. From between the rollers *Z* and *Z'* the cleansed cotton falls through an opening, *U*, provided at the lower part of the drum *k*, to which latter and to the arms *j* and *j'* a proper reciprocating revolving motion is imparted by any suitable gearing—for instance, in the same

manner as has been described in my patent of 24th of February, 1863.

The mode of working the apparatus is as follows: The cotton to be cleansed is laid on the endless cloth *c*, and thereby carried to the feed-rollers *f* and *f'*, provided round their surface with india-rubber or other suitable elastic material, so as to admit of the seeds passing between them in an unimpaired state. The rollers *f* and *f'* carry the cotton to the ginning-rollers *i* and *i'*, by the effect of which latter the seeds are expelled from between the cotton fibers, the seeds falling on the inclined boards *c* and *c'*, whereas the cotton is kept hold of by the rollers *i* and *i'*, and is withdrawn from between them by the rollers *Z* and *Z'*, and by them caused to fall through the opening *U* at the lower part of the drum *k*. In order to obtain a partial opening and drawing or stretching of the cleansed cotton without breaking or impairing the fibers thereof, and also for preventing these latter from adhering to the endless cloth and more readily fall down therefrom, it is preferable that the speed of the roller *Z'* should exceed that of the roller *Z*. Motion is transmitted to the various moving parts of the apparatus by means of suitable gearing. The three pairs of rollers *f* and *f'*, *i* and *i'*, and *Z* and *Z'* are to revolve with such speed that the first shall give freely to the second without breaking the fiber, and the second to the third pair. Those *f* and *f'* provide for the feeding of the rollers *i* and *i'*, and these latter, in their turn, for that of the rollers *Z* and *Z'*.

Having thus described the nature of the invention and the manner in which the same is put into operation, I wish it to be understood that I do not intend to limit myself to the precise details of the arrangements above described, nor to any special size of the various working parts, or to any particular mode of imparting or transmitting motion to the said parts, as many variations may be made in this respect without deviating from the main principles of the invention; but

What I desire to secure by Letters Patent is—

1. The combined operation and arrangement of the two ginning-rollers *i* and *i'*, the surface of the roller *i* of which is provided with a series of inclined annular or endless elliptical corrugations or grooves situated parallel to each other, and the surface of the other roller, *i'*, being smooth, the said corrugated or grooved roller acting in combination with the smooth ginning-roller *i'*, provided with a slip of parchment, substantially in the manner and for the purpose set forth.

2. In combination with the rollers *i* and *i'*, the general arrangement and combination of the parts acting in concert therewith, substantially as described, and illustrated in the annexed drawings, and for the purposes set forth.

FCS. DURAND.

Witnesses:

DREYFUSS,

E. SHERMAN GOULD.