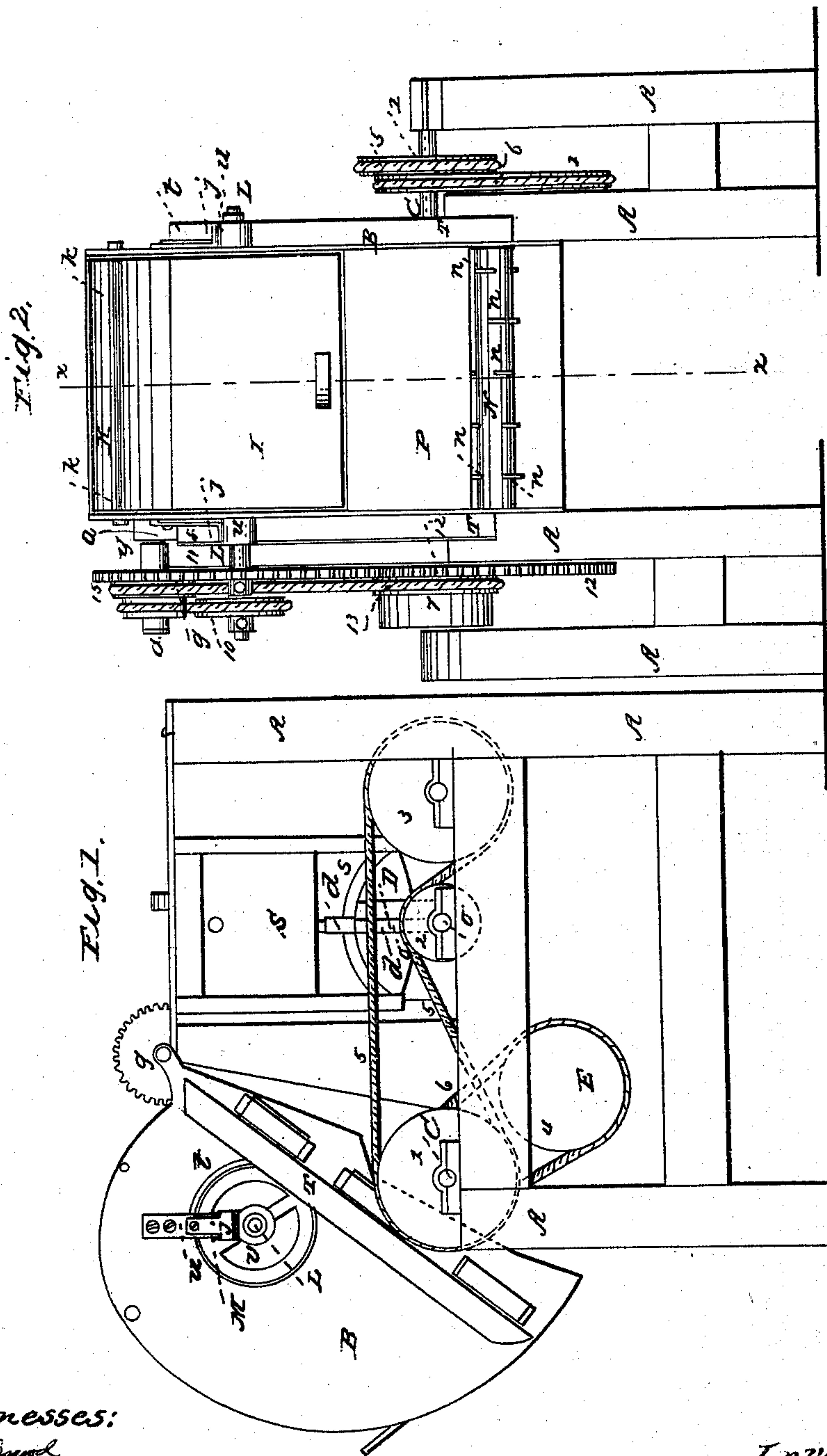


D. G. OLMSTEAD.

Cotton Gin.

No. 26,516.

Patented Dec. 20, 1859.



Witnesses:  
*R. H. Osgood*  
*J. S. Brown*

Inventor:  
*David G. Olmsted*

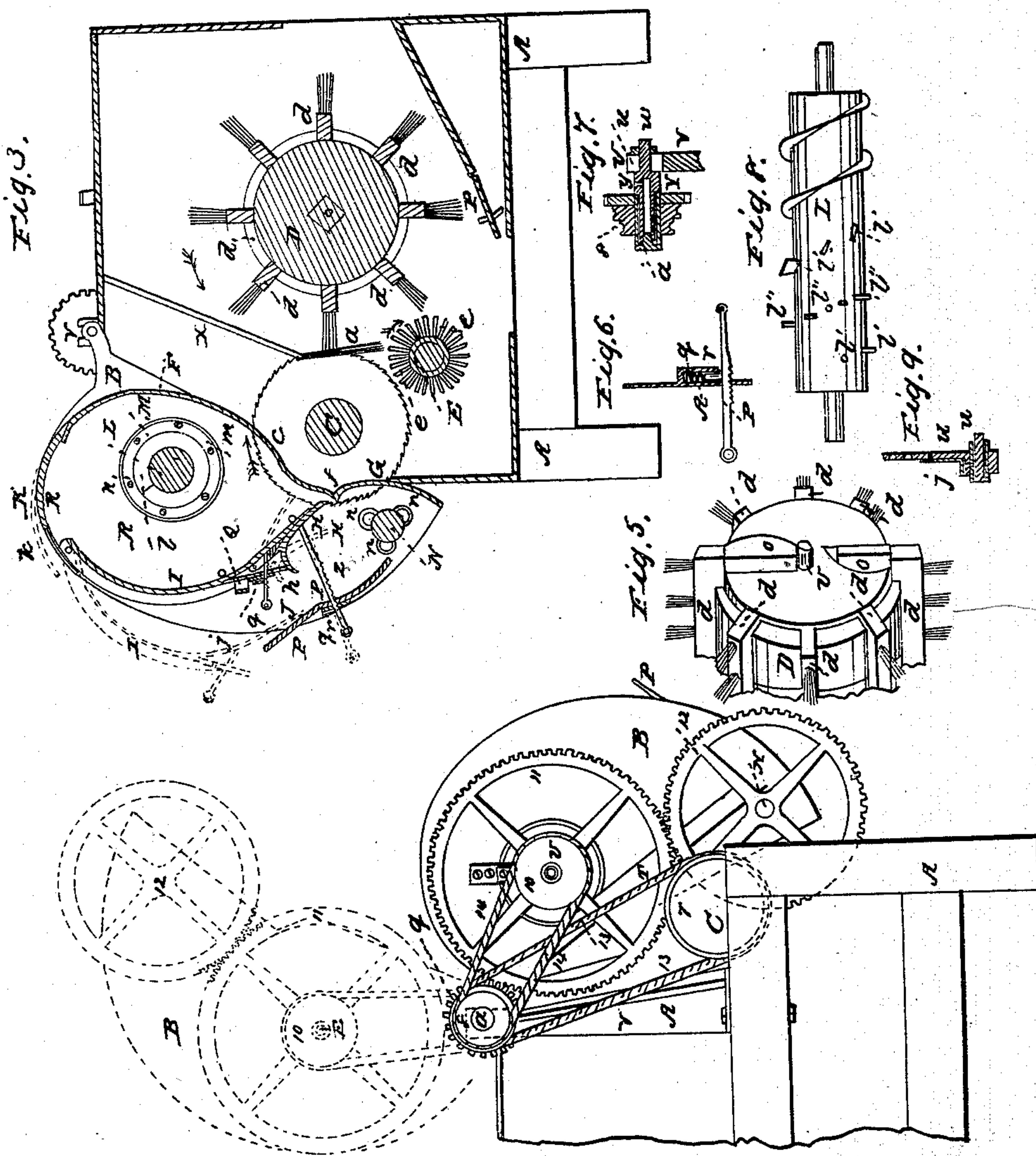
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# UNITED STATES PATENT OFFICE.

D. G. OLMSTED, OF VICKSBURG, MISSISSIPPI.

## IMPROVEMENT IN COTTON-GINS.

Specification forming part of Letters Patent No. 26,516, dated December 20, 1859.

*To all whom it may concern:*

Be it known that I, D. G. OLMSTED, of Vicksburg, in the county of Warren and State of Mississippi, have invented a new and Improved Cotton-Gin; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a side elevation of the cotton-gin; Fig. 2, a front elevation thereof; Fig. 3, a vertical section thereof in the plane indicated by the line *xx*, Fig. 2; Fig. 4, a side elevation of the front end of the cotton-gin, showing the side opposite to that seen in Fig. 1; Figs. 5, 6, 7, and 9, views of parts detached; Fig. 8, view of a part detached, exhibiting some modifications in its construction.

Like letters designate corresponding parts in all the figures.

The main frame A, in which are mounted the saw-cylinder C, stripping-brush D, and the parts immediately connected therewith, is of any suitable ordinary construction. The hopper-frame B, in which are situated the roll-box R, the grate F, and all the parts immediately connected therewith for feeding in the cotton and preparing it for the saws, is hinged to the main frame A at *a*, so that the whole may be turned up, as indicated by red lines in Fig. 4, when that is desired for any purpose. The revolving spiral screen L and hollow cylindrical screen M (when employed) and feeding-cylinder N being mounted in the hinged hopper-frame B, while the power for driving all the parts of the machine is first communicated to the saw-cylinder C, I arrange the intermediate gearing in relation to the hinging of the said frame B, so that the latter may be turned up to any extent without requiring the operation of the machine to be suspended or retarded, and without interfering in the least with the continual action of any part. The arrangement is substantially as follows: On a journal, *a*, the same as or in the sameline as the axis on which the hopper-frame B turns, a pulley, 8, is located, and receives a band, 13, passing from a pulley, 7, on the saw-cylinder shaft C, to which the power is directly applied. From a pulley, 8, on the same shaft, but of a smaller size than the pulley 15, a band, 14, passes to a pulley, 10, on the shaft of the spiral screen L, and a cog-

wheel, 9, on the same shaft as the said pulleys 8 and 15, gears into another cog-wheel, 11, on the hollow shaft or journal of the cylindrical screen M, thus causing said screen to revolve in the direction opposite to that of said spiral screen, and the last-mentioned cog-wheel, 11, gears into another cog-wheel, 12, on the shaft of the feeding-cylinder N. Thus the connecting-pulleys 8 and 15 and cog-wheel 9, turning on the same axis as the frame B, it follows that the turning of the latter can have no effect to disarrange the action of the machinery driven through said connecting-pulleys and cog-wheel. The journal *a* is to be adjusted in position by securing it in a slot, *v*, in the standard V of the frame A by a screw and nut, *w*, as shown most clearly in Fig. 7, for the purpose of tightening or loosening the bands 13 and 14, when desired, so far as not to throw the cog-wheels 9 and 11 out of gear or disarrange the same when the hopper-frame B is raised.

For the purpose of lubricating with convenience the journal *a* for the pulleys 8 and 15 and cog-wheel 9 to run on, I make a hollow space, Y, in the middle of said journal, to receive the oil, which is poured through an aperture, *y*, substantially as shown in Fig. 7, and other small holes, *z z*, extending down through the lower side of the journal from said hollow space, admit the oil to the bearing-surface of the pulleys and cog-wheel.

The stripping-brush D is driven by a band, 5, passing from a pulley, 1, on the other end of the saw-cylinder shaft, over a pulley, 2, on the shaft O of said brush, and thence around a tightening-pulley, 3, in the usual manner. The "hatchel-cylinder" E is also driven by a band, 6, passing from the same pulley around a pulley, 4, on the shaft of said hatchel-cylinder.

My improved cotton-gin is constructed so as to be adapted to the purpose of ginning all conditions of cotton, wet or dry, clean cotton, or rough cotton, for which general purpose I have made several improvements in different parts of the machine.

The roll-box R, I construct substantially in the shape represented in Fig. 3, and in the middle thereof I locate my revolving spiral screen L, which consists of a cylinder or shaft, around which is wound a spiral flange, *l*, the distance between the adjacent coils thereof being such as to allow the hulls to pass freely



within without admitting the bolls of cotton, and the height of the flange is sufficient to receive the hulls and trash and discharge them as fast as they accumulate therein. Instead of a simple continuous flange, *l*, any equivalent modification thereof may be employed—such as the flattened projections *l' l'* or the pins *l'' l''*, spirally arranged, as shown in Fig. 8, or any other arrangement which substantially furnishes a screen or separator spirally arranged. The spiral arrangement is for the purpose of working the hulls to the ends of the cylinder, and thence discharging them through openings *U* at the sides of the cotton-gin. The flange (or its equivalent) may either be wound in opposite directions from the middle, so as to discharge the hulls at both ends thereof, or it may be wound the whole length of the cylinder in one direction, so as to discharge the hulls only at one end. In addition to the spiral screen, there is added, if desired, a cylindrical hollow screen, *M*, placed concentrically around the spiral screen, and revolving in the opposite direction thereto. The construction of this screen may be as shown in the drawings, or in any equivalent manner, so as to offer meshes of the proper size to allow the hulls to pass through and leave the cotton outside; but this cylindrical screen, although it may add to the efficiency of the spiral screen within, cannot well be used alone without the spiral screen or something equivalent for discharging the hulls from it. It revolves in the direction in which the roll revolves. If the spiral screen is used alone, it should revolve in the same direction; but if used with the cylindrical screen it should revolve in the opposite direction. The screen (or screens) is situated near the center or axis of the roll-box *R*; but I find that it is best to place it somewhat nearest to the grate *F*, from the saws *c* upward to the top thereof, so that the space in the roll-box may widen therefrom gradually upward in the direction of the roll's motion to the mouth of the roll-box at the top, and thence leave an increasing space downward on the other side to the saws. By this arrangement the roll is never stopped, but continues to move freely, and the feeding in of fresh cotton at the mouth does not affect it. The screen (or screens) is mounted in bearings *u u*, suspended from the sides of the roll-box above, as represented, so as not to impede the discharge of the hulls through the apertures *U U*. An improved mode of oiling the journals of the two screens (when used together) is represented in Fig. 9. The oil is introduced through a hole in the top of the bearing, which admits it to the outer journal and a hole through said outer hollow journal, and, passing just beneath the hole through the bearing, admits the oil to the inner journal. A lid, *j*, closes over the oil-holes to keep them free from dirt.

Spouts *T T* are located outside of the cotton-gin, to receive the hulls as they come from the machine and convey them away. These

spouts are made adjustable in position endwise, so as to convey the hulls into the seed-trough at the front of the cotton-gin, or over beyond the same, as may be preferred, by changing the position of said spouts. Fenders *t t* are located at the rear of the openings *U U*, as represented, for the purpose of preventing the hulls from being forced back behind the spouts, and thus directing them into the same.

The breast-board *I* of the roll-box is made to swing out, as indicated in Fig. 3, for the purpose of getting access to the roll-box or for any other desired object. The hinge at the top is located so far back over the roll-box that the weight of the breast-board will keep it closed down. The lower edge, *J*, of said breast-board is hinged to the other part, so as to form an adjustable seed-board, as shown in Fig. 3, and a projection, *Q*, is provided on the outer side of the breast-board, through which a hinged ratchet-arm, *p*, extends for the purpose of adjusting said seed-board to any desired position. The construction of the adjusting arrangement is most distinctly represented in Fig. 6. The ratchet-arm *p* is provided with teeth on its under edge and extends through an aperture in the projection *Q*, so that said teeth will fit over the lower edge of said aperture. A small socket is situated just above the ratchet-arm, and a coiled spring, *q*, and bolt *r* are fitted therein, as shown. The expansion of the spring forces the bolt down against the ratchet-arm and causes its teeth to hold in any desired position. By first fitting the ratchet-arm away from the edge of its aperture it may be pushed out or in without impediment. The ratchet-teeth may be so shaped that the ratchet-arm may be forced inward without first raising it, as represented. Instead of locating a coiled spring in a socket, as shown, any other construction and arrangement of a spring may be employed for holding the ratchet-arm down.

The object of the adjustable seed-board *J* is to control the discharge of the seed according to the different conditions of the cotton. If the cotton is damp, the seed-board is raised, as indicated by red lines in Fig. 3, so as to retain the seeds longer in the roll-box, or until the fibers are completely stripped off. If the cotton is dry, the fibers are stripped off more readily, and consequently the seeds may pass off more rapidly, in which case the seed-board is let down farther, and thus allows more space for the discharge of the seed. Thus the position of the seed-board is to be varied according to the greater or less facility with which the fibers are stripped from the seed.

In first filling the roll-box *R* on starting the cotton-gin, and also when the cotton is clean, I generally feed through the door in the top of the roll-box, and thus gain time in the one case and gin somewhat faster in the other case; but in ginning wet or rough cotton I first place it in a hopper, *Z*, located in front and beneath the roll-box, and then feed it up into the roll-box through a hulling-grate, *H*. The arrange-



ment and operation of this grate, of the hopper Z, feeding-cylinder N, ginning-grate F, and ginning-saws *c c* for the accomplishment of this purpose are substantially as follows: The grate H is composed of narrow ribs with spaces between wide enough to allow the cotton and seeds to freely pass through, but narrow enough to exclude most of the hulls and trash. They are attached at their upper ends to a hinged bar or board, so that the whole grate may swing out and in, as indicated in Fig. 3. A ratchet-arm, *p*, arranged in the same way as that above described for adjusting the seed-board J, is employed for adjusting the said grate. The inner lower ends of the grate-ribs do not extend quite back to the ginning-grate F, but leave a space between wide enough to allow the seeds to freely pass down through and escape.

The hopper Z is shaped so as to approximate as nearly as practicable to a cylindrical form, for the purpose of producing a regular roll of the rough cotton therein. To this end not only is the front side, Q, properly curved, but curved projections *h h* are formed on the upper and front side of the ribs composing the grate, substantially as shown, so that the cotton may not rise up through the feeding-mouth, and also a curved extension, G, of the ginning-grate F is provided, as represented in Fig. 3, the form being such as to conform to the general shape of the hopper, and curved projections *f f*, where the extension G unites with the regular grate F, are also formed on the ribs, for the purpose of directing the cotton past the lower edge of the grate H, and thereby of preventing the clogging of the same in the seed-discharging space between the two grates, all substantially as represented.

In order further to assist in establishing the roll of the cotton in the hopper, I locate the feeding-cylinder N (before mentioned) at the bottom thereof, between the front side, Q, and the grate-extension G. This cylinder is provided with staple or knuckle like projections *n n*, so as to take hold of the roll, but not to cling thereto and waste the cotton or obstruct the motion of the roll. It revolves in the direction indicated by the arrow in Fig. 3. It also serves the purpose of discharging the freed hulls, &c.

The saws *c c* pass through the grate-extension G, and first act upon the roll in the hopper and carry the cotton with its seed up through the hulling-grate into the roll-box R, while said hulling-grate separates most of the hulls, which are discharged at the bottom of the hopper. Then, as the cotton joins the regular roll in the roll-box, whatever hulls or trash may still cling to it are separated by the screen (or screens) in the roll-box, as above described. The ginning goes on steadily and rapidly, making a good quality of lint even out of rough cotton. Thus, with the above-improved arrangement, by employing the double roll and feeding the cotton up through the hulling-grate I gin the roughest

cotton rapidly and well, while clean cotton is ginned still more rapidly by feeding directly into the roll-box.

I employ an apron or door, K, hinged just at the rear of the mouth of the roll-box R, for the purpose of shutting said mouth, so that the cotton may pass over it when feeding into the hopper Z. When feeding into the roll-box, this apron is arranged so as to be unhinged and taken away. It is provided with arms *k k*, reaching somewhat over the breast-board I, so that when the latter is raised the apron may be thrown back thereby without further trouble or attention. The upper part, P, of the hopper-front Q may also be hinged, if desired, so as to be thrown back, when desired, out of the way over the mouth of the hopper.

After the lint is stripped from the seeds by the saws I subject it to a sort of hatcheling or combing process while stripping it from the saws by the stripping-brush D. For this purpose I employ what I have termed a "hatchel-cylinder," E, which is located closely between and below the said saws and stripping-brush and revolves slowly in the direction indicated by the arrow in Fig. 3. This cylinder is provided with stiff projecting wires or teeth *e e*, situated at sufficient distances one from the other to allow the trash or bits of leaf which may be separated from the lint to pass freely through between them and escape. The lint, as it is stripped from the saws by the stripping-brush D, is dashed against and drawn through said teeth of the hatchel-cylinder by said stripping-brush, and thereby freed from the trash or bits of leaf, which are broken into fine particles by this action, and escape through said teeth *e e*, the operation being assisted by the constant revolving of the cylinder.

In order to direct the motion of the air produced by the saws and stripping-brush properly upon the hatchel-cylinder, and thus assist in the discharge of the trash, as well as to cause the lint to pass off in the proper direction without waste, I employ an air conductor or director of peculiar construction and arrangement. For this use I find bristles to be the most suitable, since they furnish a partition which closely fills the spaces between the saws, at the same time yielding to the fibers as they pass through, and are practically impervious enough to the air; but whatever substance may be employed having an equivalent effect I claim to use. This partition of bristles is secured to a solid partition, X, reaching down from the top of the cotton-gin nearly to the edge of the saws, as shown in Fig. 3. Thence the bristle partition extends just across the rear edges of the saws, only allowing the teeth to be swept by the stripping-brush behind it, and reaches nearly to the hatchel-cylinder, substantially in the position and direction indicated in Fig. 3. The air is by this means directed down against the rear side of the hatchel-cylinder when desired, and is almost completely prevented from passing along the



saws in front of said hatchel-cylinder. Thus the air is concentrated upon the hatchel-cylinder at the proper place, and, blowing through the teeth thereof, effectually clears out the trash.

The mote-board P is hinged, as represented in Fig. 3, so as to be adjusted up and down for the purpose of separating the motes from the lint.

The stripping-brush D is constructed as usual, except that I extend one or more of the brush-wings *d d* somewhat beyond the cylinder from which they project, and continue these extensions over the ends of the cylinder toward or to the shaft O, as shown at *o o*, Fig. 5.

These extensions serve to increase the force of the current produced by the revolution of the brush and of directing it so as to drive the lint farther into the lint-room. This is only effected in the best manner by making these fan-like extensions continuations of the wings *d d*, so that the end blast and side blast may act together. The air is admitted through apertures *s s* in the sides of the cotton-gin, generally somewhat above the shaft, said apertures being closed or adjusted by sliding shutters or gates S, Fig. 1.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Feeding the cotton into the roll-box through a hulling-grate, H, so as to exclude the principal hulls and trash, while the seed-cotton is admitted, as specified.

2. The projections *f f* at the intersection of the ribs of the ginning-grate F and extension G, for the purpose of directing the cotton past the seed-space at the lower edge of the hulling-grate H, in combination with said grate H.

3. The arrangement of the air-directing partition *a*, constructed substantially as described, in combination with the hatchel-cylinder E, for the purpose specified, at the same time disclaiming its use in any other manner or connection.

4. The extensions *o o*, when arranged as continuations of the brush-wings *d d* around the ends or heads of the brush-cylinder, for the purpose herein specified, while I disclaim the use of wings or fans on the ends of the brush-cylinder unconnected with the brush-wings *d d*.

D. G. OLMSTED.

Witnesses:

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