T. G. Boone,

Carding Mach.

No. 6,197. Patented Mar. 20, 1849.

Fig. 1

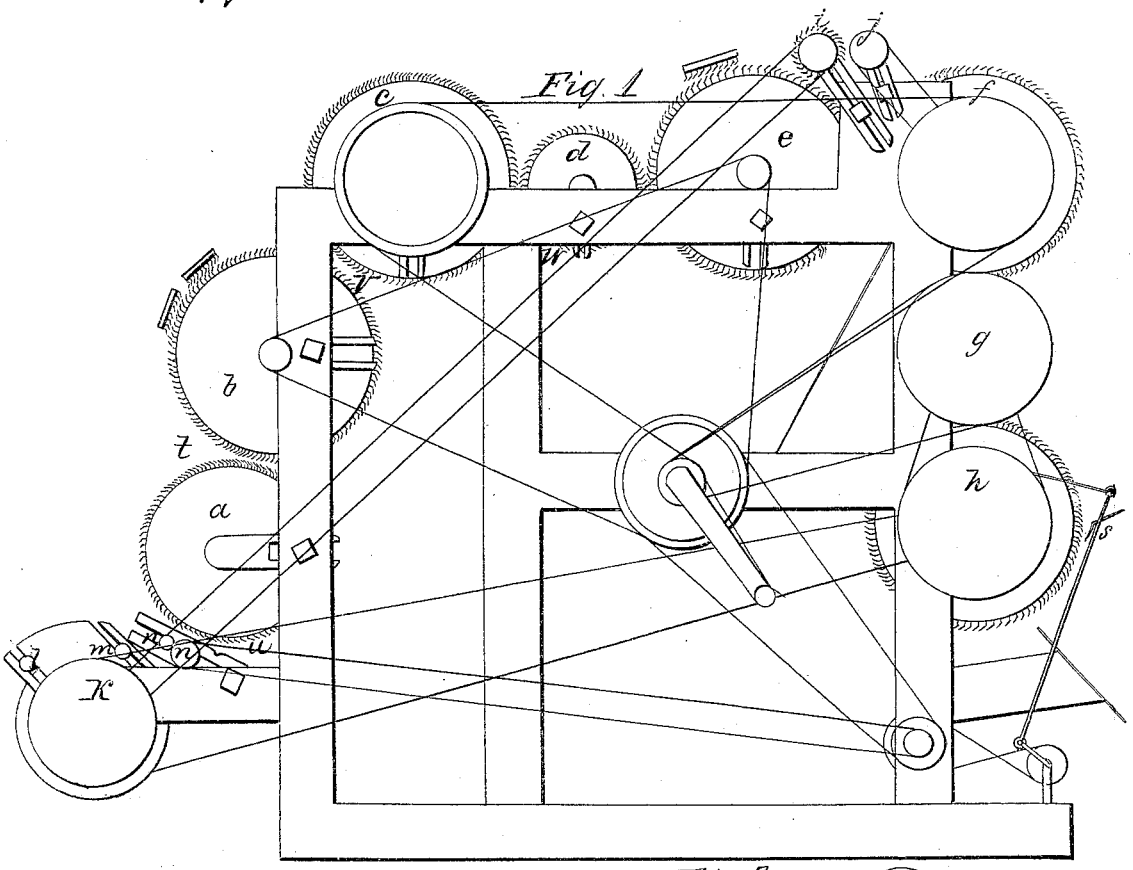
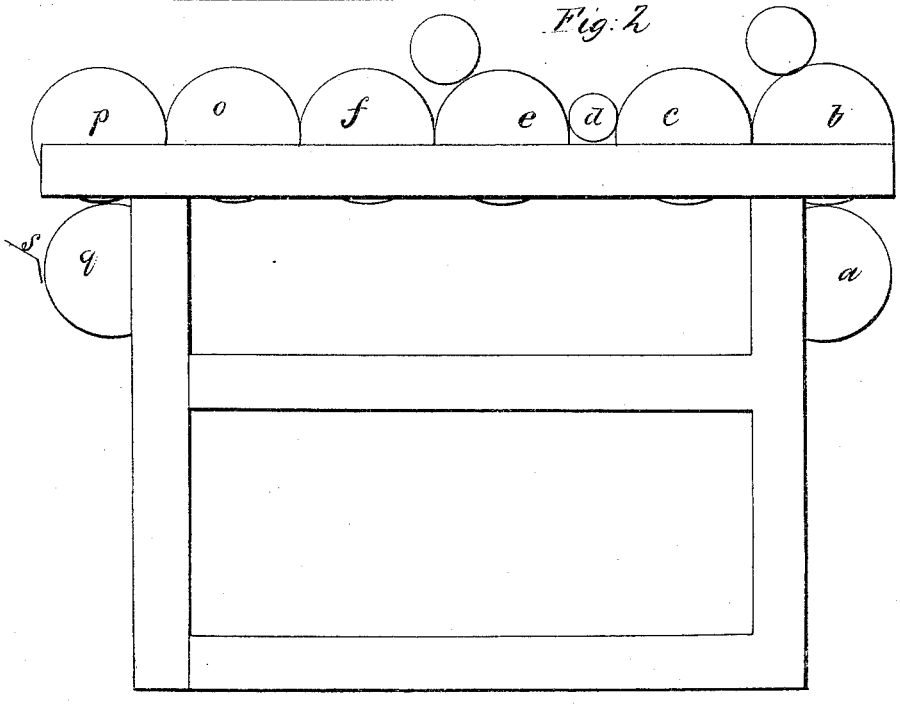


Fig. 2



UNITED STATES PATENT OFFICE.

THOMAS G. BOONE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN CARDING-MACHINES.

Specification forming part of Letters Patent No. **6,197**, dated March 20, 1849.

To all whom it may concern:

Be it known that I, THOMAS G. BOONE, of the city of Brooklyn, county of Kings, and State of New York, have invented a Carding-Machine, which is new in its combinations and valuable in its operation, by which I purpose to operate on the staple of cotton by subjecting it to the action of two or more main cylinders in one machine, so combining their action with other cylinders therein that the greatest benefit may be attained in the carding of the staple and the disengagement of the impurities therefrom with the least possible damage to the fiber or staple, which I effect by separating or spreading the staple into a state of unusual sparsity, and subjecting it while in such state of extreme division to successive action of carding by means of successive main and doffer cylinders in one machine, of which—

Figure 1 is a side elevation. *a* is a cylinder, known as a "licker-in." *b* is a main cylinder. *c* is a doffer. *d* is a stripper. *e* is a main cylinder. *f* is a doffer. *g* is a reducing-doffer. *h* is a second reducing-doffer. *s* is a comb. *i* is a clearing-cylinder. *j* is a top stripper. *k* is a lap-cylinder. *l* is a lap-rod. *m* is a weighted roller. *n n* are feed-rollers. The bat or lap of cotton is put around the lap-rod *l*, which, with the bat thereon, is placed and resting on lap-cylinder *k*, is turned and unwound by its motion, carrying the lap under the weighted roller *m*, by which it is pressed against the lap-cylinder, partaking of its motion, presenting the staple to feed-rollers *n n*, said feed-rollers having a more accelerated motion or speed, by which it is drawn out and reduced to any state of thinness required and presented to the licker-in *a*, which turns toward said feed-rollers, beating the cotton and taking the staple underneath up to main cylinder *b*. Main cylinder *b* is placed over licker-in *a*, in order that the dirt and impurities disengaged in the action between the licker-in and main cylinder might escape through an aperture into a chamber, both of which are provided in the casing thereto at *t*, while the staple is carried forward and carded on the edge of doffer *c*, from which it is taken by stripper *d* on its edge underneath to main cylinder *e*, by which it is carried forward and carded onto the card-edge of doffer *f*, which, revolving toward its main cylinder *e*, takes the staple underneath and deposits it on the upper surface of card-cylinder *g*. Cylinder *g* is a reducing-doffer having about one-third the surface speed of doffer *f* and revolving and having its card-edge in an opposite direction, its upper surface and edge moving in the same direction of the lower surface and edge of doffer *f* at a much less surface speed, thereby collecting the sparsely-distributed fiber from the doffer *f* and conveying it to second reducing-doffer *h*. Reducing-doffer *h* has its edge and motion in an opposite direction to cylinder *g* and precisely the same as doffer *f*, but of a surface speed reduced to about one-third of that of reducing-doffer *g*, by which means the staple is collected from the lower surface of reducing-doffer *g*, on the upper surface of second reducing-doffer *h*, in a thicker sheet suitable for the action of the comb *s*, by which it is separated from said doffer.

The carding of cotton is one of the most important branches in the manufacturing of that article, and the object sought to be attained is the separating of the staple or fiber thereof from each other in a manner as perfectly as it can be done with the least possible injury to said fibers, and the placing of them together again in their light and separate form in a manner less compact than their former state. To effect this, two objects are necessary: One is to separate it from its remaining impurities; the other to place it in such a state of extreme division that its fibers can be acted upon without seriously injuring them, and the process best calculated and properly arranged to do the one is best also to effect the other.

The benefits to be derived from this invention may be better contemplated if we calculate the sparsity of cotton as spread out on the surface of doffer *c* preparatory to further action. The surface speed of a common main cylinder of forty inches diameter revolving one hundred and twenty turns per minute given to one of my main cylinders of twelve inches diameter would require about four hundred turns per minute and the doffer speed of one-seventh of the same about fifty-seven turns per minute. Taking one and one-half ounce per minute on a card of thirty inches width, being at the rate of about sixty

pounds per day, the surface of a doffer thirty inches wide and twelve inches diameter being about eleven hundred and thirty-one square inches multiplied by fifty-seven turns per minute, making four thousand four hundred and sixty-seven square inches of doffer-surface over which one and one-half ounce of cotton would be spread per minute on doffer *c*, from the surface of which it being taken, as aforesaid, by stripper *d*, the surface speed of stripper *d* being more than twice the speed of doffer *c*, it would double the sparsity of the same in presenting it to main cylinder *e* at the rate of one and one-half ounce of cotton spread over about one hundred and twenty-eight thousand nine hundred square inches, main cylinder *e* commencing its action of carding and cleaning from a feeding in by said stripper *d* at this extreme division or sparsity.

Other benefits superior to the combinations heretofore in use are secured in providing for and effecting the disengagement of the impurities of the cotton therefrom by all the first cylindrical actions to which it is subjected, as seen, to wit, *u t v w*.

Whereas in common machines, after the cotton has been once conveyed to the main cylinder, there is little or no chance for the escape of its weightiest impurities until they are carried forward and fall out at the last action had thereon between the doffer and main cylinder; and when the large amount of hard earthy and silicious substances usually disengaged at that last action is contemplated, in connection with its dulling and roughing effects on the cards and the staple-breaking effects on the cotton, the evil attending the common action of workers is apparent, for while it is conceded that they do a considerable amount of carding and evening, they, by their continual returning of the staple over and over to be acted upon by the main cylinder-cards already overcharged with staple and impurities, must do a vast amount of staple breaking, waste-making, &c., whereas in my plan no cotton once taken from my main cylinder is again subjected to its action, but its progress is forward, thinly scattered by speeding up the doffers to several times the proportional speed which doffers have to their main cylinder in the common method.

I have also constructed a card-roller or top-cleaning-cylinder *i* to turn at slow speed, with its edges forward on its surface next the main cylinder, contrary to the motion of the same, to take the impurities projecting from the surface thereof without causing them a more compressed action against the same, which they would have under a cylinder revolving in a contrary direction, or if driven under the top-flats, by being flittered against by the cards.

j is a beater or stripper to clean top clearer *i*, revolving toward it and depositing its contents on the casing prepared to receive it.

Fig. 2 is a sectional view of the same principle of combination, where three main cylinders and three doffers have been used with only one reducing-doffer, which form I would prefer to that of Fig. 1, the combinations being virtually the same. *a b c d e f* are precisely the same as in Fig. 1. *o* is a third main cylinder; *p*, a third doffer; *q*, a reducing-doffer. Main cylinder *o* revolves toward doffer *f*, stripping the staple therefrom, carrying it underneath, and carding it onto doffer *p*. Doffer *p*, revolving toward reducing-doffer *q*, deposits its staple on the surface of that cylinder. Reducing-doffer *q*, having its edge and motion contrary to that of doffer *p*, receives its staple, carrying it underneath and up to the separating action of comb *s*.

1. Having thus explained the nature of my invention, its mode of construction and operation, I do not claim the lap-cylinder *k*, nor the licker-in *a*, nor the feed-rollers *n n;* but I claim the weighted roller *m*, in combination with the feed-rollers and the lap-cylinder, for the purpose of drawing in cotton and feeding it to the licker-in in a thinner sheet than is done by carding-machines at present in use.

2. I do not claim a licker-in nor the first main cylinder as such, nor the common action of such cylinders as they may have been heretofore well known, in whatever relative position they may have been placed; but I do claim the aperture and chamber in the casing at *t*, where the casing projects in near to where the main cylinder-card, at its lowest surface, takes the staple from the top or upper surface of the licker-in card, near to such aperture and chamber, as described, (and also provided in the casing;) and I do claim them also in combination with the peculiar placing of such main cylinder *b* directly over the licker-in *a*, so as to bring their place of nearest proximity and action exactly or nearly over the center of the licker-in and as near to such aperture and chamber as it may safely be placed, in order to discharge such dirt and silicious impurities as may be disengaged by such action and throwing it through such aperture by the combined motion of both cylinders, without allowing it to fall either into the cards again or onto the lap or mat of cotton entering them.

3. I do not claim the using of two doffers to one main cylinder, or of "double doffers," so called, as such have been used in different methods and for different purposes, having action with the main cylinder; but I do claim the arrangement and action of a reducing-doffer as my own invention, the same having no action with the main cylinder, but with the doffer, whereby I collect the fiber from the common doffer, though sparsely scattered thereon, into a thicker sheet or mat more suitable for a proper delivery by the comb or other apparatus for stripping or clearing the same; and I claim the same whether operated by using two such reducing-doffers in combination, as cylinders *g* and *h*, Fig. 1,

or by using one only, as cylinder *q* in Fig. 2, or in any other way that is substantially the same in principle and effect, in order to collect the staple from the common doffer into a thicker mat, to be taken off by a comb or other stripper. I am enabled by the action of such reducing-doffer to run the common doffer at a much greater speed than is usual, thereby presenting a much larger amount of clean doffer card-sheet to the surface of the main cylinder, whereby I keep the staple in greater sparsity than I otherwise could without having it too sparse to be delivered in a perfect mat or sheet.

4. I do not claim a card-roller or top-clearing cylinder extending across a main cylinder, simply as such, I having understood that top-flats have been constructed as well rotating as stationary; those revolving doing so in a direction calculated to press the impurities by them disengaged from the main cylinder under their lower surfaces between them and the main cylinder, carrying it to a place to be stripped from off their rising surface; but what I do claim is a card-roller or top-clearing cylinder *i* moving the impurities disengaged by its lower surface from the main cylinder on its edge in a direction contrary to the edge and action of the main cylinder, and calculated to take it out from the place of contact without pressing it between itself and the main cylinder, in combination with beater or stripper *j*, revolving in a manner to clear the same and deposit the strippings, as described.

THOMAS G. BOONE.

Witnesses:
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WILLIAM C. HERBERT.