No. 31,315. PATENTED FEB. 5, 1861.

C. HARDY.

MECHANISM FOR GRINDING THE CYLINDERS OF CARDING MACHINES.

Fig. 2.

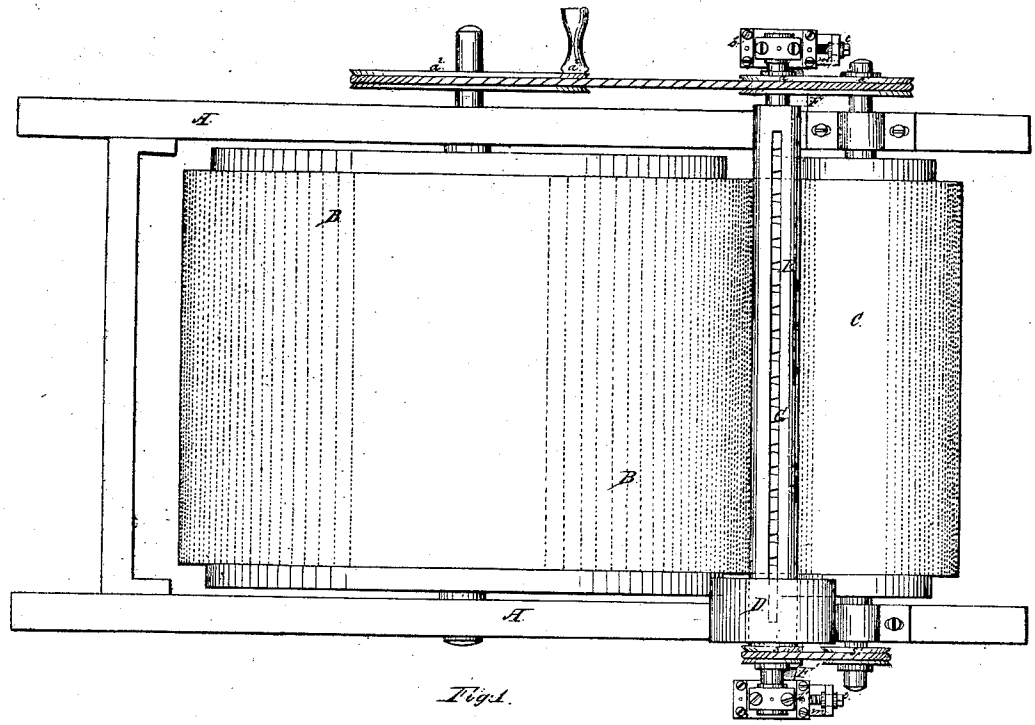
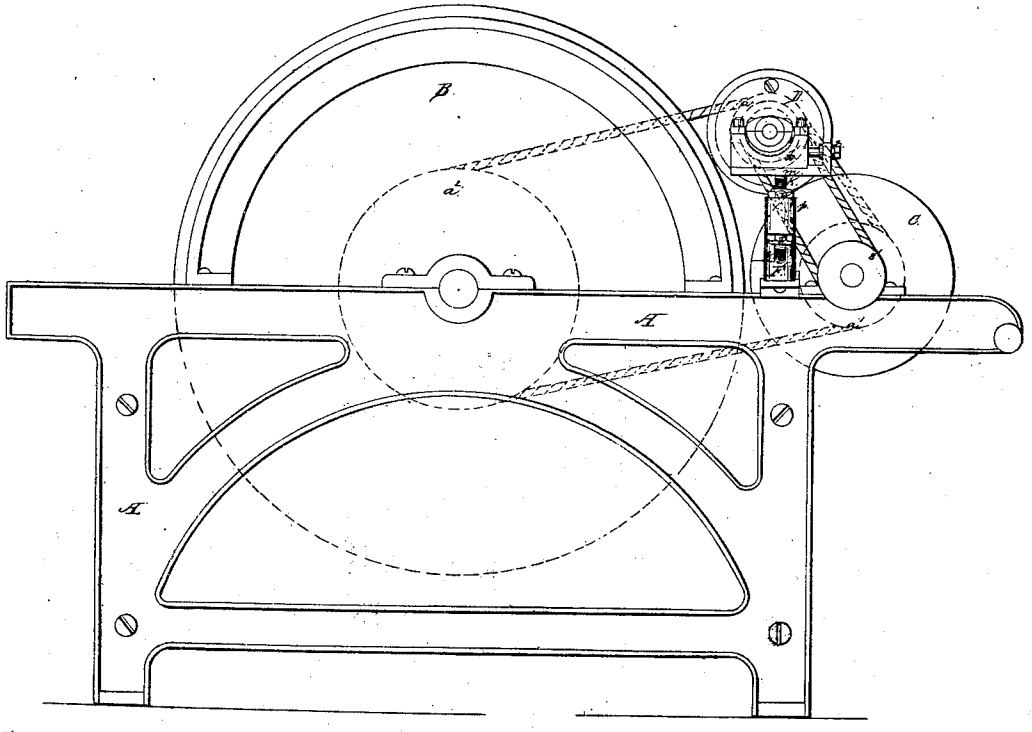


Fig. 1.



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CHARLES HARDY, OF BIDDEFORD, MAINE.

IMPROVEMENT IN MACHINERY FOR GRINDING THE CARD-TEETH OF CARDING-CYLINDERS.

Specification forming part of Letters Patent No. **31,315**, dated February 5, 1861.

To all whom it may concern:

Be it known that I, CHARLES HARDY, of Biddeford, in the county of York and State of Maine, have invented certain new and useful Machinery for Grinding the Card-Cylinders of Carding-Machines; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, which are hereby referred to as a part of this specification.

In order to explain the nature, operation, and utility of my improvement, I present in the drawings a carding-machine with a card-grinder attached, exhibiting machinery much of which is now in use.

I shall hereinafter expressly designate what is mine and in what consists my improvement.

In the drawings, Figure 1 is an end view of a carding-machine with a card-grinder attached which represents my improvement. Fig. 2 is a top view of the same.

A is the main frame of the carding-machine.

B is the main card-cylinder.

C is the doffer-cylinder.

D is the grinder wheel or cylinder, cylinders B and C being in their usual position and bearings, the grinder being designed to grind them while in that position.

E is a hollow tubular shaft having a slot lengthwise through one of its sides, as seen in Fig. 2 of the drawings, and is supported at one end by its journal turning in box *b*, which box is sustained by arm F, which is fixed to and projecting from one end of the card-frame. Said shaft E is provided with a driving-pulley *a*, the end opposite its driving end being supported by and turning upon screw-shaft G. Screw-shaft G, revolving within shaft E, has one journal supported by and turning in box *b'*, which box is sustained by arm F', which is fixed to and projects from the other end of the card-frame. The said screw shaft being provided with a helix-groove, (as partially seen through the slot in shaft E in Fig. 2,) so constructed that by an iron follower or stride traversing in said groove and connected to the grinder D by a stud passing through said slot, the said grinder by the rotary motion of said screw-shaft is made to vibrate or traverse and re-traverse the whole length of said slot. The end of said screw-shaft at box *b'* is provided with a pulley *s*, its opposite end being supported by and turning within the head of hollow shaft E. The grinder D is rotated by said hollow shaft.

By means of a belt and pulleys *s* and *s'* screw-shaft G is driven from the doffer, as seen in the drawings. Shaft E, by means of pulleys *a* and *a'*, is driven by the same belt from the fly-wheel a^2 of the main cylinder which drives the doffer, the card-cylinders being revolved while being ground, as indicated by the arrangement of the several belts and pulleys seen in the drawings.

The machine-grinders for grinding the main and doffer cylinders at the same time now and heretofore in use are limited in their traverse or vibrations to the path of the card-teeth, the arrangement of the bearings of the said shafts operating the grinder and other arrangements not admitting the grinder to traverse outside the space provided with card-teeth, (the width of which space is indicated in the drawings in the finely-dotted portion of the card-cylinders,) the outer bearings of said shafts being arranged about on a line with the ends of the card-frame, and the said groove and slot being constructed with a view to the same limited range of the grinder, in consequence of which arrangements it will be perceived that a portion of the teeth near the edges or ends on each cylinder must fail of being ground equally with those intermediate. To obviate this inequality, a stop-motion of the grinder has been introduced, and is now in use, for the purpose of staying the traverse or vibratory movement of the grinder at each end of its traverse, while it continues its rotary movement, grinding the space of the width of the grinder at either end of the cylinders while so stayed.

For a more particular description of said stop-motion and of some other machinery hereinbefore referred to, I refer to the Letters Patent of Jonathan Parker, for "improvements in machinery for grinding card-cylinders," dated March 3, 1857.

The objections to said stop-motion are: It is found difficult, if not impossible, so to regulate the length of time of staying the traverse motion as to grind the outer teeth equally with those intermediate, if it were possible

for a grinder having no traverse movement so to grind them. Again, it is subject to the original difficulty—the inequality arising from the failure of the grinder to pass alike over the whole width of card-clothing with the whole of its own width, the grinder while vibrating passing its whole surface over the more central parts of the cylinders, while at the ends, for a space nearly equal to its own width, the grinder only passes by part of its width, while the teeth nearest the edges are barely touched. Again, it is found that a stationary grinder, or one which does not traverse while it revolves, does not grind the card suitably. In consequence of the particles of emery with which the face of the grinder is provided being commonly of unequal degrees of coarseness, a grinder which simply revolves without traversing is apt to leave on the card-teeth an inequality corresponding to that in the particles of emery on its face, whereas if the grinder vibrates across the card the effect of this inequality in the emery is so distributed as to produce measurable uniformity of grinding. Again, it is found that the compound or double abrasion produced by an emery-grinder having a traverse as well as rotary movement, produces a superior point to the card-tooth—a smoother point, free from wire-edge, and what carders term a "needle-point"—a point requiring no smoothing process.

The nature and purpose of my improvement is so to extend the traverse movement of the grinder that it shall traverse in each direction entirely beyond the path of the card-teeth, and at the commencement of each transit approach to the edge of the card and engage anew, thus operating uniformly on the whole card by simply pursuing its rotary and traverse movements without interruption.

I will now designate and describe my improvement. The two arms F and F′, fixed, as before specified, to the card-frame, and sufficiently elevated to support the said grinder in proper position, are so formed as to project outward and sustain the said boxes *b* and *b′* (the bearings of said shafts E and G) beyond and outside the line of the ends of the card-frame, as more plainly shown in Fig. 2 of the drawings. I extend hollow shaft E, with its slot, and also screw-shaft G, with its helix groove, (preserving its former arrangement in other respects,) sufficiently, by the revolution of said shaft G, to move the grinder in its traverse a space equal to its entire width beyond and outside of the range of card-teeth at each end of the cylinders, as shown in Fig. 2 of the drawings, the grinder being then seen at one extremity of its traverse and beyond the path of the card-teeth of the cylinders. The rotary movement of each of the shafts E and G being independent of each other, the velocity of each and their relative velocity is to be governed by adaptation in the use of said pulleys before specified, as applied to the separate driving powers for the two shafts. The relative speed which I find it most suitable to employ is at the rate of three hundred and seventy-five to four hundred revolutions of said grinder per minute, to such a rate of revolution of screw-shaft G as shall give six transits, or three vibrations to and fro, per minute. By my arrangement above specified, the rotary and traverse movements of the grinder are maintained without the stoppage of either, and the whole width of the card-teeth of both cylinders are operated upon by a grinder having both rotary and traverse motion, the said grinder passing its whole width over the whole width of the cylinder-cards, bestowing on every part the same kind and degree of operation. I use a grinder-cylinder about four inches in width, and I deem that the most advantageous width for the purpose.

The grinding apparatus herein specified being designed to grind the main cylinder and doffer at the same time while in their usual position and bearings for carding, a very nice adjustment of the grinder is required.

For the purpose of adjusting the grinder, I use an arrangement making a part of arms F and F′, and alike on both, which is seen in the drawings upon arm F′ in Fig. 1. The said outer or journal ends of shafts E and G are sustained in rocker-bearings in boxes *b* and *b′*. By turning horizontal screw *t* the box is moved in either direction horizontally on table *m*, and is hold in position by said screw, while screw *k*, having one of its ends fixed to the under surface of table *m*, passes through a socket *p* in arm F′, and serves by the action of nuts *x* and *z* (above and below the socket) to raise or depress the table *m* and secure it firmly in position.

It may be observed the arrangement herein specified for extending the range of the grinder may apply to other modes of causing the grinder to traverse besides that herein particularly specified, and the said extended bearings may of course be affixed to other parts of the card-frame than that made use of according to the drawings, including the arches, with such modifications as mechanical skill will suggest, if desirable.

I claim—

Extending and adjusting the shafts G and E in the manner represented, whereby I am enabled to cause the grinder D to traverse and retraverse all of the teeth of the cards with its entire breadth, substantially as specified.

CHARLES HARDY.

Witnesses:
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