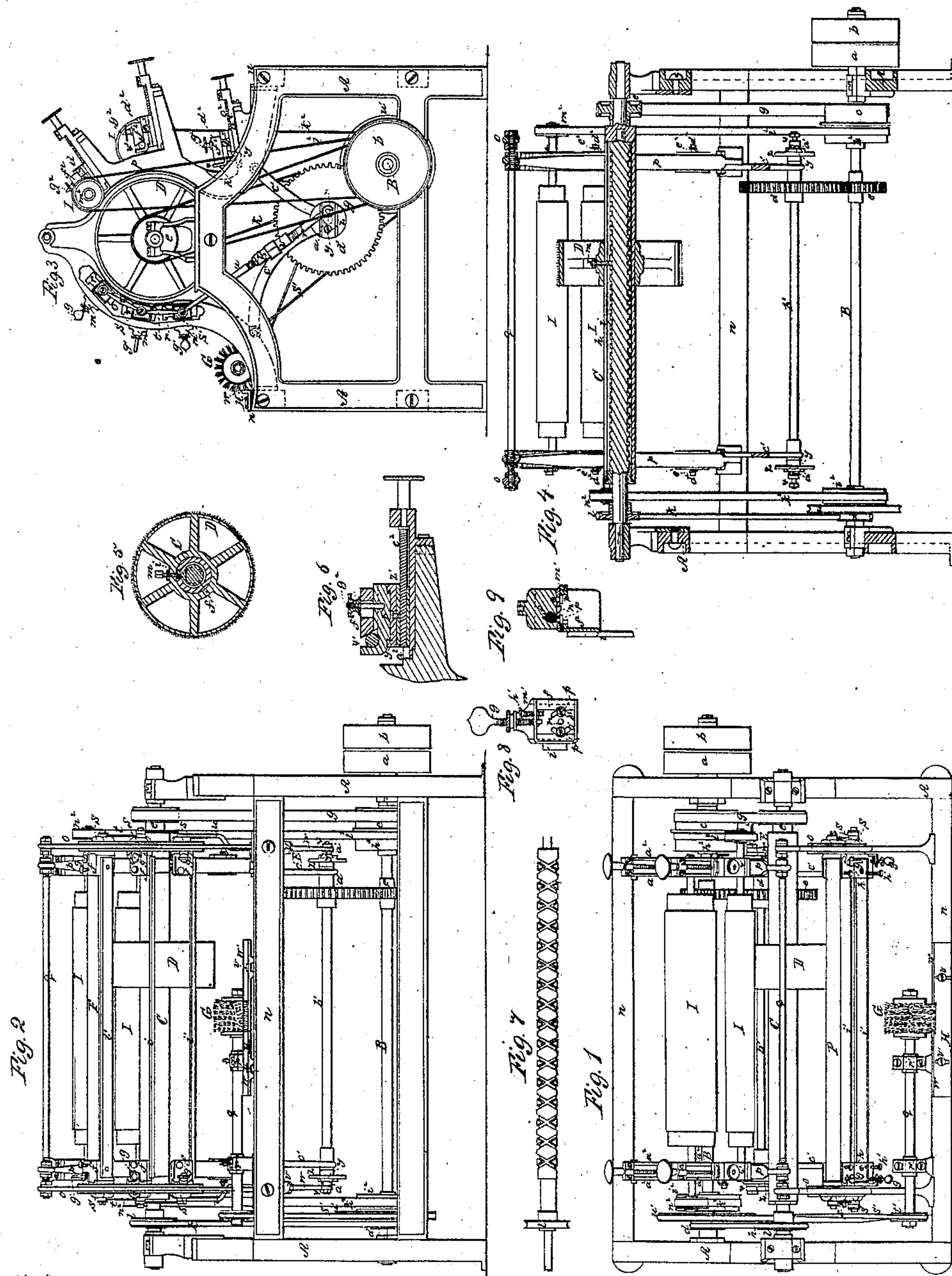


C. Hardy,
Card-Grinding Machine.
N^o 63, 884. Patented Apr. 16, 1867.



Witnesses;
Samuel N. Piper
Geo. H. Andrews

Inventor;
Charles Hardy
by his attorney
R. H. Ladd

United States Patent Office.

CHARLES HARDY, OF BIDDEFORD, MAINE.

Letters Patent No. 63,884, dated April 16, 1867.

MACHINE FOR GRINDING TOP CARDS, AND THE WORKERS, STRIPPERS, AND LICKER-IN CYLINDERS OF CARDING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL PERSONS TO WHOM THESE PRESENTS SHALL COME:

Be it known that I, CHARLES HARDY, of Biddeford, in the county of York, and State of Maine, have invented a new and useful Machine for Grinding the Top Cards and the Workers and Strippers and "Lickers-In" of a Carding Engine, and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view.

Figure 2, a front elevation; and

Figure 3, an end elevation of it.

Figure 4 is a longitudinal section; and

Figure 5, a transverse section of the reciprocating grinder, its shaft, and operative screw.

Figure 6 is a vertical and longitudinal section of one of the shaft-supporting boxes of the workers and strippers, such figure also exhibiting mechanism for adjusting such box.

In such drawings, A denotes the main frame of the machine. Within it, and extending across it from end to end, is a driving-shaft, B, provided with one fast pulley *a*, and a loose pulley, *b*. Fixed on the driving-shaft are two other wheels or pulleys *c* *d*, around one of which, viz, that marked *c*, and a wheel or pulley, *e*, fixed on a tubular shaft, C, an endless belt, *g*, travels, and serves to convey rotary motion to the pulley *e* and shaft. Arranged concentrically within the tubular shaft C is a shaft, *f*, which is provided with a screw or helical groove, *h*, as shown in figs. 4 and 7, the latter figure being a side view of the shaft. This groove is cut in the circumference of the shaft, and, after passing a sufficient distance along the shaft, returns back upon itself to the point of starting. The screw-shaft so made extends into, and is surrounded by, the tubular shaft C, which has a long slot, *i*, formed in and lengthwise of it. The shaft *f* is put in revolution by an endless belt, *k*, which goes around a wheel or pulley, *l*, fixed on the shaft *f*, such belt also being carried around the pulley *d*.

Concentrically with and on the shaft C is a grinder or grinding-wheel, D, whose periphery is to be covered with emery or other suitable abrasive material. This grinder slides lengthwise on the shaft C, and has a screw, *m*, going through its hub, and entering the helical groove of the interior or screw-shaft *f*. When the two shafts C and *f* are revolved at different speeds, which they are to be while the machine is in operation, the grinding-wheel will not only be revolved by and with them, but will have an endwise movement imparted to it, that is, will be caused to traverse, first, in one direction along the shaft C, and next, back again, or in the opposite direction. In other words, it will have imparted to it a reciprocating rectilinear motion on the said shaft C. From each of the two opposite upper girts *n n* of the frame A two curved arms, *o o* or *p p*, are extended, in manner as represented in the drawings, they being supported at their upper ends by a rod, *q*, which goes through them, and is held to them by screws and nuts.

Each of the arms *o o* contains a series of straight slots, *r r r*, arranged in it as exhibited. In each of such slots is a slide, *s*, each slide of each arm being connected by rods *t t*, which are jointed to them. A connecting-rod, E, made so as to be expansible lengthwise, that is, of three parts, *u v w*, two of which, *u* and *w*, screw into the middle one, *v*, is jointed to the lowermost slide *s* of each set of slides, and also to an adjustable crank-pin, *x*, projecting from a slide, *y*. The said slide *y* is applied to the side of a wheel, *z*, or in a groove made therein, and is held thereto by a set-screw, *a'*, which goes through a slot in the slide, and screws into the wheel. There is a wheel, *z*, fixed on each end of the shaft *b'*, whose journals are supported in brackets or hangers *c' c'*; and such shaft receives rotary motion by means of gears *d' e'*, one of which is fixed to it, and the other to the driving-shaft. By means of the connecting-rods and cranks the two sets or series of slides will have imparted to them reciprocating movements in and lengthwise of their slots.

Each slide, by means of a dove-tailed plate, *m'*, supports an adjustable socket, *f'*, and in such manner as to enable such socket or carrier to be moved toward and from the shaft C, in a direction radial to the axis thereof. Each of such carriers is provided with an adjusting screw, *g'*, so applied to it and its supporting-plate *m'* as to enable the carrier, by means of such screw, to be adjusted and fixed in position relatively to the axis of the shaft C. Each carrier is also provided with a clamp-screw, *h'*, for fastening a top card within it, and it is connected with an opposite carrier by means of one of a series of bars, *i' i' i'*.

Figure 8 is an inner side view of a carrier and its plate m^1 . The said plate m^1 is supported in, and so as to be capable of being turned on, a pivot or pin, n^1 , projecting from the slide s , the said pin being particularly exhibited in Figure 9, which is a vertical section of the slide, the supporting-plate, and the carrier. Furthermore, there are two slots $o^1 o^1$ in the plate m^1 , one being above, and the other below, the pin n^1 . These slots receive set-screws $p' p'$, which screw in the slide s , and serve to pin the plate m^1 to the said slide. From the above it will be seen that, by supporting the plate m^1 on the pins n^1 , projecting from the slides $s s$, as described, we have the means of turning the plates and their carriers so as to properly adjust the face of a top card to the abrasive surface of the grinder; also, that, when once the carriers have been adjusted for such purpose, their supporting-plates may be fastened in position relatively to their slides by the set-screws.

A top card placed in two of the carriers is shown at F. Each pair of carriers on a level with each other is intended to support and hold a top card, so that it may be ground by the grinder while the latter may be in revolution. During such time each top card will not only have reciprocating motions imparted to it, but it will move in one plane, so as to cause the ends of its teeth or wires to be in one plane instead of being in a curve, corresponding with, but the reverse of, that of the periphery of the grinder.

As prior to the grinding of a top card, as well as occasionally during the process of grinding it, and particularly after it may have been ground, it is desirable to cleanse it of dust or other extraneous matter, I apply to a rotary shaft, q' , a cylindrical brush, G, such shaft and brush being arranged in the frame A in manner as represented in the drawings. The journals of the shaft are supported in boxes $r' r'$, upheld by brackets extended inward from one of the upper girts $n n$. An endless band, s' , running upon a pulley, t' , (fixed on the shaft q'), and another pulley, w' , fixed on the driving-shaft, serves, when the latter shaft is in revolution, to impart rotary motion to the brush shaft, which, in turn, will cause the brush to be revolved. Against this brush the cards may be borne, as circumstances may require, for cleansing them. In the process of cleansing a card by the brush the card is laid upon an adjustable gauge or supporter, H, which is fixed on the top of the next adjacent girt n by means of set-screws $v' v'$ going through slots made in the said supporter. Two lips or flanges $w' w'$ extend upward from the inner edge of the supporter, there being a space between them for the brush to enter. The card, while resting on the supporter, is to be borne against the lips, and should be moved endwise while being cleansed by the brush.

While the grinder D may be grinding a series of top cards, it may also be grinding a series of cylindrical cards, such as "workers," "strippers," or "lickers-in." Two of such cards are shown at I I in the drawings as having their shafts supported in adjustable boxes applied to the curved arms $p p$.

Each of the boxes is not only adjustable in directions toward and away from the axis of the screw-shaft f , but is adjustable toward and away from the adjacent end of a cylindrical card when supported by such box. Furthermore, such box is capable of being turned around, more or less, on a pivot, in order to cause the box to properly accommodate itself to a journal to run in it; and such box is also provided with an adjustable cap for holding the journal in place in the box. In the drawings such boxes are shown at $x' x' x'$. Each rests on, and is dove-tailed to, a support-plate, y' , which rests on a carriage, z' , supported in parallel ways $a^2 a^2$. A pivot or pin, b^2 , extends down from the plate y' into the carriage z' , so as to enable the plate to be turned around on the carriage. An adjusting screw, c^2 , suitably applied to the carriage and its supports, serves to adjust it and the box relatively to the axis of the shaft f . Another adjusting screw, d^2 , screwed into the box, and turning in, and held by, a furcated arm, e^2 , projected from the plate y' , serves to move the box laterally.

The adjustable cap of the box is shown at f^2 , it being dove-tailed to the box, and held to it by a set-screw, g^2 , which goes through a slot in the cap. The said cap is to be capable of being slid toward and from the upright h^2 of the box, and has its front end bevelled, as represented in the drawings, the same being in order that it may extend over a journal, so as to hold it in the box. Each of the cylindrical cards, while being ground, is to be revolved. For this purpose there are pulleys $h^2 i^2$ fixed on the driving-shaft. Endless belts $k^2 l^2$ proceed from these pulleys to and around the pulleys $m^2 n^2$ of the cylindrical cards. Thus, by means of the said belts and pulleys, the cards will be revolved, the grinder, in the mean time, being caused to traverse along the cards, or from end to end of them, as well as entirely beyond each of such ends, that is, each end of the card clothing of such card.

I make no claim to any devices or mechanism contained in Hulme's British Patent, No. 9,091, for the year 1841, for I, with my machine, effect the grinding of two or more top cards at once, and by one rotary grinder, and in a manner so that the face of each card shall be ground in a plane tangential to the grinding surface of the rotary grinder, whereas in the machine of the said Hulme only one card is ground at once; therefore, what I claim as of my invention is as follows:

I claim the combination, as well as the arrangement, of the rotary grinder and mechanisms for supporting, grinding, and operating two or more top cards, so as to cause them at one and the same time, while being ground, to have reciprocating motions in directions transversely of them, and in planes tangential to the curved surface of the grinder, the whole being substantially as specified.

I also claim the combination of the box x' and its lateral adjusting mechanism with the carriage z' and its longitudinal adjusting mechanism.

I also claim the combination of the plate y' and its pivot b^2 with the box x' and the carriage z' , and their mechanisms for effecting their longitudinal and lateral adjustment, as set forth, such employment of the plate y' and its pivot serving to enable the box to turn, so as to readily adjust itself to the bearing of a card cylinder when placed within the box.

I also claim the adjustable cap f^2 and the box x' , as made and applied together, as set forth.

I also claim the combination, as well as the arrangement, of the grinder and its operative mechanism and mechanisms, for supporting and operating one or more top cards, and one or more cylindrical cards, on opposite

sides of such grinder, in manner and for the purpose of grinding such top cards and cylindrical cards at one and the same time by such grinder, substantially as described.

I also claim, in combination with each set of top-card carriers and their slides, mechanism for supporting such set of carriers, and moving them toward the shaft of the grinder, under circumstances and in manner substantially as hereinbefore specified.

I also claim the combination of the rotary cleansing brush, its operative mechanism, and the adjustable gauge-bar, applied to the frame A, and for the purpose as set forth.

CHARLES HARDY.

Witnesses:

R. H. EDDY,

F. P. HALE, Jr.