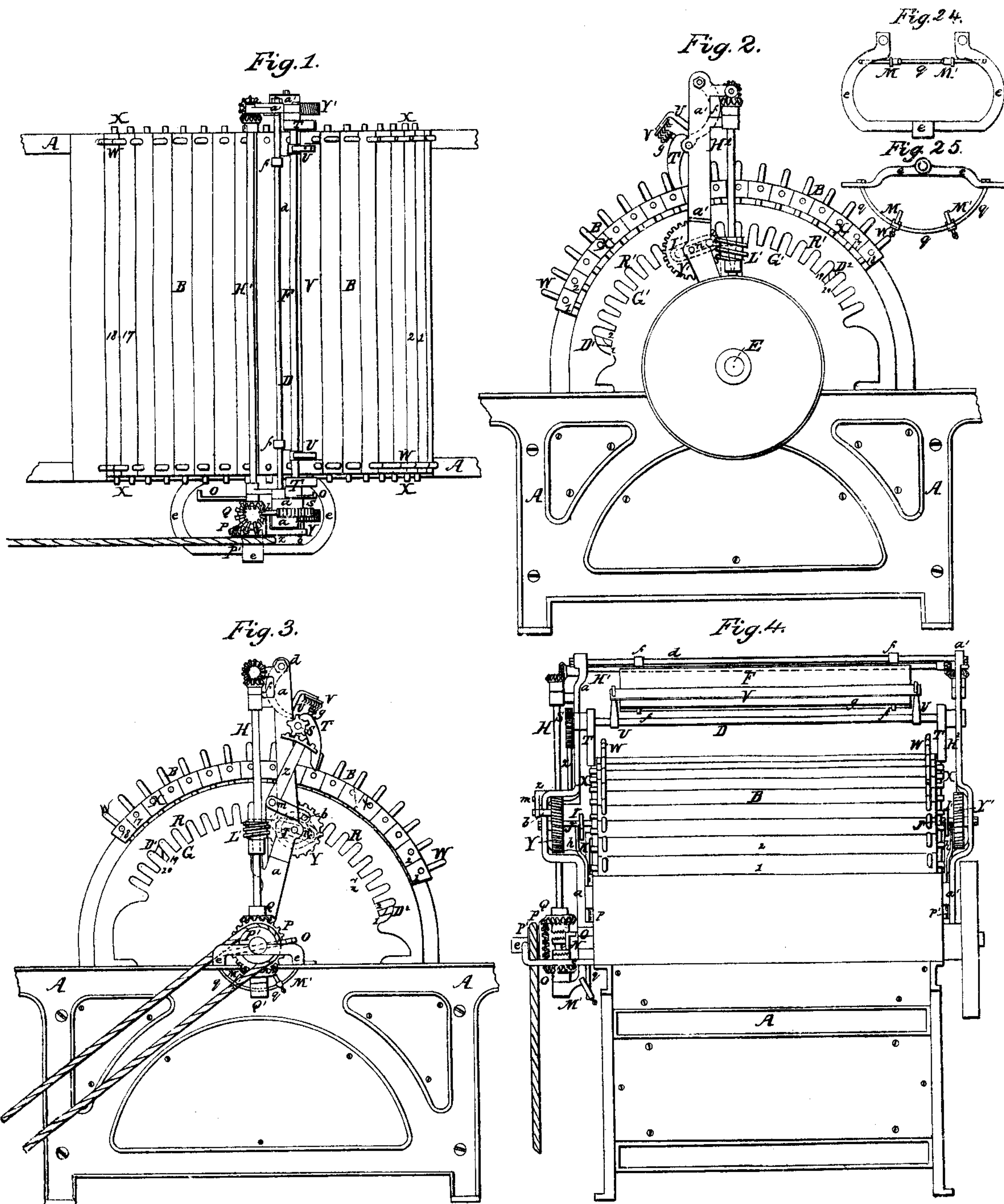


H. Woodman.

Machine for Cleaning the Top Cards of Carding Engines.

N<sup>o</sup> 15,313.

Patented Jul. 8, 1856.

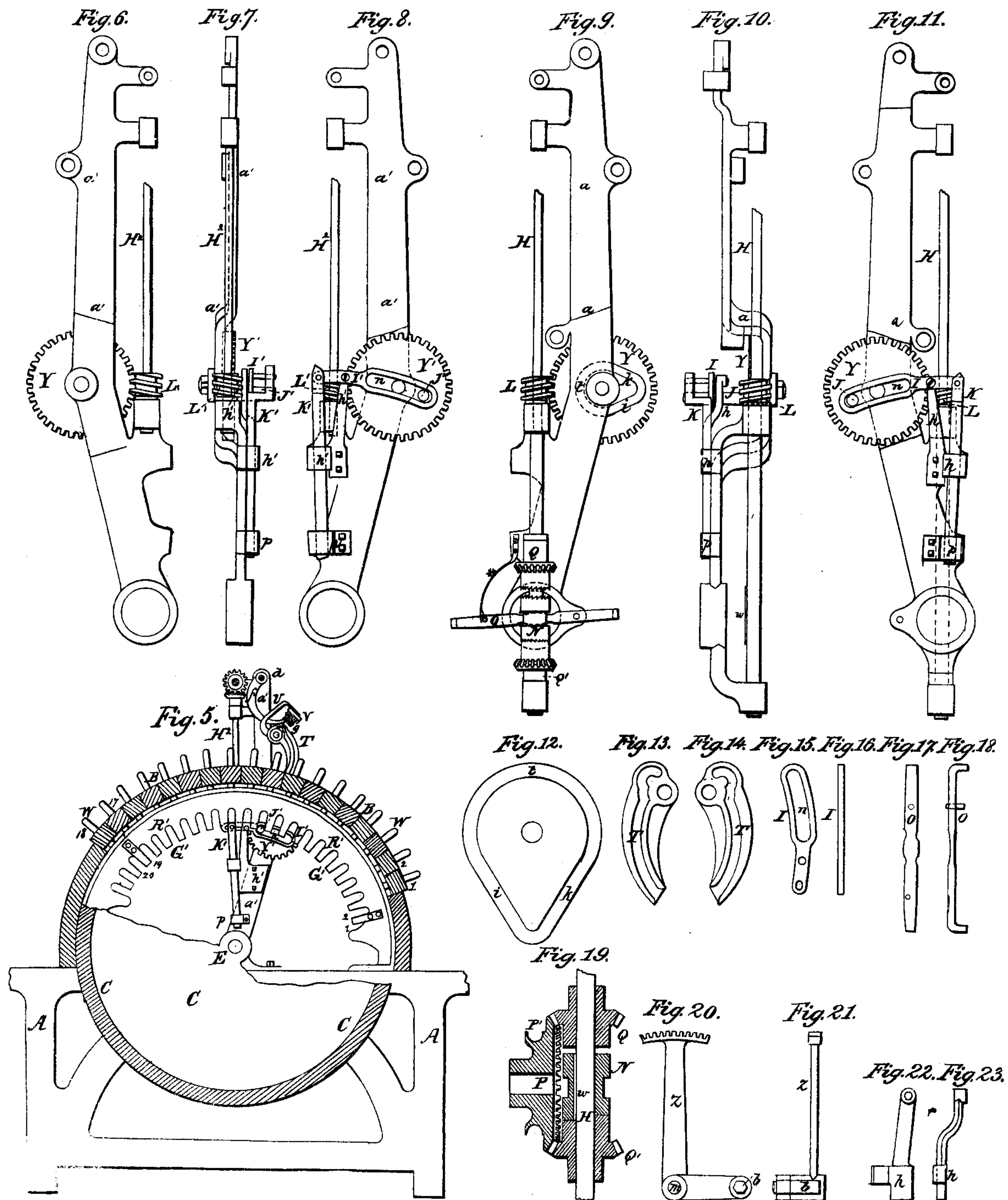


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# UNITED STATES PATENT OFFICE.

HORACE WOODMAN, OF BIDDEFORD, MAINE.

## IMPROVEMENT IN MACHINERY FOR CLEANING THE TOP-FLATS OF CARDING-ENGINES.

Specification forming part of Letters Patent No. **15,313**, dated July 8, 1856.

*To all whom it may concern:*

Be it known that I, HORACE WOODMAN, of Biddeford, in the county of York and State of Maine, have invented Improved Machinery for Cleaning the Top Cards of Carding-Engines; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof, making a part of this specification.

Of the said drawings, Figure 1 denotes a top view of the carding-machine provided with my improvement. Fig. 2 is an elevation of that end of it called the "driving end," or the end to which the driving-power is applied to the card. Fig. 3 is an elevation of the opposite end, to which the driving-power is applied to my cleansing or stripping machinery. Fig. 4 is a rear elevation. Fig. 5 is a transverse section of it, giving a central or inside view of parts of my improvement in connection with and partially obstructed by the arch of top cards.

Other figures representing detached parts of my improvement are given in my drawings, and will be hereinafter referred to and described in giving a full delineation of the machine.

In the first place, A represents the main frame of the carding-machine, while B B B denote a series of top cards thereof, each of which cards is composed of a bar or lag B, having a strip of card filleting or teeth thereon fixed on its under surface in the usual manner. The main card-cylinder is shown at C, many of the remaining well-known working parts of the carding-machine not being represented in the drawings, they having no special reference to my improvement, being such as are in general use.

The nature of my said improvement consists in the greatly simplified and perfected mechanism by which said top cards are in succession raised, cleansed, and restored to their seats.

I make use of two arms *a* and *a'* and a cross-connection bar *d*. These form a frame, which may be called the "cleanser-frame," which is made to extend upward or outward from and turn freely on the boxes of the main shaft E of cylinder C, the two arms *a* and *a'* being placed outside the cylinder, as seen in Figs. 1, 2, 3, and 4 of the drawings.

The form and parts of arms *a* and *a'* are most plainly seen in Figs. 6, 7, 8, 9, 10, and 11 of the drawings, where they are represented in connection with some other parts of my improvement, Fig. 6 representing an end or outside view; Fig. 7, a side or cross view, and Fig. 8, a central or inside view of arm *a'*, and such other connected parts as are given in said figures, and Figs. 9, 10, and 11 representing the same series of views of arm *a*, and such other parts as are given in connection in either of said figures.

There are sustained in suitable bearings in arms *a* and *a'* (which bearings are seen in Figs. 6 to 11) shafts H, H', and H<sup>2</sup>, which are connected together by bevel-gears, as seen in the full drawings, and which shafts turn freely in said bearings.

Stand *e*, a top view of which is given in Fig. 24 and an end view in Fig. 25, is affixed to that end of the card-frame which is the driving end of my machine by means of bolts. Said stand supports a stud the axis of which is on a line with the axis of the cylinder-shaft. There is placed on this stud a bevel-gear P and driving-pulley P', which turns freely on said stud. Said bevel-gear P engages with two smaller bevel-gears Q and Q', which turn freely on said shaft H. There is placed on shaft H, between gears Q and Q', a clutch N, said clutch sliding freely on said shaft in the space between said gears Q and Q'. Said clutch is attached to said shaft H by means of a spline *w*, embedded in said shaft and fitting a groove cut in the hollow bearing of said clutch, as seen in Fig. 19 of the drawings, which gives a central and longitudinal section of said pulley, bevel-gears, clutch, spline, and portion of shaft H. The said clutch is provided with teeth at each of its ends corresponding to teeth on the inner ends of the hubs of gears Q and Q', as seen in Figs. 9 and 4 of the drawings, the teeth on the ends of the clutch working alternately into the teeth on the hubs of said gears Q and Q' and giving rotary motion to said shaft H whenever so engaging in the teeth of either of said gears Q and Q' and reversing the rotary motion of said shaft as it changes from the teeth of one to the teeth of the other. (Said spline *w* on shaft H is more plainly represented on Fig. 10 of the drawings.) There is also cut around said clutch a groove, as seen in Figs. 4, 9, and



19, in which lever O, as seen in Fig. 17 in side view and in Fig. 18 in edge view, bears and engages for the purpose of changing said clutch from the teeth of one of said gears to the teeth of the other. The manner of moving said clutch by said lever will be explained hereinafter. The rotary motion given to shaft H produces a rotary motion of shaft II<sup>2</sup> by means of said connecting bevel-gears and of horizontal shaft II'. Upon shafts II and II<sup>2</sup> are fixed worms L and L', as seen in Figs. 2, 3, 6, 7, 9, and 10, which worms engage with and communicate rotary motion to worm-gears *y* and *y'*, which worm-gears *y* and *y'* turn freely on studs or axles on arms *a* and *a'*, as seen in the drawings, and are most distinctly seen in Figs. 6 to 11. In the outer side of gear *y* is cut a groove, the form of which is shown in Fig. 12.

Bent lever Z, formed as shown in Fig. 20, vibrates freely on a stud or axle *m*, placed on the (cleanser-frame *a*) arm *a*, as seen in the drawings. From the short arm of the lever Z projects a round pin *b*, as shown in Fig. 21. This pin *b* enters and traverses in the groove in gear Y. On the long arm of said lever is a section of teeth which engage with pinion S on shaft D, producing a reciprocating rotary motion of said shaft, while the said pin *b*, projecting from the short arm of lever Z, is traveling in the straight parts of said groove, which straight parts, as seen in the drawings marked *i k*, are arranged at an acute angle with regard to each other, and are connected by a semicircular portion of said groove, no motion of said lever being produced while the said pin is traveling in said semicircular part.

Rotary shaft D is supported in suitable bearings in arms *a* and *a'*, the said pinion S being placed on the end of said shaft, outside of arm *a*. Said shaft D carries two grooved lifter-cams T T, which are formed as seen in Figs. 13 and 14, which exhibit inner side views of said cams. Besides these cams, the shaft D supports, by means of two bent arms U U, a bar V, arranged as seen in the drawings, this bar V, when in use, having a strip of card-filleting affixed along its under surface, and it may be termed the "cleansing" or "brush" bar. Each top card B B is supported in the usual way on two pins W, extending from the frame of the card or arch, and through the top card near its end. There is also projecting from each end of the top card a small stud X. When the shaft D is turned in one direction, it carries the lifter-cams T T toward the studs in the end of the top card for the purpose of raising it. The said studs will be received into the grooves of the cams T T, and owing to the eccentricity of the grooves and their peculiar action on the studs the top will be raised upward from off its seat and the brush or card bar V will be carried by the rotary movement of shaft D underneath and in contact with the filleting of said top card. The grooves of the lifter-cams T T are so formed as to cause the entire un-

der surface of the card-filleting to be brought thoroughly into contact with the cleansing-bar V, the act of cleansing being effected in this wise—viz., the first or forward movement of the brush-bar carries said brush-bar under the top card. Then the shaft D being rotated in the opposite direction the said cleansing-bar is again brought into thorough contact with the filleting of the top card and in its backward movement cleanses said top card. As soon as the act of cleansing the top card is effected the lifter-cams T T depress the top card back to its seat. The cross-connection bar *d* supports, by means of two hangers *f f*, the pan or trough F and a narrow bar *g* of the same length of the pan fixed on the edge of the pan nearest the card-stripper when at rest. On the upper surface of said bar is affixed a narrow strip of card-filleting. The brush-bar V in its return movement, after cleansing a top card, passes over said narrow bar face to face and there rests until another movement of the rotary shaft D. At the next movement of the shaft D the filleting on the brush-bar engages with the filleting on the narrow bar and is thoroughly cleansed, producing a clean brush-bar every time a top card is cleansed, and when the bar V passes over the narrow bar face to face, as aforesaid, forces and deposits the waste from said narrow bar into said pan.

There is attached to and projecting from the circular frame-work or arch which supports the top cards the flanges R and R', containing a series of slots or openings G and G', corresponding to the position of the series of top cards, excepting that at the end of the flanges on the doffer side of the card there are two slots beyond the range of taps, and at the other end are two slots connected by a curved groove extending beyond the range of top cards. There are also connected by a curved groove two other slots, being the third and fourth from the doffer side, the purpose of which slots and grooves will be more fully explained hereinafter. I will observe that in the manufacture of new cards the said flanges may be cast as part of the new card-frame, and on old cards may be attached to the arch by screws. Thickness of the flanges about half an inch.

The levers I are shown detached in Fig. 15 of the drawings, which is a side view. The space *n* on this figure represents a large slot in said lever. The small oblong space at the other end of this figure represents a small slot. The round space between the two slots is a hole in the lever. Fig. 16 represents an edge view of the same lever I.

The form of stands *h* is shown in Fig. 22 in side view and in Fig. 23 in edge view. Stands *h* and *h'* are attached to arms *a* and *a'* by bolts or rivets, as shown on Figs. 8 and 11 of the drawings. Said stands support levers I and I' by means of studs or screws passing through the round holes in said levers referred to in Fig. 15, as seen between the two



slots, and into the round holes in the top of stands  $h$  and  $h'$ , as shown in Fig. 22, and said levers vibrate freely on said studs or screws.

Sliding bars  $k$  and  $k'$  are provided with bearings in arms  $a$  and  $a'$  by means of cap  $p$  and rivets, and a lip of stands  $h$  and  $h'$ , as seen Figs. 7, 8, 10, and 11, and said bars are connected near the upper end with levers  $I$  and  $I'$  by means of pins or studs projecting from the upper ends of said sliding bars through holes in the ends of said levers, which holes are the small slots in said levers referred to in description of Fig. 15, which pins or studs work freely in said small slots.

There are projecting from the inner sides of worm-gears  $Y$  and  $Y'$  round pins  $J$  and  $J'$ . These round pins pass through slots  $n$  in levers  $I$  and  $I'$ , and project far enough to operate also in the slots or openings  $G$   $G$  in flanges  $R$  and  $R'$ . By the rotary motion of gears  $Y$  and  $Y'$  the round pins  $J$  and  $J'$  describe a circle the diameter of which is the space of two slots  $G$   $G$ , and the center of which and the inner points of the flanges or openings of the slots are equidistant from the center of the card-cylinder, so that when the pins  $J$  and  $J'$  shall each have entered, traversed, and passed out of a slot the said pins shall have performed half a revolution. The slots being fixed and stationary and the frame being movable on its axis, the said pins  $J$  and  $J'$ , by their action in said slots, will have moved the cleansing-frame the space of two slots or top cards. During the remainder or other half of the revolution of gears  $Y$  and  $Y'$ , the pins  $J$  and  $J'$  being removed from contact with the slots of the flanges  $R$  and  $R'$ , no motion of the cleansing-frame is produced; but by the continued rotary motion of gears  $Y$  and  $Y'$  during the other half of its revolution the same pins  $J$  and  $J'$ , acting in slots  $n$  of levers  $I$  and  $I'$ , produce a motion of said levers, by which sliding bars  $K$  and  $K'$  are moved longitudinally in slots in flanges  $R$  and  $R'$ , thereby holding the cleansing-frame in a state of rest while simultaneously therewith the pin  $b$  traverses the angular or straight parts  $i$   $k$  of the groove in gear  $Y$ , operating through bent lever  $Z$  the rotary shaft  $D$ , and the stripping operation is performed, the top card being restored to its seat, and the sliding bars  $K$  and  $K'$  being withdrawn from the flanges at the same time, the revolution of gears  $Y$  and  $Y'$  being completed. Thus by one complete revolution of gears  $Y$  and  $Y'$  the cleansing-frame is moved the space of two top cards, and is there held firmly at rest, while the lifting, stripping, and depressing machinery does its office, the movement of the cleansing-frame occupying one half of said revolution of said gears, and the holding of the frame and process of stripping a top card occupying the other half of said revolution, the action on pin  $b$  of the groove on the outside of gear  $Y$  moving the said lifting and stripping mechanism, the (action of) pins  $J$  and  $J'$  upon the back side of gears  $Y$  and  $Y'$ , operat-

ing in slots  $n$  of levers  $I$  and  $I'$ , moving the holding and steadying mechanism, and the same pins  $J$  and  $J'$ , operating in slots  $G$   $G$  of flanges  $R$  and  $R'$ , effecting the movements of the cleanser-frame from card to card, all as hereinbefore particularly set forth and specified. The said cleanser-frame having traversed the series of top cards, cleansing every other card in succession, and having arrived at and cleansed card 2 of the series, (marked 2 on the drawings,) the pins  $J$  and  $J'$  enter the slots (marked 2 on the drawings) in flanges  $R$  and  $R'$  and move therein until they arrive at the points  $D^2$ , or at the top or roof of slots 2, at which point the frame will have been moved during that engagement of the pins in the slots the space of one top card. At this time the end of lever  $O$  is brought in contact with the shipping-dog  $M'$ . I will here observe that shipping-rod  $q$ , with shipping-dogs  $M$  and  $M'$ , are shown in the drawings in connection with stand  $e$  in Fig. 24 in top view and in Fig. 25 in side or end view. I will also observe that lever  $O$  vibrates on a stud affixed to arm  $a$ , said stud being shown in Fig. 9 on the right limb of said lever; also, there is a spring marked \*, (shown on Fig. 9,) attached to arm  $a$ , which is to assist lever  $O$  in holding clutch  $N$  into engagement with gears  $Q$  and  $Q'$ . Lever  $O$  being brought in contact with shipping-dog  $M'$ , clutch  $N$  is thrown out of engagement with the teeth on the hubs of gear  $Q$  and into engagement with the teeth on the hubs of gear  $Q'$ , thereby causing the shafts  $H$ ,  $H'$ , and  $H^2$  to rotate in the reverse direction, and the pins  $J$  and  $J'$  move off through the curved grooves into slots 1 and out of slots 1, no motion of the cleanser-frame being produced while the pins are moving through the curved grooves and through slots 1, and top card 1 is raised, cleansed, and restored to its place. Thereupon the cleanser-frame, owing to the reverse motion given to shafts  $H$ ,  $H'$ , and  $H^2$ , moves back over the series of top cards, operating upon and cleansing those cards which were not cleansed in the first or opposite circuit of the frame, until it arrives at slots 19, when the same process for reversing the movements or circuit of the cleanser-frame is performed, and when the pins  $J$  and  $J'$  arrive at the point  $D'$  at the top or roof of slots 19, the frame during this engagement of the pins in the slots having moved the space of one top card, the opposite end of lever  $O$  is brought in contact with shipping-dog  $M$ , clutch  $N$  is thrown up and out of engagement with the teeth in the hub of gear  $Q'$  into engagement with the teeth in the hub of gear  $Q$ , the motion of the shafts  $H$ ,  $H'$ , and  $H^2$  is again reversed, (no motion being given to the frame while the pins are traveling in the curved grooves and out of slots 20,) card 18 is cleansed, and another retrograde or reverse movement is given to the cleanser-frame, as before described, which reverse movements recur by the same process as often as the said cleanser-frame shall



arrive at the end of its circuit in either direction. The two slots beyond 19 and 20, as seen in the drawings, being the two slots beyond the range of the top cards on the doffer side of the card, are to accommodate the action of the sliding bars K and K', as will be perceived by reference to the position and action of said bars.

The arrangements hereinbefore particularly set forth are with a view to stripping every other card; but should it be desirable to employ this machinery to strip every card or to strip any number in each circuit of the cleansing-frame, omitting any stated proportion greater than every other card, that object may be accomplished by simply moving pins J and J' nearer to or farther from the center of gears Y and Y', so that during the revolution of said gears the said studs shall describe a lesser or greater circle corresponding to the space occupied by any given number of tops or slots. The diameter of said circle being narrowed to the space of one slot it will act on every card, or widened to the space of several, it will leave an interval proportioned thereto, upon the principle apparent in the foregoing specification. It being understood that when every card is not stripped in each circuit of the frame, but stated cards are alternately stripped and omitted, arrangements corresponding to and on the principles of the curved grooves between the slots at the ends of the circuits, hereinbefore described, must be made to effect the reverse movements of the cleanser-frame with reference to the alternate omissions or intervals. If desired to strip every top card in addition to the removal of the pins, as aforesaid, it will be necessary to fill up the curved grooves, so as to have none but simple slots; also, should it be desirable to dispense with any number of top cards at either end of the series, the range or circuit of the cleanser-frame may be limited accordingly by simply moving the dogs M or M', or both, on the shipping-rod q, by which lever O may be brought in contact therewith at any point of the circuit of the cleanser-frame, and the circuit or movement of said frame be thereby reversed at such point in manner hereinbefore particularly set forth. It being understood here also that where every card is not to be stripped during each circuit, but alternate omissions are to occur, it will be necessary to have at the termini of the circuit arrangements corresponding to and on the principle of the curved grooves before described, in order so to reverse the movements of the

cleanser-frame that the stripping apparatus shall perform at the desired intervals alternately as well as within its limited circuit.

I will here insert a more particular description of the curved grooves referred to. They are shown on Figs. 2 and 3 of the drawings, and are the spaces defined by lines drawn between slots 1 and 2 and between slots 19 and 20, and are of sufficient depth to admit the pins J and J' while engaged in the slots to pass through them from one slot to the other.

Having thus given a full description and specification, I will state what I claim as new.

I do not claim the combining of lifter-cams T T and brush-bar V with rotary shaft R, nor any device, combination, or improvement described and specified in my Letters Patent of the United States, dated August 1, 1854, for "improvement in cleansing the top cards of carding-machines," the said combinations and improvements being secured to me by the said Letters Patent already.

What I do claim is—

1. The arrangement of gears Y and Y' on the cleansing-frame, and in combination therewith, in manner substantially as described, the studs or pins J and J' on the inner sides of said gears, and the levers I and I' and the sliding bars K and K', operating together, with the slotted or corrugated arches or flanges, for the purposes set forth.

2. The said slotted or corrugated arches, whether cast with the main frame of the card or attached thereto, as specified, a means of holding the traverse or cleansing frame in place while the top cards are raised, stripped, and depressed, and a means of regulating the reciprocating movements of said traverse or cleansing frame from one side of the card to the other, and also from one card to any other, in the manner specified.

3. The combination of the lever O and shipping-rod q, with its dogs M and M' and sliding clutch, arranged substantially in the manner described, to reverse the motion of the cleansing-frame.

4. The arrangement of waste-pan F, substantially as described, with a narrow bar and strip of filleting attached to the front edge of the pan, so placed as to remove the waste from the cleansing-bar V to produce a clean brush-bar for the cleansing of each top card.

HORACE WOODMAN.

Witnesses:

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