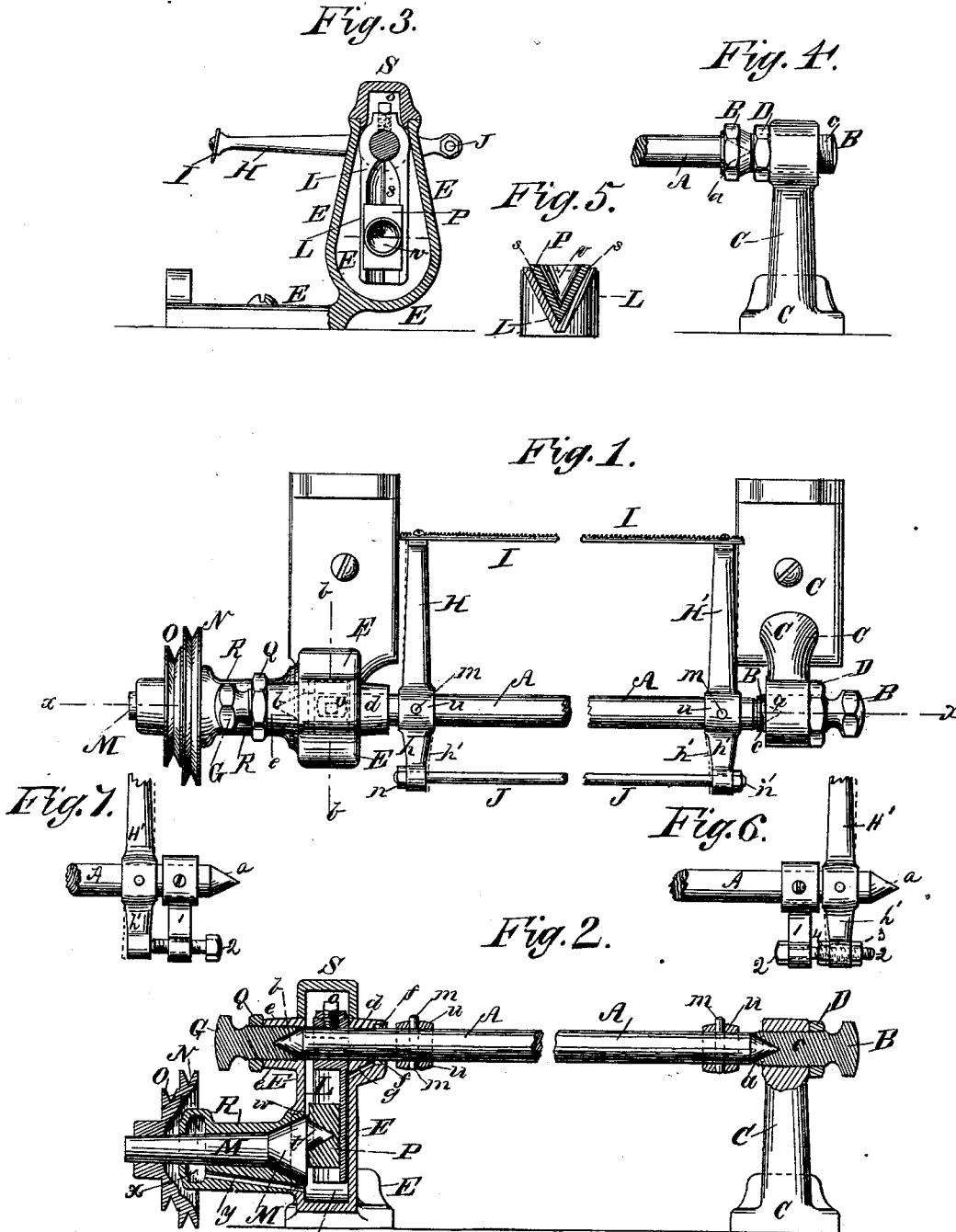


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MECHANISM FOR OPERATING DOFFER COMBS.

No. 188,833.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MECHANISMS FOR OPERATING DOFFER-COMBS.

Specification forming part of Letters Patent No. **188,833**, dated March 27, 1877; application filed October 17, 1876.

*To all whom it may concern:*

Be it known that I, EDWARD WRIGHT, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Comb-Vibrators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a plan of a doffer-comb vibrator to which my improvement has been applied. Fig. 2 represents a vertical longitudinal section of the same, taken through the line *x x*, Fig. 1; and Fig. 3, a vertical transverse section of the same as taken through the line *b b*. Fig. 4 represents, in elevation, a modification of the adjusting socket-screw as mounted and applied to the rock-shaft, the latter being broken off; and Fig. 5, a detached sectional detail view of the rock-shaft crank-arm and crank-pin socket-slide. Fig. 6 represents a detached plan view of a modification of the device for adjusting the fingers that carry the doffer-comb, and Fig. 7 a similar view of another modification of the same devices.

My invention relates to a new and improved mode of operating doffer-combs.

My invention consists, first, in a new and improved mode of constructing the vibrating arms which carry the doffer-combs, and of applying them to the rock-shaft which operates them, whereby, through an adjusting-rod, the arms can be so swiveled upon the shaft as to strain the comb between their ends in the line of its length, and thus keep it straight and in good operative condition, especially where a long comb is used; secondly, in combining a crank-arm, provided with a V-shaped groove and correspondingly-shaped traveler or slide-piece, with an adjustable rock-shaft and adjusting-screw, whereby the whole of the bearings can be tightened or loosened by a single operation, by simply turning the socket-screw in the proper direction to effect the result required, whether to adjust the mechanism when first put together, or to compensate for wear

after it has been running for some time; thirdly, in constructing the crank-pin shaft and its sleeve with a double taper or inclination, whereby, as worn, they can be readily brought to a perfect bearing by simply turning the socket-screw; fourthly, in so constructing and combining the crank-shaft, crank-pin, and crank-arm of the rock-shaft, which carries and operates the doffer-comb, with each other and with a socket-screw that their respective bearings may all be simultaneously adjusted, whether to tighten or loosen the same, by simply turning the socket-screw in the proper direction for these purposes; fifthly, in an improved mode of constructing and arranging the oil chambers and channels for the more effectual lubrication of the operative parts of the mechanism.

To enable others skilled in the art to make, construct, and use my improvement, I will describe its parts in detail.

In the drawing, A represents the rock-shaft which carries and operates the doffer-comb.

Both ends of this rock-shaft are made tapering or conical, as shown at *a* and *b*, and form the pivotal points on which it rocks.

The outer end *a* is mounted in a socket-bearing or conical depression of corresponding size and shape, formed in the inner end of an adjusting-screw, B, and which I term a "socket-screw."

This socket-screw B is made to screw into a female screw cut in the upper end of a standard, C, which, in turn, is suitably fastened to the frame of the machine.

On the socket-screw B is mounted a check-nut, D, for use in fastening the former once the bearings have been properly adjusted.

In Fig. 1 the socket-screw is so arranged and applied to standard C as that the socket which forms the bearing for the outer end of the rock-shaft is formed in the end of the screw-bolt stem *c*, the check-nut D in this case being arranged on the outer side of the standard C, while in Fig. 4 the socket is represented as being formed in the bolt-head itself, and the check-nut arranged on the inside of standard C. Either mode of forming the socket in the socket-screw and of applying it to the conical end of the rock-shaft is equally efficacious, and so with the check-nut.

The other end of rock-shaft A is mounted in bearings formed in another standard or frame, E, which, like standard C, is suitably secured to the frame of the carding-machine, but on the opposite side.

Standard E consists of a hollow casing cast in one piece, and provided with two sleeves, *d* and *e*, for the reception of rock-shaft A, as represented in Figs. 1 and 2, and for the actuating crank-arm L of the rock-shaft, and at the same time forms an oil tank or reservoir, F. Sleeve *d* is provided near its outer end with a small annular recess, *f*, the lower edge of which communicates, through a channel, *g*, with the oil tank F, and serves to conduct the surplus oil back to the tank. Sleeve *e* is provided with a female screw, into which is fitted a screw-bolt, G, in the inner end of which is formed a socket-bearing for the reception of the conical end *l* of rock-shaft A. Screw-bolt G is also provided with a check or jam nut, Q.

On rock-shaft A are mounted the fingers H and H', which carry the doffer comb I.

These fingers I construct differently from those in common use. In the first place I provide each of them with an arm in the rear of the rock-shaft—finger H with arm *h*, and finger H' with arm *h'*—and then connect them together by means of an adjusting screw-rod, J, as shown in Fig. 1.

In the second place, instead of keying or screwing the sleeve *u* of these fingers fast to the rock-shaft, as is the present practice, I simply connect them to the latter by passing a pivotal pin, *m*, through them and the rock-shaft, in the manner represented in Figs. 1 and 2.

By mounting them on the rock-shaft in this manner, and making the hollow of the sleeves *u* a little larger than the rock-shaft, the fingers H H' are rendered capable of being slightly swiveled on the pins *m*. Hence it will be apparent, inasmuch as the arms *h h'* are connected together by the screw-rod J, that by simply turning the nuts *n n'* in the proper direction, arms *h h'* will be drawn toward each other, and the fingers H H' forced outward away from each other, thereby straining the comb-plate I between them in the line of its length, and thus making and keeping it tight and straight where a very long comb is being used—a feature of great practical consideration and value.

The actuating crank-arm L of the rock-shaft A is arranged on the inside of the tank F, formed by the shell of standard E, and is mounted at its upper end on the rock-shaft A, which, in being passed through sleeves *d* and *e* to its conical bearing formed by the socket in the inner end of the screw-bolt G, is first passed through an opening in the upper end of the crank-arm L.

The shaft then being properly adjusted in its bearings in B and G, crank-arm L is firmly secured to the rock-shaft A by a screw-bolt, *o*, or by any other suitable means and

known way, care being taken in so doing to secure it in its proper relation to the fingers, that the comb may occupy the proper position, when operated, to do its work effectually.

Crank-arm L, at its lower end and front side, is provided with a vertical or longitudinal V-shaped groove, *s*, into which a corresponding V-shaped or conical crank-pin, *t*, plays, and by which motion is imparted to the crank-arm, and, through the latter, to the rock-shaft A, fingers H H', and doffer-comb I.

Crank-pin *t* is secured eccentrically to the end of the driving-shaft M, on the outer end of which are mounted the driving-pulleys N and O, and which latter may or not be cast or formed in one piece.

Instead of driving the crank-arm L directly from the crank-pin *t*, a slide, P, may be interposed between, and which plan I much prefer. The front face of this slide is provided with a conical socket, *v*, of such size and shape as to correspond with the size and shape of the conical crank-pin *t*. Into this socket crank-pin *t* takes and turns. The rear side of this slide P is of a V shape, like that of the groove *s* of the crank-arm, and corresponds therewith in size and angle, and is so made that it may fit therein, and is well illustrated in Figs. 2, 3, and 5; so that, crank-pin *t* fitting into socket *v* of slide P, and being rotated by its shaft, the slide P is made to slide up and down in the V-shaped groove of the crank-arm, and, in so doing, imparts an oscillating movement to the latter, and, through it, to the rock-shaft and doffer-comb.

The driving-shaft M and its sleeve or bearing R are both formed with a double taper, so that the shaft, by being forced outward, can always be brought to a true bearing. Sleeve R is constructed separately from the casing or frame E, and is secured thereto by means of a screw-thread, *w*, cut on its inner end, which takes into a female screw cut in an opening formed for its reception in the lower end of the outer side of casing E, as illustrated in Fig. 2.

The outer end of sleeve R is provided with an annular chamber, *x*, which forms an oil or lubricating chamber for shaft M, and which communicates through channel *y* with the oil-tank F.

Casing E is provided with a removable cap-piece, S, which covers the opening through which the crank-arm L is inserted or removed from the inside of said casing. This cap is also removed whenever it is desired to lubricate bearing *b* of rock-shaft A in the end of screw-bolt G.

The vibrator being thus constructed, motion is imparted, in the usual manner, to the driving-shaft M and its crank-pin *t*, and, through the latter, to arm L, which, being made to oscillate back and forth, imparts a rocking motion to rock-shaft A, and the latter a vibrating motion to the doffer-comb.

It will also be apparent that any unevenness or want of straightness in the comb can be readily remedied by simply turning either or both of the screw-nuts *n n'* on the ends of the adjusting-rod J until the "slack" has been fairly taken up by the straining of the comb-plate between the diverging ends of the fingers H H'.

In this case I have shown a mode of effecting this result by swiveling both of the fingers H and H' simultaneously, and which I consider the best mode. Still, the same result may be obtained by applying independent devices to each of the arms *h h'*, and then adjusting each separately—as, for instance, by firmly securing to the rock-shaft A, at or near each of the fingers H and H', and between them, an arm, 1, arranged to extend rearwardly in a line with the arms *h h'* of said fingers. Each of these arms 1 (see Fig. 6) is made of the same length as the arms *h h'*, and is provided with a transverse opening through its end for the passage of a screw-bolt, 2.

The ends of arms *h h'* are each provided with a slotted opening in their end, through which screw-bolt 2 also passes. Upon the end of each screw-bolt 2 is placed an adjusting-nut, 3, by which the adjustment of the fingers and the straining of the comb-plate I is effected.

On the inside of the arms *h h'*, between them and the arms 1, if desired, may be arranged, on each of the screw-bolts 2, an adjusting jam-nut, 4, by means of which and the adjusting-nuts 3 3 any required tension may be given to the comb. Similar adjusting jam-nuts may also be applied to the adjusting-rod J of Fig. 1 for a like purpose.

If desired, the arms 1 may be arranged on the rock-shaft on the outside of the fingers H H', in which case no slot need be made in the end of the arms *h h'*, the screw-bolts 2 being simply made to abut against their side, as shown in Fig. 7, whereby, by turning in the required direction, they will either tighten or slacken the strain on the comb. But of all these modes I prefer the first. The two latter are simply modifications of the first.

In a former patent, granted to me January 18, 1876, and numbered 172,541, an adjusting-spring was used in connection with the rock-shaft for the purpose of keeping the operative parts in close working order.

Experience has since developed the fact, however, that such an arrangement, while operating well, was yet objectionable in certain respects.

It required careful attention, for the reason that the action of the spring caused too much friction, and not unfrequently resulted in the heating and burning of the oil. It also consumed too much power. Moreover, when the spring is adjusted to the required speed, and the speed, from any cause whatever, becomes higher, then the operative

parts become liable to get out of order, on account of the force of the stroke of the comb, which, forcing the rock-shaft back, loosens the connection of the parts, and thereby renders them inoperative.

With my present improvement, these troubles are remedied. The bearings of the operative parts can be set up to a close fit, and the speed thereafter may be varied as desired without affecting the adjustment of the parts; and when, by ordinary wear of the contacting surfaces, the bearings require a slight adjustment, it is instantly effected by simply turning the adjusting-screw as little or much as may be necessary, all the bearings being, by that operation, simultaneously adjusted.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of swivel-fingers H H' with a doffer-comb, I, and its actuating rock-shaft, substantially as and for the purpose set forth.

2. The combination of the swivel-fingers H h H' h' and comb I with the adjusting-rod J and rock-shaft A, substantially as and for the purpose set forth.

3. In a doffer-comb vibrator, the combination of a crank-arm, L, constructed with a V-shaped groove, and provided with a correspondingly-shaped traveler or slide-piece, P, with an adjustable rock-shaft, A, for operating the comb, and an adjusting-screw, B, substantially as and for the purposes set forth.

4. In a doffer-comb vibrator, the combination of the double-tapered crank-head shaft M, and its correspondingly-shaped sleeve R, and a V-shaped crank-pin, *t*, with an adjustable rock-shaft, A, a crank-arm, L, constructed with a V-shaped groove, *s*, and a correspondingly-shaped traveler or slide-piece, P, the whole operating in the manner and for the purposes substantially as set forth.

5. The combination of an adjusting-screw, B, with the rock-shaft A, crank-arm L, crank-pin *t*, and actuating-shaft M, the whole being constructed in the manner substantially as described, whereby all the bearings in the machine can be brought to a close joint by a single operation, as set forth.

6. The combination of the rock-shaft A and a sleeve, *d*, provided with an oil-chamber, *f*, and channel *g*, with the tank F, substantially as described.

7. The combination of the actuating-shaft M and a sleeve, R, provided with an oil-chamber, *x*, and channel *y*, with the oil-tank F, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

EDWARD WRIGHT.

Witnesses:

DANIEL DAVIS, Jr.,  
PHINEHAS BALL.