2 Sheets—Sheet 1.

E. WOODWARD & M. BROCK.

Devices for Applying Power from a Rotating Shaft to a Lasting-Machine.

No. 213,857. Patented April 1, 1879.

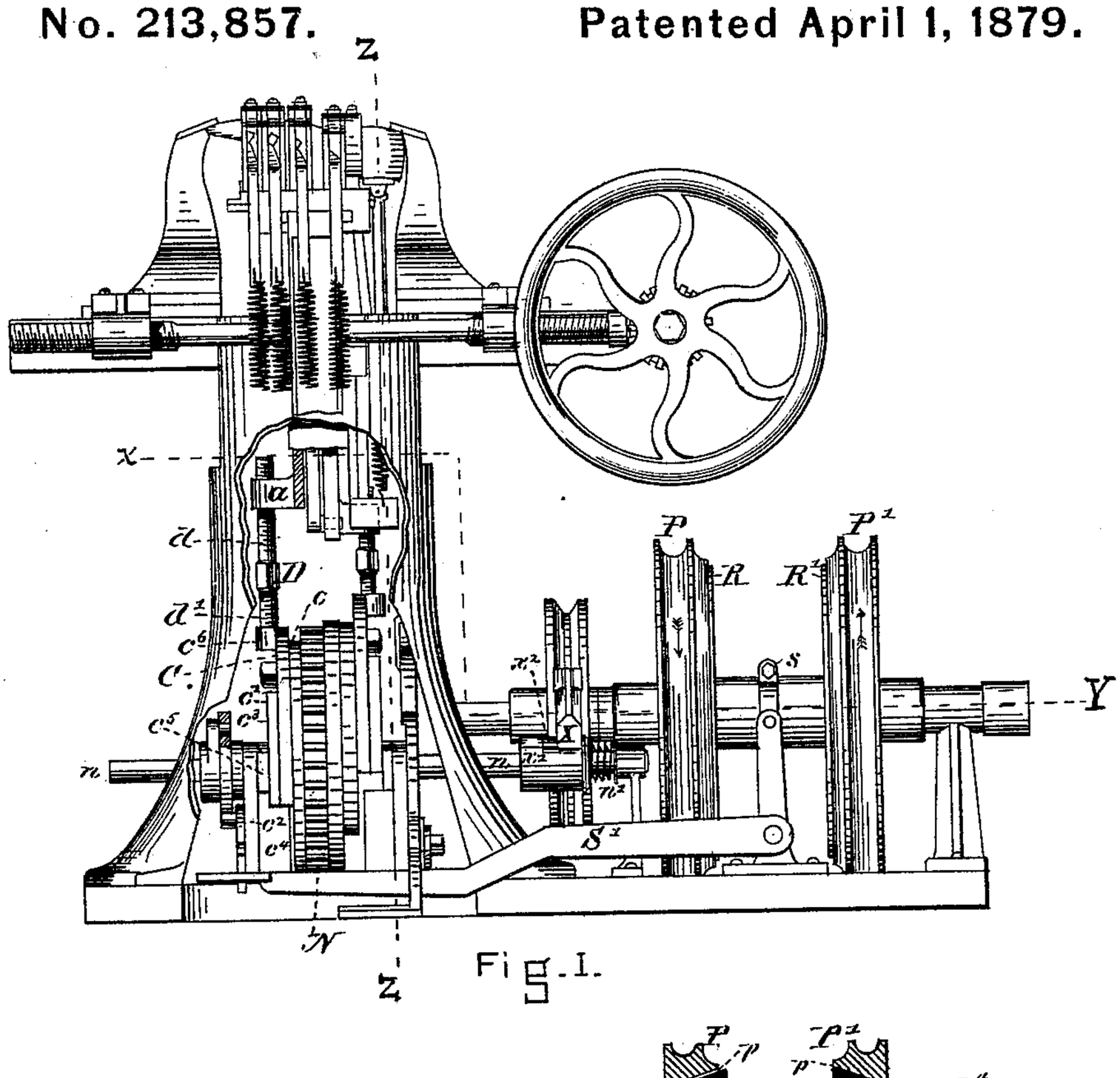

Fig. 1.

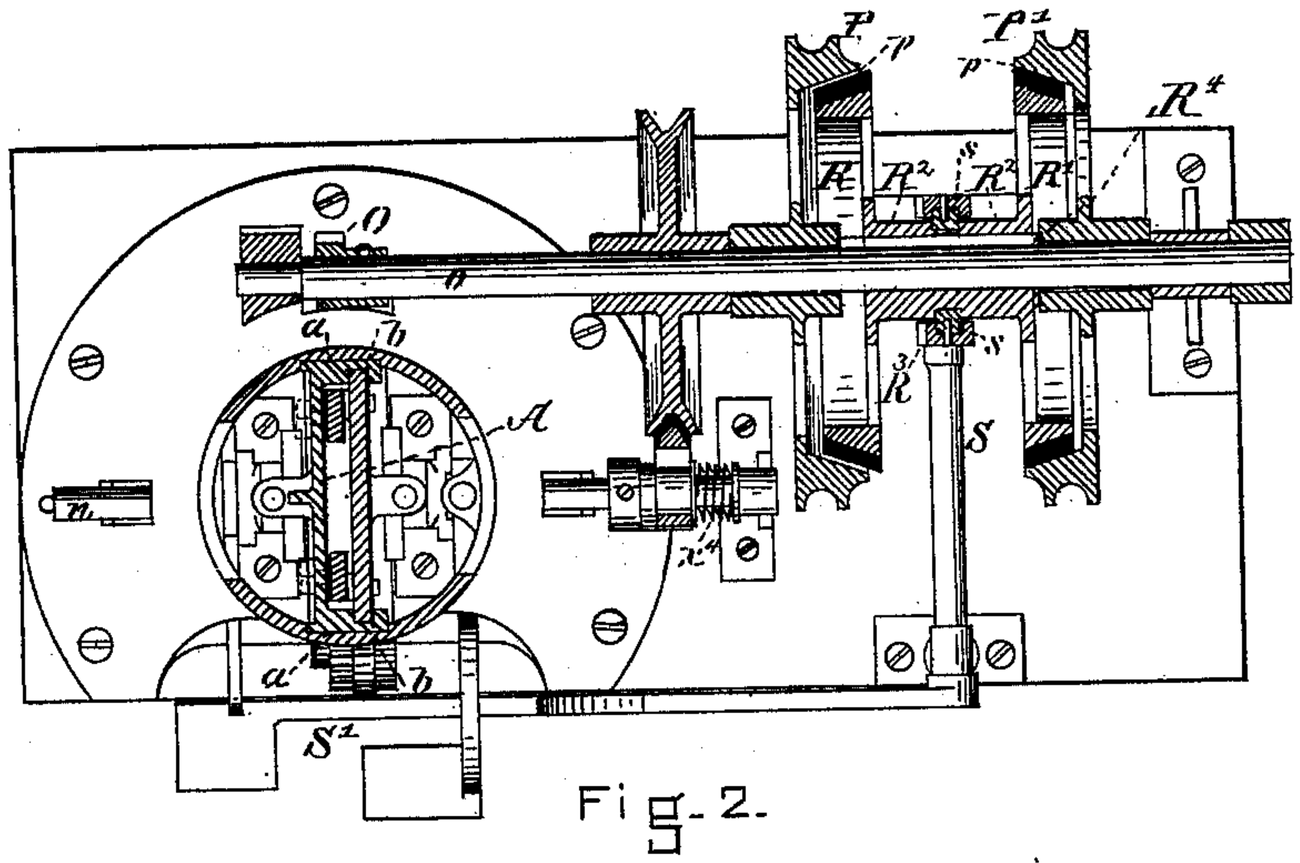

Fig. 2.

WITNESSES

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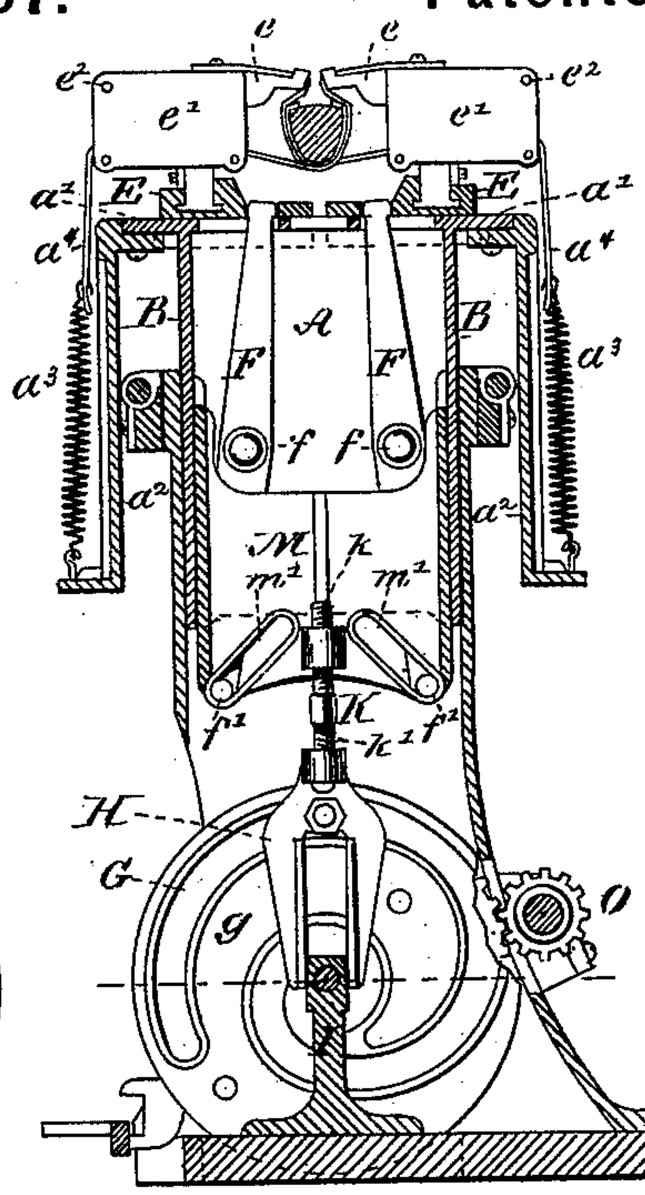

Fig. 3.

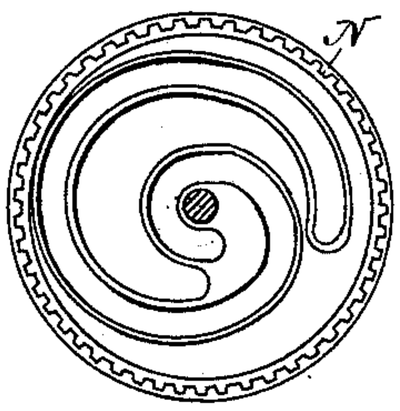

Fig. 6.

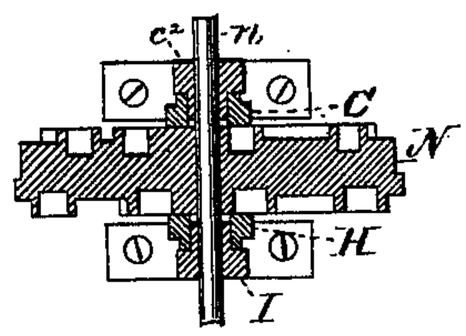

Fig. 7.

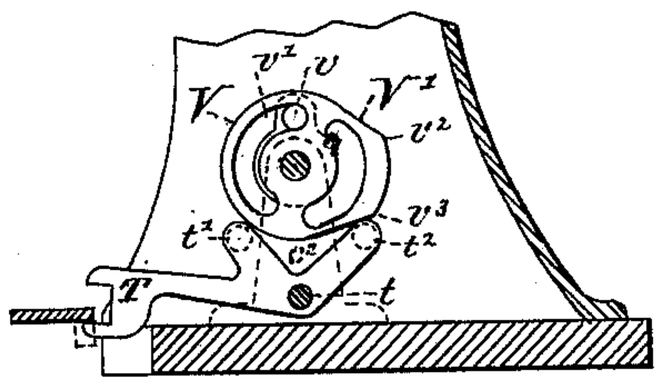

Fig. 4.

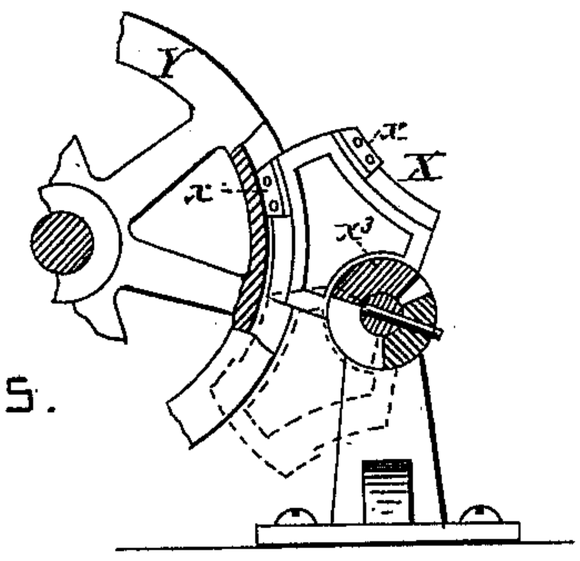

Fig 5.

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ERASTUS WOODWARD AND MATTHIAS BROCK, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE COPELAND LASTING MACHINE COMPANY, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN DEVICES FOR APPLYING POWER FROM A ROTATING SHAFT TO A LASTING-MACHINE.

Specification forming part of Letters Patent No. **213,857**, dated April 1, 1879; application filed December 6, 1878.

To all whom it may concern:

Be it known that we, ERASTUS WOODWARD and MATTHIAS BROCK, both of Boston, in the county of Suffolk, and in the Commonwealth of Massachusetts, have invented an Improvement in Devices for Applying Power from a Rotating Shaft to Lasting-Machines, of which the following is a specification:

This invention relates to appliances in and connected with a lasting-machine, serving to control and operate the moving tools thereof from a rotating shaft.

Patents previously granted fully set forth the movements of the cross-head and the movements of the jaws which support the girth-carrying fingers upon the cross-head. The motions necessary to give to the girth-supporting fingers are substantially these: an upward vertical movement parallel, or substantially parallel, with the sides of the last to a position somewhat above the plane of the upper surface of the insole, followed by a closing-movement, which shall cause the ends of the fingers to project upon the surface of the insole, and an inwardly-descending movement to said surface. These movements or modifications thereof are necessary in wrapping a girth upon the surface of the last in the lasting process. To remove the lasted upper from the machine, and to return the girth and girth-actuating mechanism to its original position preparatory to their again operating, it is necessary that these movements of the girth-carrying fingers be reversed; and our improvement consists in automatic means for providing the girth-carrying fingers with these movements, and in automatic devices for controlling their operation when power is employed in running the machine.

In the drawings, Figure 1 represents a side elevation of our invention with a portion of the frame of the machine broken out to show the interior mechanism. Fig. 2 is a horizontal section on the line *x y* of Fig. 1. Fig. 3 is a vertical section on the line *z z*, Fig 1. Figs. 4 and 5 are enlarged detail views, to more distinctly show the construction and operation of certain parts not clearly shown in the other views. Figs. 6 and 7 further illustrate the construction.

The cross-head A is provided with a vertical movement within the frame B by means of the cam-groove C in the face of the disk *c*, the connecting mechanism being a yoke, c^1, which straddles the support c^2, and whose inner and outer faces c^3 act as guides, in connection with the surfaces c^4 of said support c^2 and the surface c^5 and the face of the disk *c*, in guiding said yoke in its vertical movement and the rod D.

The rod D is provided with the right-and-left screws *d d'*. The ends of said connecting-rod are screwed into nuts c^6 and *a* upon the yoke and cross-head respectively. The movements of the cross-head are thus controlled by the cam-groove C, and by varying the position of the groove more or less throw can be given the cross-head.

The cross-head, it will be observed, is provided with an upward movement, a stationary period, and a slight falling movement. This movement, of course, can be varied by changing the location of the cam-groove. The height to which the cross-head lifts may be adjusted by means of the screw connecting-rod D, by increasing or diminishing the space between the yoke and the cross-head.

The cross-head is provided with suitable extensions a^1 upon each side, which slide in corresponding ways *b* in the frame B. The top of the cross-head is provided with a flat table or plate, which extends beyond each side of the cross-head, as shown in Fig. 3, and furnishes the support for the jaws E, which carry the girth-supporting fingers *e*, and which are provided with horizontal closing and opening movements.

The levers F, pivoted at *f* to the cross-head, and operated by the cam-groove G in the disk *g* through a yoke, H, which straddles the support I, and is guided thereon in the same manner that the yoke c^1 is guided, the connecting-rod K, having right-and-left screws *k k'*, and the sliding plate M, which has a vertical movement upon the cross-head, and is provided with slots *m'*, in which the pins *f'* upon the lower ends of the levers F close and open the jaws E.

During the upward throw of the cross-head the connecting-rod K and the connecting-rod

D move at about the same speed until just before the cross-head reaches the highest point, when the connecting-bar K commences to move somewhat faster; then the connecting-rod D continues its upward movement after the cross-head becomes stationary, thereby lifting the plate M, and causing the same to close, or partly close, the jaws E by spreading the levers F.

Before the jaws are entirely closed the cross-head may fall slightly, which will facilitate their closing. The cross-head A and plate M may then drop a short distance together.

The connecting-rod K may be used to adjust the distance between the yoke H and the plate M in the same manner that the connecting-rod D is used to regulate the distance between the yoke and the cross-head.

The cam-groove G, therefore, actuates the mechanism which operates the horizontal movements of the jaws.

The disks *c g*, in which the cam-grooves are formed, or upon which they are secured, are fastened, one upon each side, to the driven spur-wheel N. This driven spur-wheel is keyed to the revolving shaft *n*, which is provided with bearings in the supports c^2, I, and *n'*.

The spur-wheel N is driven by the driving-cog O upon the counter-shaft *o*. Arranged upon this counter-shaft are the loose pulleys P P′, which it is intended shall be belted to run in opposite directions. These loose pulleys are provided with the cone-shaped recesses *p* upon their opposite faces. Between the loose pulleys is arranged a pair of cone-clutches, R R^1, rigidly united by the sleeves R^2 and the collar R^3. The sleeves slide on the fast feather R^4 on the shaft *o*.

The clutches are respectively forced into the interior of the pulleys P P′ in reversing the movements of the cross-head and jaws by means of the crank S, which lays hold of the pins *s*, projecting from the collar R^3, and the lever S′.

The dog T raises and lowers the lever S′, to automatically disengage the clutches from the driving-pulleys immediately before the reversal of the motion. It is pivoted at *t* to the support c^2, and is provided with arms t^1 t^2, upon which, or upon pins projecting therefrom, the edge-cam V bears in depressing or raising the lever S′. The edge-cam V is formed on a loose disk, V′, upon the shaft *n*, and the pin *r*, which projects from a revolving disk, r^1, made fast to said shaft *n*, plays in the slot r^1 in the loose disk, and causes the same to partially revolve in operating the dog T.

When the cross-head is in its lowest position the portion of the cam at r^3 bears upon the arm t^1 and throws the dog to its lowest position, causing it to depress or lower the end of the lever S′, and when the portion of the cam v^3 is reversed, and contacts with the arm t^2, the dog T is lifted, thereby raising the end of the lever.

Loosely attached to the shaft *n* is the bracket or arm X, the outer edges of which, at *x*, are caused to alternately engage with the brake-wheel Y, rigidly fastened to the counter-shaft *o*.

A collar, x^1, pinned to the shaft *n*, and provided with the projection x^2, to contact with the portion x^3 on the brake bracket or arm X, operates the brake by causing the same to be firmly held against the brake-wheel, and they are so timed that the brake is applied at the limit of the opening and closing movements.

A spring, x^4, surrounding the shaft *n*, bears against the outer end of that portion of the bracket surrounding the shaft, and clamps it against the collar in order that the collar, in its revolution, may carry the brake to a position against the brake-wheel before the brake is applied, in order that the same may not be thrown violently against the brake-wheel when it is operated.

The cross-head A may be provided with the downwardly-projecting arms or brackets a^2, to the lower end of which may be fastened the springs a^3, which regulate the tension on the straps or girth a^4.

The girth or strap supporting fingers *e* may be pivoted to move vertically in their respective boxes e^1 at e^2. This gives each finger a longer leverage than has heretofore been given them. The advantages of this mechanism are so obvious that it is not necessary to specifically state them.

The operator lowers the lever S′, which causes the cone-clutch R to engage with the pulley P, constantly revolving in the direction indicated by the arrow. The counter-shaft and driving-gear are thus set in motion, and the cross-head and jaws actuated by the cams.

At the conclusion of the upward and closing movements the lever is automatically lifted, disengaging the clutch from the pulley, and the brake is automatically applied. To reverse the movements, the operator lifts the lever S′, when the clutch R^1 engages with the pulley P′, which constantly revolves in an opposite direction from that of the pulley P, and the brake is automatically thrown off, and the jaws opened and cross-head lowered until the cross-head reaches its lowest level, when the lever is automatically lowered by the dog T, disengaging the clutch R^1 from the pulley P′, when the brake is again reversed, and again automatically applied, leaving the lever in a position to again move the clutch R.

It will be observed that when the cross-head is at its lowest level the lever S′ can only operate the pulley which lifts the cross-head. The dog T prevents it from being lifted sufficiently to throw the clutch R^1 against the other pulley. Likewise, when the motions are reversed, in opening the jaws and lowering the cross-head the dog again prevents the lever from being moved in other than the right direction for operating the proper pulley.

It will also be observed that immediately after the mechanism has been started or reversed the dog ceases to act as a stop, and allows the lever to operate either of the clutches, so that at the commencement of the upward

or downward movements the machine can be started only in the right direction, and if once started will automatically come to rest at the end of the respective movements, but that at any intermediary stage the machine is under the control of the operator, and the movements can be reversed at any time except at their said commencement.

Although this mechanism is described as employed in operating girth-supporting fingers only, we do not confine ourselves to its use in connection therewith, but may employ it or portions or modifications in actuating any devices for adjusting, fitting, and clamping an upper upon a last, or in folding its edge upon the insole in the lasting processes, whenever it is necessary to provide devices for so doing with vertical movements parallel, or substantially parallel, with the sides of a last, and horizontal closing and opening movements parallel, or substantially parallel, with the plane of the surface of the insole or any variation or modification of these movements.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a machine for lasting the uppers of boots and shoes, the combination of a cross-head, its operating-cam and connecting mechanism, and the jaws, their operating-cam and connecting mechanism, all arranged to operate and provided with movements substantially as and for the purpose described.

2. In a machine for lasting the uppers of boots and shoes, the combination of a driving-gear and driven spur-wheel, and cams operating the cross-head and jaws, all arranged to operate substantially as described.

3. In a machine for lasting the uppers of boots and shoes, the combination, with the cams operating the lasting mechanism, of the spur-wheel N and its driving mechanism, all arranged to operate substantially as described.

4. In a machine for lasting the uppers of boots and shoes, the combination of cams *g* and *c*, with means for actuating the same in moving the cross-head and jaws in the operation of lasting, and for reversing the movements upon the completion of the lasting process, all arranged substantially as set forth, and for the purposes described.

5. In a machine for lasting the uppers of boots and shoes, the combination of the following instrumentalities: first, cams for actuating the cross-head and jaws carrying the side-lasting mechanism; second, automatic means for operating said cams in either direction; third, mechanism for automatically disengaging the driving mechanism at a stated period; fourth, a brake automatically operated at stated intervals.

6. In a machine for lasting the uppers of boots and shoes, the combination of a cam, C, a cross-head, and the intermediate connecting mechanism D for adjusting the extent of lift of said cross-head, substantially as and for the purposes described.

7. In a machine for lasting the uppers of boots and shoes, the combination of jaws having horizontal movements, the rotating operating-cam *g*, and a slotted yoke-connection with the levers actuating said lasting-jaws horizontally, whereby said jaws are provided with closing and opening movements, substantially as and for the purpose described.

8. In a machine for lasting the uppers of boots and shoes, the combination of a rotating cam, *g*, horizontally-moving jaws, and intermediary connecting mechanism K, capable of vertical adjustment, substantially as and for the purposes described.

9. As a driving and reversing gear for power lasting-machines, the combination, on and with a shaft, of two loose pulleys adapted to revolve in opposite directions, a pair of cone-clutches adapted to slide on a fast feather fixed to said shaft between said pulleys, and adapted to engage with either of said pulleys, but not with both at the same time, and an automatic unshipping-lever, actuated from the cam-shaft *n* of the machine proper at the completion of the throw of cam *g* on said shaft, adapted to control the movements of the cross-head in one or the other direction, substantially as described.

10. As a means for controlling the driving and reversing gear of power lasting-machines, the combination, with the sliding clutches, of the driving and reversing gear of the shifting-lever S′, dog T, and cam V, brought into action by the driven mechanism at the completion of a revolution of a cam, *c*, adapted to control the vertical movements of the cross-head in one or the other direction, substantially as described.

11. As a means for connecting the driven mechanism of a power lasting-machine to the shifting-lever which controls the driving and reversing gear, the dog T, provided with arms t^1 t^2, in combination with the loose cam V and disk v^1 on the driven shaft, whereby the shaft *n*, carrying cam C, is permitted to make more than a full revolution in giving to its fixed cams their full throw, and said fixed cams controlling the motions of the cross-head, and allowed to wrap more than once around the shaft *n*, substantially as shown and described.

12. As a stop-motion for the driving and reversing gear of power lasting-machines, and for controlling the movements of the cams C and G, operating the cross-head, the reversible brake X, adapted to alternately engage automatically with the brake-wheel Y of the driving mechanism and check its movement before the movements of said cams are reversed, and adapted to be controlled as to the time of said engagement by the collar x^1 on the driving-shaft *n*, substantially as described.

13. As a part of the stop-motion mechanism of a power lasting-machine, the combination of the double reversible brake X, provided with the projection x^3, collar x^1, having the projection x^2, and the spring x^6, all adapted to allow more than a complete revolution of the

cams which control the movements of the cross-head, and to operate substantially as described.

14. In a machine for lasting the uppers of boots and shoes, the combination of mechanism adapted to operate the cross-head and jaws carrying lasting appliances in the manner indicated, with a brake for stopping or controlling the motion of said cross-head and jaws at the completion of the throw of the cams which control the movement of said cross-head, substantially as and for the purposes described.

15. As a means of securing from injury the operative parts of a power lasting-machine, the combination of the shifting-lever S′ with a dog, T, whereby said shifting-lever is prevented from any but a reversing movement at and shortly before the time when the forward or back motion of the cams which control the movement of the cross-head is completed, substantially as described.

16. In a machine for lasting the uppers of boots and shoes, the cross-head A, provided with the downwardly-projecting brackets a^2, in combination with the springs a^3 and straps a^4, all arranged substantially as described.

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GEO. F. WALKER.