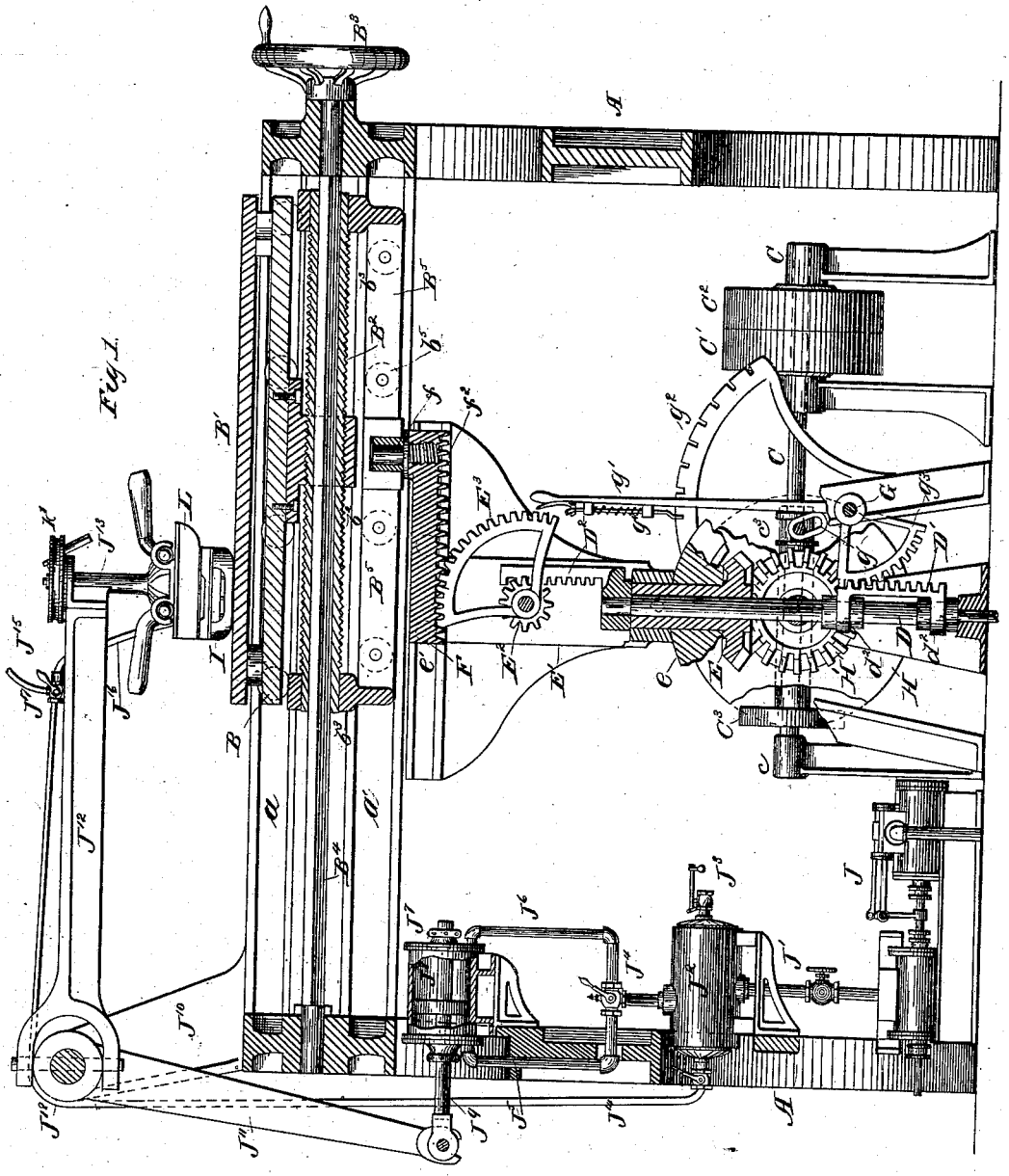
(No Model.) 2 Sheets—Sheet 1.

L. STERNBERGER & F. G. TEES.

IRONING MACHINE.

No. 264,966. Patented Sept. 26, 1882.

Fig. 1.



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

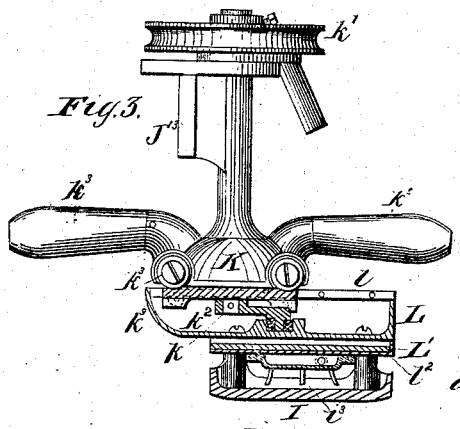


Fig. 4.

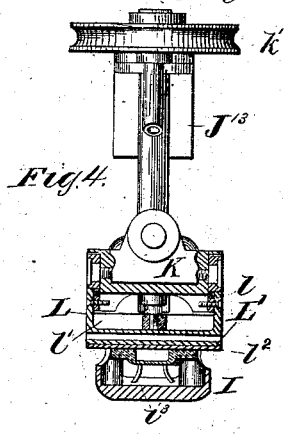


Fig. 2.

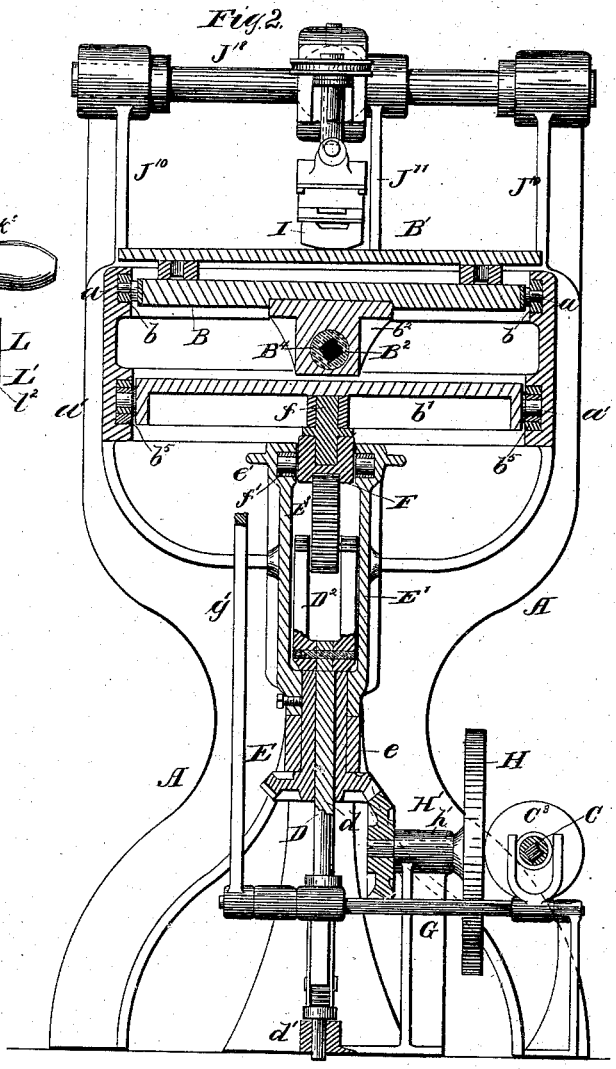


Fig. 5.

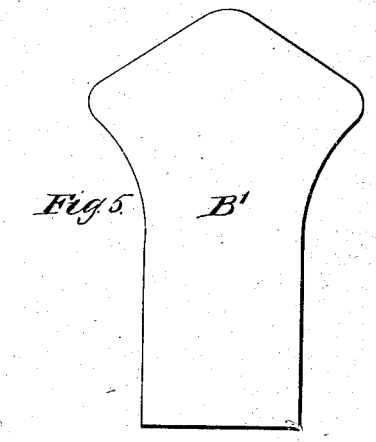
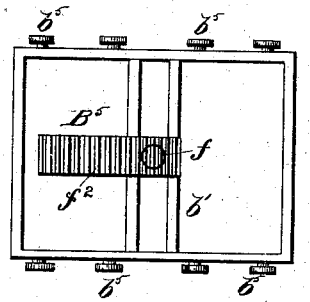


Fig. 6.



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UNITED STATES PATENT OFFICE.

LEOPOLD STERNBERGER AND FREDERICK G. TEES, OF PHILADELPHIA, PENNSYLVANIA; SAID TEES ASSIGNOR TO SAID STERNBERGER.

IRONING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 264,966, dated September 26, 1882.

Application filed January 17, 1881. Renewed March 11, 1882. (No model.)

To all whom it may concern:

Be it known that we, LEOPOLD STERNBERGER and FREDERICK G. TEES, both of the city and county of Philadelphia, in the State of Pennsylvania, have jointly invented certain new and useful Improvements in Ironing-Machines, of which improvements the following is a specification.

The object of our invention is to provide improved mechanism for the ironing and polishing of garments and textile fabrics; and to this end our improvements consist in certain novel devices and combinations for the attainment of the following results, to wit: the simultaneous variation of the degree of traverse and the number of movements of a reciprocating table in such relation one to the other as to maintain a uniform speed of the table irrespective of its length of stroke; the adjustment of a reciprocating table relatively to a fixed iron or to the center of motion of a reciprocating iron, so as to confine the action of the iron to certain desired portions of the table; and the application, with different degrees of pressure, of the iron to the table and its instantaneous removal therefrom, as required.

The improvements claimed, which, while specially designed for application in ironing-machines, are likewise susceptible of adaptation to other uses, are hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal central section through an ironing-machine embodying our improvements; Fig. 2, a vertical transverse section through the same; Figs. 3 and 4, vertical longitudinal and vertical transverse sections, respectively, through the iron; and Fig. 5, a plan view of an ironing-board.

To carry out our invention, we provide a substantial frame, A, having at top longitudinal guides *a*, in which a reciprocating table, B, is supported upon friction-rollers *b*. The table B carries upon its top a board, B′, which receives the article to be ironed, and its motion is derived through the intermediate mechanism, presently to be described, from a countershaft, C, mounted in bearings *c* and carrying fast and loose pulleys C′ C², around which passes a belt transmitting power from a prime mover. A vertical shaft, D, is mounted and supported in a lower bearing, *d*′, and in the bearing *e* of a miter-gear, E, which is fitted upon a key, *d*, on the shaft D, so as to admit longitudinal movement of the shaft within it, while rotating with said shaft at any and all points in the range of such longitudinal movement. Vertical standards E′ are secured to the hub or tubular shaft of the gear E, and horizontal guides *e*′ are formed upon or secured to the upper ends of the standards E′, within which guides an adjustable crank-arm, F, carrying a crank-pin, *f*, is supported on friction-rollers *f*′. The crank-pin *f* fits in a transverse groove or recess, *b*′, formed in a frame or casing, B⁵, supported upon friction-rollers *b*⁵ in guides *a*′, located below and parallel with the guides *a* of the table, the frame B⁵ having end bearings, *b*³, on its upper side, in which bearings a screw, B², is mounted so as to be capable of rotation by a shaft, B⁴, and hand-wheel B³. A nut, *b*², is secured centrally upon the lower side of the table B and engages the thread of the screw B². During the rotation of the shaft D the crank-pin *f* imparts reciprocating movements to the frame B⁵ and the table B (connected therewith, as before described, by the screw B² and nut *b*²) by its traverse along the groove *b*′, and the throw of the crank F is increased or decreased coincidently with a corresponding decrease or increase of the speed of the shaft D, so as to maintain a uniform speed of the table B, in the following manner:

A horizontal shaft, G, located at right angles to the counter-shaft C, has upon one of its ends a hand-lever, *g*′, by which it may be rocked in its bearings, the lever being retained in different desired positions by a spring-detent, *g*⁴, engaging notches in a segment, *g*². A toothed segment, *g*³, on the shaft G engages the teeth of a rack, D′, having on its back one or more lugs or projecting arms, *d*², each of which fits freely between collars fixed upon the shaft D, so that when the rack D′ is elevated or depressed by the segment *g*³ it imparts a corresponding longitudinal movement to the shaft D without interfering with the movements of rotation imparted to the latter

by the miter-gear E. Racks D^2 upon the upper end of the shaft D mesh with pinions E^2 upon a short horizontal shaft mounted in bearings in the standards E′, (which are secured, as before stated, to the shaft of the gear E.) A segment-gear, E^3, secured upon the shaft of the pinions E^2, engages the teeth of the rack f^2 on the crank-arm F, and, accordingly as the hand-lever g' is moved to the right or the left of Fig. 1, moves said arm and its attached crank-pin f toward or from the center of the shaft D, thereby correspondingly increasing or decreasing the throw of the crank and consequent traverse of the table B. The rotative speed of the shaft D is increased or decreased coincidently with and proportionately to the decrease or increase respectively of the crank-throw by changing the position of a friction-wheel, C^3, which is secured upon a sleeve, c^3, fitted on a key or squared portion of the counter-shaft C, a slotted arm, g, secured on the shaft G, engaging pins on a ring fitted between collars on the sleeve c^3, and moving the sleeve and wheel C longitudinally upon the counter-shaft, in accordance with the movements of the hand-lever g', by which the shaft D is raised or lowered. The periphery of the wheel C is in frictional contact with the face of a disk, H, upon one end of a horizontal shaft, h, the opposite end of which carries a miter-gear, H′, meshing with the gear E, to which and to the shaft E rotation from the counter-shaft is thus imparted. By reference to Fig. 1 it will be seen that as the shaft D is elevated to reduce the throw of the crank the wheel C^3 is moved toward the center of the disk H, and consequently increases the speed of the latter and of the shaft D, and, conversely, that as the shaft D is lowered to increase the throw of the crank the wheel C is moved in the opposite direction, and proportionately reduces the speed of the shaft, thus causing the table B to be moved at the same speed, irrespective of the different degrees of traverse imparted to it by the changes of crank-throw, the object of such variations of traverse being to adapt the machine to operation upon articles of different sizes, as may from time to time be desired, the same requiring for their proper treatment to be subjected to a uniform determined speed in the ironing operation.

The iron or polisher I, the construction and mode of operation of which will be hereinafter described, is supported above the board B′ at a point about in line with the axis of the shaft D, and the position of the table is changed relatively to the center of the iron, so that the action of the latter shall be limited to a certain desired portion of the board B′ by the rotation of the screw B^2 in one or the other direction, which rotation is effected by means of a shaft, B^4, passing centrally through the screw B^2, said shaft being rotatable in a bearing in the upper portion of the frame A by a hand-wheel, B^3. A portion of the shaft B^4 entering the screw B^2 is squared or provided with a longitudinal key or feather fitting a corresponding recess in the screw, or vice versa, so that the rotation of the shaft in either direction imparts a corresponding movement of rotation to the screw, while admitting of the longitudinal movement of the screw upon the shaft, the result being that according as the nut b^2, to which the table is attached, is moved by the screw toward the right or the left of Fig. 1 the range of traverse of the table will be about a right line to the right or to the left of the center of the shaft to which the iron I is connected, and the action of the iron will consequently be exerted upon portions of the board to the right or to the left of its center, as the case may be. The freedom of longitudinal movement afforded to the screw upon the shaft B^4 enables the desired changes of the center of traverse of the table relatively to the center of the iron to be made as well during the motion of the table as when the same is at rest, thereby obviating the necessity of interrupting the ironing operation by the stoppage of the table during the adjustment.

In order to enable the iron I to be applied to the garment or fabric upon the board B with a greater or less degree of pressure, as may be required, and to admit of its instantaneous removal therefrom by the operator, we provide a suitable air-pump or compressor, J, which is connected by a valved pipe, J′, with a reservoir, J^2, into which it forces and compresses air to such pressure as may be desired, the same being indicated by a gage, and excess being relieved by a weighted valve, J^3, upon the reservoir. The latter is connected by a pipe with a three-way cock, J^4, the passages in which communicate respectively with the atmosphere, and by pipes J^5 and J^6 with the two ends of a working-cylinder, J^7, having a piston, J^8, secured upon a piston-rod, J^9, working through stuffing-boxes in its ends. Where two or more machines are employed in a single establishment or within a convenient distance of an air-compressing apparatus it will be obvious that a single air-compressor will suffice for the entire series. The piston-rod J^9 of the working-cylinder is connected to one end of an arm, J^{11}, projecting downwardly from a horizontal shaft, J^{18}, mounted in bearings upon standards J^{10} on the upper portion of the frame A of the machine, said shaft carrying a horizontal arm, J^{12}, projecting over the board B′, and having at its outer end a bearing, J^{13}, to which the iron I is connected. The arm J^{12} is hinged or pivoted vertically to the shaft J^{18}, so as to swivel thereon in a horizontal plane, to admit of the removal laterally of the iron from the board and to vibrate vertically with the movements of the shaft J^{18} in its bearings. Upon the admission of air from the reservoir J^2 to the right side of the piston J^8 the latter is moved to the left, moving the arm J^{11} in the same direction and moving the outer end of the arm J^{12} downward, thereby applying the

iron I to the board B′, the pressure with which the application is made depending upon the degree of air-admission as regulated by the three-way cock J^4. The admission of air on the opposite side of the piston correspondingly moves the same, with its connections, in the opposite directions, thereby raising the iron from the board, the air which has previously acted escaping through the discharge-opening of the cock J^4. The iron I is heated by gas, and for the purpose of increasing the intensity of the combustion we provide an air-pipe, J^{14}, leading from the reservoir J^2 and connected with the gas-supply pipe J^{15}, the mixture being led through a feed-pipe, J^{16}, governed by a cock or valve, J^{17}, to a series of burners located within the iron.

The iron I may be of any preferred construction, and be either fixed upon or connected with the capacity of motion relatively to the support J^{13}.

In order to attain the advantages of imparting motion to the iron independently of the table, properly applying heat, and preventing the access of oil to the work, we find the following construction to be most convenient and desirable: The support J^{13} carries on its lower end a block, K, in the center of which is the lower bearing for a shaft, k, by which reciprocating motion is imparted to the iron, the shaft being rotated by a belt passing around a pulley, k', on its upper end, and carrying a crank, k^2, on its lower end. The block K and support J^{13} are preferably connected by a ball-and-socket joint, and the shaft k formed in two parts, connected by a universal coupling located within said ball-and-socket joint, so as to admit of the movement of the block K and iron I in different planes, an instance of such construction, which does not form part of our present invention, being shown in Letters Patent of the United States No. 174,589, granted to L. Sternberger and D. M. Pfautz, under date of March 7, 1876. In such case the angle of the block K and its attached iron I to the ironing-board may be varied and governed by the operator as desired by means of handles k^3 on the block. The iron I, which is hollow and internally heated by gas or a mixture of air and gas conducted by the pipe J^{16} to a series of burners, i^3, having their apertures above its lower plate, is secured to the lower side of a box, L, closed at its sides and ends and open at top, and having on each of its sides a longitudinal rail or guide, l, the upper and lower sides of which form bearings for friction-rollers k^3, journaled upon studs on the sides of the block K. A transverse slot or recess, l', is formed in the box L by two flanges or ribs rising from its bottom plate, within which recess the pin of the crank k^2 works, so as to impart reciprocating motion to the box L and the attached iron when the shaft k is rotated, the box and iron being supported by the lower series of friction-rollers on the block K. The box L serves as a reservoir which incloses the working parts and collects and retains any oil that may drip therefrom, preventing the access thereof to the work, and by the use of the internal guides and crank-pin recess the length of the apparatus is reduced as far as practicable, while affording proper facilities for the reciprocation of the iron. To preserve the working parts from excessive heat, a wooden pad, L′, having its outside covered with thin sheet metal, and having a recess in its top, forming an air-space above the same, is interposed between the iron I and box L, the pad L′ being further protected by an asbestus facing, l^2, on its lower side.

The board B′, which receives the articles to be ironed, is supported on rubber or other elastic material on the top of the table B, being furnished with pins or stops on one of its ends to prevent its longitudinal displacement. Where the apparatus is used exclusively for the ironing of shirts we prefer that the board shall be made of the general outline shown in Fig. 6—that is to say, in the form substantially of the body of a shirt, so that the latter may be fitted above and below it and held in position by a suitable latch or button, and the action of the iron be applied, as is desirable, only to a single ply or thickness of the goods.

Inasmuch as certain features of our improvements may be applied, without change of principle, to uses other than that of ironing and polishing fabrics, we do not limit them to such specific application, which we have here described and shown as the best means of clearly illustrating their construction and mode of operation.

We claim as our invention and desire to secure by Letters Patent—

1. The combination of a table and rotary crank with mechanism, substantially as described, for adjusting it transversely of its axis and connecting with and imparting reciprocating motion to said table, gearing whereby rotary motion is given to said crank, and mechanism, substantially as described, for simultaneously varying the rotative speed of the crank and altering its throw.

2. The combination, substantially as set forth, of a rotary crank with means for adjustment transversely of its axis, a reciprocating frame having a transverse groove or recess to receive the crank-pin, an adjusting-screw mounted in bearings in said frame, a table secured to and supported by a nut fitted upon said adjusting-screw, and an iron or polisher supported above said table upon a center within the range of the traverse of the table along the adjusting-screw.

3. A rotary crank with means for adjustment transversely of its axis, a reciprocating frame having a transverse groove to receive the crank-pin, an adjusting-screw mounted in bearings in said frame, and a table secured to and supported by a nut fitted upon said adjusting-screw, combined with an iron or polisher suspended from a rock-shaft above the

table, a working-cylinder having valved supply-pipes connected with an air-compressor, and an arm connecting the piston-rod of the working cylinder with the rock-shaft that supports the iron.

4. In an ironing-machine, a rotary and vertically-adjustable shaft provided with upper and lower racks, gearing for revolving said shaft, rotary standards supporting a pinion, and an upper oscillating toothed segment, said pinion engaging the upper rack, and a rotary and transversely-adjustable crank provided with a rack engaging said upper toothed segment, combined with a lower oscillating toothed segment engaging the lower rack, a shifting friction-gear, and means for operating said segments and friction-gear conjointly, substantially as and for the purposes set forth.

5. In an ironing-machine, an air-pump and valved pipe, a reservoir and safety-valve, and a three-way cock whose passages communicate respectively with the atmosphere and with a pipe at each end of the working-cylinder, combined with an iron or polisher and suitable connecting devices, whereby the iron may be applied to the garment or fabric with a greater or less degree of pressure and instantaneously removed therefrom.

6. The combination, substantially as set forth, of an iron shaft having a crank upon one of its ends, a block having a central bearing for the iron shaft and side friction-rollers, a box closed at its ends and bottom and having side slides or bars fitting between said rollers, and a transverse slot or recess engaging the crank-pin of the iron shaft, and an iron or polisher secured to said box on the side opposite that on which the crank-pin recess is formed.

7. The combination, substantially as set forth, of a frame fitted to slide upon horizontal guides, a shaft capable of rotation, and a crank by which reciprocating movement is imparted to said frame, an adjusting-screw mounted in bearings in said frame in the direction of its traverse, a table secured to and supported by a nut fitted upon said adjusting-screw, and a shaft mounted in a bearing fixed relatively to the frame and table, said shaft passing into and being adapted to rotate the adjusting-screw irrespective of the condition of rest or motion of the frame.

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