2 Sheets—Sheet 1.

J. E. WILSON.
Plaiting-Machine.

No. 202,211. Patented April 9, 1878.

Fig 1

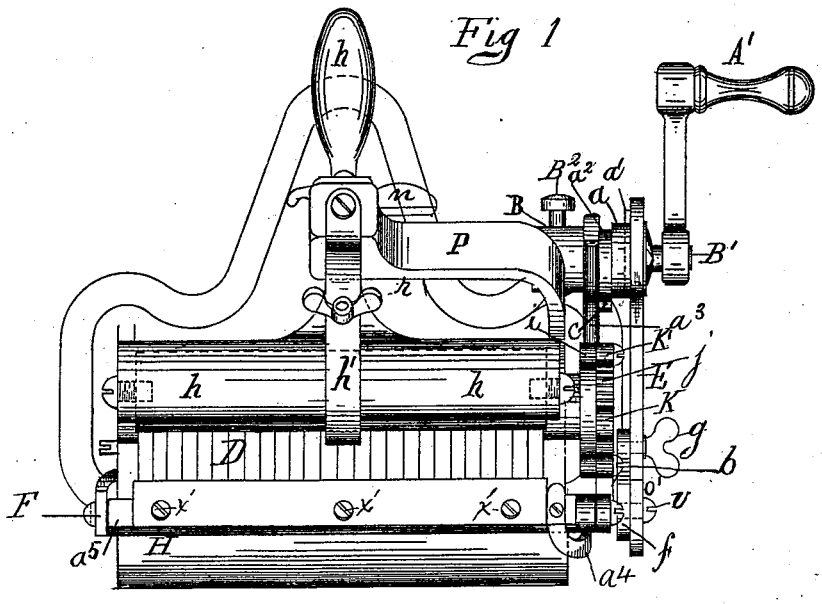
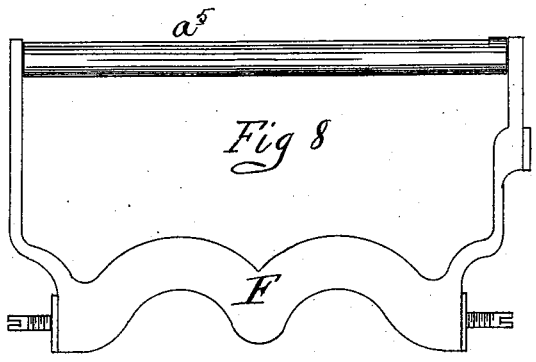


Fig 8



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Plaiting-Machine.

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Fig 2

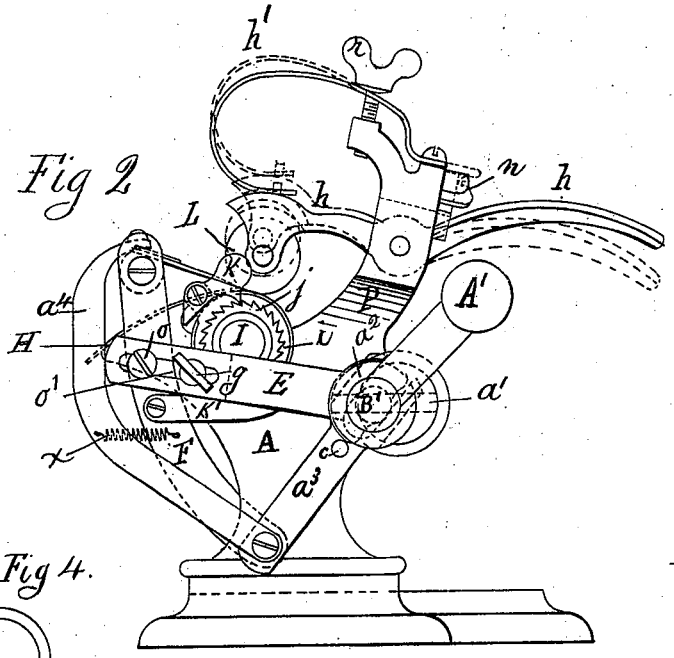


Fig 6

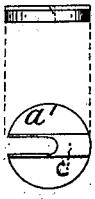


Fig 4.

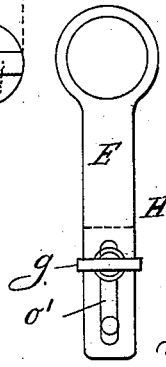


Fig 3

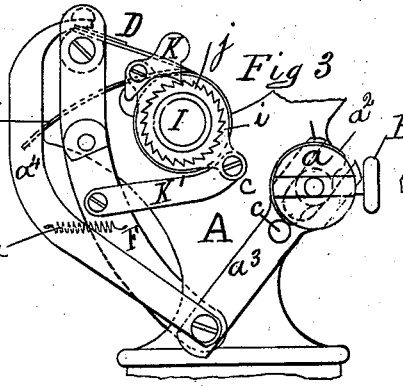


Fig 5

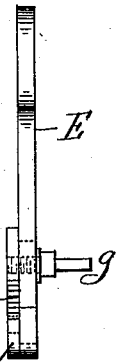
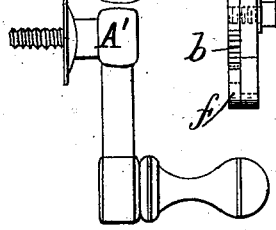


Fig 7



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UNITED STATES PATENT OFFICE.

JAMES E. WILSON, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN PLAITING-MACHINES.

Specification forming part of Letters Patent No. **202,211**, dated April 9, 1878; application filed October 8, 1877.

To all whom it may concern:

Be it known that I, JAMES E. WILSON, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented new and useful Improvements in Rotary Plaiting-Machines, which improvements are fully set forth in the annexed specification and in the accompanying drawings.

My invention relates to that class of plaiting-machines in which a knife works with a reciprocating motion, in combination with two rollers which turn intermittingly to receive and press the folds of the material being plaited as it is fed forward to them by the knife.

My improvements relate to improved means of adjusting such machines accurately and conveniently to make different widths of plaits; to an improved manner of supporting the pressure-roller, and of constructing and applying a pressure-spring thereto adjustable for variations of pressure upon the roller, said spring being so applied to the pressure-roller, and the roller so hung in combination therewith, that the pressure-roller can be lifted off from the main roller, fastened in that position, and returned thereto, while the pressure-spring retains its adjustment; also, by the use of my devices I am able to cause the edge of the knife to bear with an even positive pressure upon the material being plaited during the entire forward movement of the knife by which the fold of the material is carried between the rollers, when the knife is lifted clear from the cloth and carried back to its starting position, and by the employment of a segmental apron under the knife I provide a proper bearing for its edge always in the line of its movement.

Furthermore, the independent manner in which I support the pressure-roller above the main roller allows of the passage through the rollers of greatly varying thicknesses of folds without in the least disturbing any of the regular adjustments of the machine.

In the drawing, Figure 1 is a plan of my machine. Fig. 2 is an end elevation of the same. Fig. 3 is a partial end elevation with the crank, connecting-rod, and eccentric removed. Fig. 4 is a face view of the connecting-rod detached from the machine, and Fig. 5 is an edge view of same. Fig. 6 is a view of the eccentric. Fig. 7 is a view of the crank, and Fig. 8 is a view of the swinging knife-bar frame detached from the machine.

In the different figures like letters refer to like parts.

A is the frame. P is an arm cast on frame A, to support the upper roller and holder. A′ is the crank; B, the crank-shaft bearing in the frame; B^1, the crank-shaft; B^2, thumb-screw in crank-shaft bearings; a^1, the eccentric; a, a grooved disk or eccentric carrying-plate; a^2, cam on shaft B^1; a^3, forked cam-lever; a^4, bent knife-bar lever; a^5, knife-bar. D is the knife; c, pin in forked cam-lever a^3; E, slide-jointed connecting-rod; f, short piece of connecting-rod; g, thumb-screw in f; o, screw through slot in connecting-rod E; o', slot in rod E; b, graduating-marks on E and f; F, swinging knife-bar frame; x, a spiral spring; H, segmental apron; I, the main hollow roller; i, the pawl-carrier; j, the ratchet; K, the pawl; K′, connecting-strap between pawl-carrier and swinging knife-bar frame F; L, upper or pressure roller; h, handle and upper-roller support; h', pressure-spring; n, pressure-roller-support catch; r, adjusting-screw through spring h'.

Machines of this description require that at least one of the rollers between which the folded work passes should be heated quite hot, so as to fix the folds formed by the knife. In most machines gas is used under the main roller for this purpose; but, as this is not obtainable in all places, I make my main roller hollow and use a heated slug of iron placed therein for heating it. The heat required being considerable, it is found to be necessary that all the working parts of the machine contiguous to the heated roller should be operative without the aid of the tempered springs, as the heat will soon soften them and destroy their efficiency; and one object which I have kept in view in building my machine has been to avoid this difficulty, substituting for springs devices to operate positively or by gravitation, thus avoiding spring action. The pressure-spring h' is sufficiently removed from the heated roller I to protect it from the influence of the heat.

The plaiting-knife in machines of this char-

acter is usually arranged to move on the surface of a roller; but I provide an apron, upon which the edge of the knife moves, and by linking together movements of the knife, knife-bar frame, and pawl-carrier, and consequently thereby governing the movement of the rollers, the movement of all these essential parts must so coincide as to produce perfect work.

Crank-shaft B^1 is fitted to turn in bearing B in frame A. A hole is drilled and tapped in bearing B for thumb-screw B^2, and in crank-shaft B^1 is drilled a hole to receive the end of screw B^2 when the shaft is turned to a certain position, and so hold the shaft fixed. The outer end of shaft B^1 is drilled and tapped to receive the screw. (Shown outside of the flange on the crank, Fig. 7.)

The portion of shaft B^1 next to the frame is turned to receive the fork-shaped end of cam-lever a^3, and projecting out on the front face of this lever is a pin, *c*. On shaft B^1, next to lever a^3, is fixed a cam, a^2, the edge of which, turning against pin *c*, gives lever a^3 an obliquely downward motion, and so retains it during the upward sweep of the knife.

Next on shaft B^1 is placed a disk, *a*, having cut across its face a groove, *c'*, Fig. 3. Against disk *a* is placed the eccentric a^1, which has across its surface a projection, *s*, corresponding in width and thickness to the groove *c'* on disk *a*. The slot in a^1 permits it to have a sliding motion against the face of disk *a*. The connecting-rod E is placed on the eccentric a^1 and the crank A' is screwed into shaft B^1, holding all the parts in any desired working position.

The swinging knife-bar frame F is pivoted near the base of the frame A, at each end of same, and the sliding-joint connecting-rod E is attached thereto by a screw, *o*, passing through section *f* thereof, the slot *o'* in rod E allowing said rod to freely slide on said screw and against the face of *f* when thumb-screw *g*, which screws into *f* and through slot *o'*, is loosened, and when the pieces E and *f* of said connecting-rod have been set to their required adjustments they are secured in such position by tightening up thumb-screw *g*.

To guide the operator in setting the two portions E and *f* of the connecting-rod so that the stroke of the knife-bar frame may produce the required width of fold or plait, graduating-marks *b* are made on the top edges of E and *f*. Knife-bar a^5 is hung between the two arms of the swinging knife-bar frame F, being thereto pivoted, so it can have a rocking motion, and knife D is attached to its upper face by screws *x' x' x'*.

The upper end of the bent knife-bar lever a^4 is attached by a screw to the knife-bar, and its lower end is pivoted to the lower end of the forked cam-lever a^3, and through said connection the reciprocating movements of lever a^3 rock the knife-bar and lift and depress the edge of the knife as it moves back and forth over the apron H, carried by the reciprocating movements of the swinging knife-bar frame. Thus by a single revolution of the crank, through the connections heretofore described, the knife moves back and forward and its edge rises and falls. The spiral spring *x*, attached to the bent knife-bar lever a^4 and to the swinging knife-bar frame F, causes the edge of the knife D to have an upward tendency during its backward sweep, the operations of the working parts being so timed that, through the action of cam a^2, forked cam-lever a^3, and bent knife-bar lever a^4, the pressure of knife D is released at the instant it has completed its upward or forward movement, and consequently delivered the fabric plaited between the rolls.

On the extension of the bearing of hollow roller I is fixed ratchet *j*, said extension also supporting pawl-carrier *i*, and serving as a pivot, upon which said pawl-carrier rotates reciprocally in conjunction with swinging knife-bar frame F through the medium of connecting-strap *k'*, which is pivoted at one end to the swinging knife-bar frame F, and at the other end to pawl-carrier *i*. K, being loosely pivoted to the upper end of pawl-carrier *i*, engages in the teeth of ratchet *j* by gravitation, thus giving to hollow roller I an intermittent rotary motion coincident with the backward stroke of knife D, carrying forward the fabric doubled by the previous action of the knife.

The upper or pressure roller support and handle *h* is cast in one piece, and is pivoted on an arm, P, cast on frame A. By bearing down the handle *h* the upper roller is lifted from the lower one, and may be fixed in a raised position by turning thumb-catch *n*, so that one end shall swing over and lock said handle, said catch *n* being pivoted on the back side of arm P.

Pressure-spring *h'* has one end firmly attached to arm P, and the other end carried over and bent under and pressing on the top of roller-support *h*.

Thumb-screw *r*, being interposed between the junction of spring *h'* and arm P and roller-support *h*, serves to increase or lessen the pressure of spring *h'* at pleasure.

The operation of my machine is as follows: First, to adjust it to any required width of plait, turn the crank to about the position shown in Fig. 1, when thumb-screw B^2 can be turned into a stop-hole in shaft B^1, and thus hold the shaft in a fixed position; secondly, turn the crank back half a turn, and this will unscrew it from the end of shaft B^1, leaving eccentric a^1 free to move horizontally, sliding in the groove in grooved disk *a;* thirdly, loosen thumb-screw *o* and slide connecting-rod E to the right or left until the graduating-mark on E coincides with one of the corresponding marks on *f*, the marks on *f* being made for variations of one-eighth of an inch. This accomplished, tighten up thumb-screw *o*, screw up crank A', loosen thumb-screw B^2, and the machine is ready to operate.

During the operation of adjusting, as above,

the edge of knife D should be held closely between the rollers I and L by a light pressure of the hand. This throws the entire sliding adjustment into the movements of the eccentric a^1 and obviates any lost motion that may possibly affect the accurate movements of the knife from wear of parts.

Having thus adjusted the machine, the heated slug can be placed in hollow roller I; next, the end of the fabric may be placed between knife D and apron H, and, by lifting roller L by pressing upon the handle to support *h*, the end of the fabric can be inserted and held between the rollers.

By now turning crank A′, the knife first moves backward, its edge being lifted and kept clear of the cloth; but before it begins its forward movement its edge is brought to bear firmly and positively against the fabric on the apron, to insure the certain action of the knife and fabric together toward the rolls, without which the folds would be improperly made. Thus by continuing to turn the crank it will be found that the fabric is evenly and regularly laid in plaits, as indicated by the adjustments heretofore described and made.

In machines of this description it is necessary that the movements of the plaiting-knife and the intermittent movements of the rollers should coincide in degree, and therefore the width of the teeth on the ratchet is determined by the distance that the surface of the roller I should move to carry the fabric forward while pressing down the folds delivered by the knife. The adjustments in this machine being made for eighths of an inch, it follows that the widths of plaits which can be produced are an eighth of an inch each, or multiples of that width.

There being sometimes inconveniences arising from the necessity of making plaits the width of which must be governed by the number of the ratchet-teeth, as above set forth, I do not confine myself to the employment of a ratchet and pawl, as shown in drawings, for moving the rollers; but there may be placed on the roller I, in place of the ratchet *j*, a pulley with a V-groove in its periphery, and a pawl with an edge conforming in shape to said groove may be hung in place of pawl *k*. The action of this device would be, that the pawl would come to a bearing against the grooved wheel wherever the pawl-carrier *i* may be when commencing its forward movement, and all adjustments for width of plait would be made on connecting-rod E and *f*, and the roller movements would, of necessity, correspond therewith.

What I claim as my invention is—

1. The combination, with shaft B^1 and crank A^1, of thumb-screw B^2, cam a^2, grooved disk *a*, eccentric a^1, connecting-rod E and *f*, thumb-screw *g*, forked cam-lever a^3, pin *c*, bent knife-bar lever a^4, knife-bar a^5, knife D, swinging knife-bar frame F, and spiral spring *x*, substantially as and for the purpose set forth.

2. The apron H, as and for the purpose set forth.

3. The combination of knife D, apron H, roller I, and roller L, substantially as and for the purpose set forth.

4. The swinging knife bar frame F, connecting-strap K^1, pawl carrier *i*, pawl K, ratchet *j*, and rollers I and L, combined and arranged to operate substantially as and for the purpose set forth.

5. The combination of cam a^2, forked cam-lever a^3, pin *c*, bent knife-bar lever a^4, knife-bar a^5, and knife D, substantially as and for the purpose set forth.

6. The combination of eccentric a^1, connecting-rod E and *f*, thumb-screw *o*, and swinging knife-bar frame F with knife-bar a^5 and knife D, substantially as and for the purpose set forth.

7. The slide-jointed connecting-rod in two pieces, E and *f*, in combination with thumb-screw *o*, and the graduating-marks *b* on said rods, substantially as and for the purpose set forth.

8. The disk *a* with its groove c^1, in combination with the eccentric a^1, substantially as and for the purpose set forth.

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Witnesses:
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