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J. A. BATCHELOR & F. E. HALL.

FEED MECHANISM FOR SEWING MACHINES.

(Application filed Dec. 16, 1899.)

(No Model.)

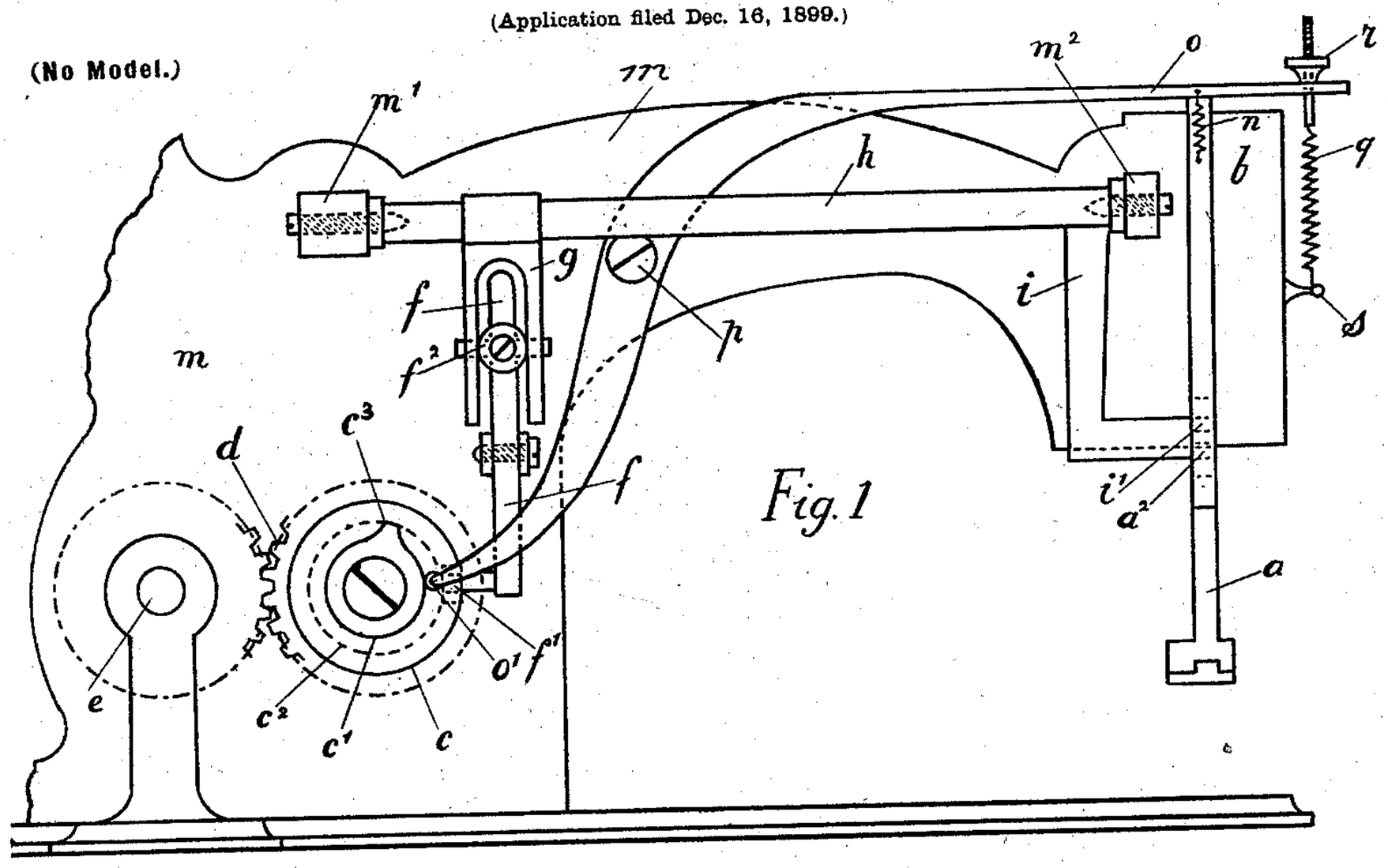


Fig. 1

Fig. 2.

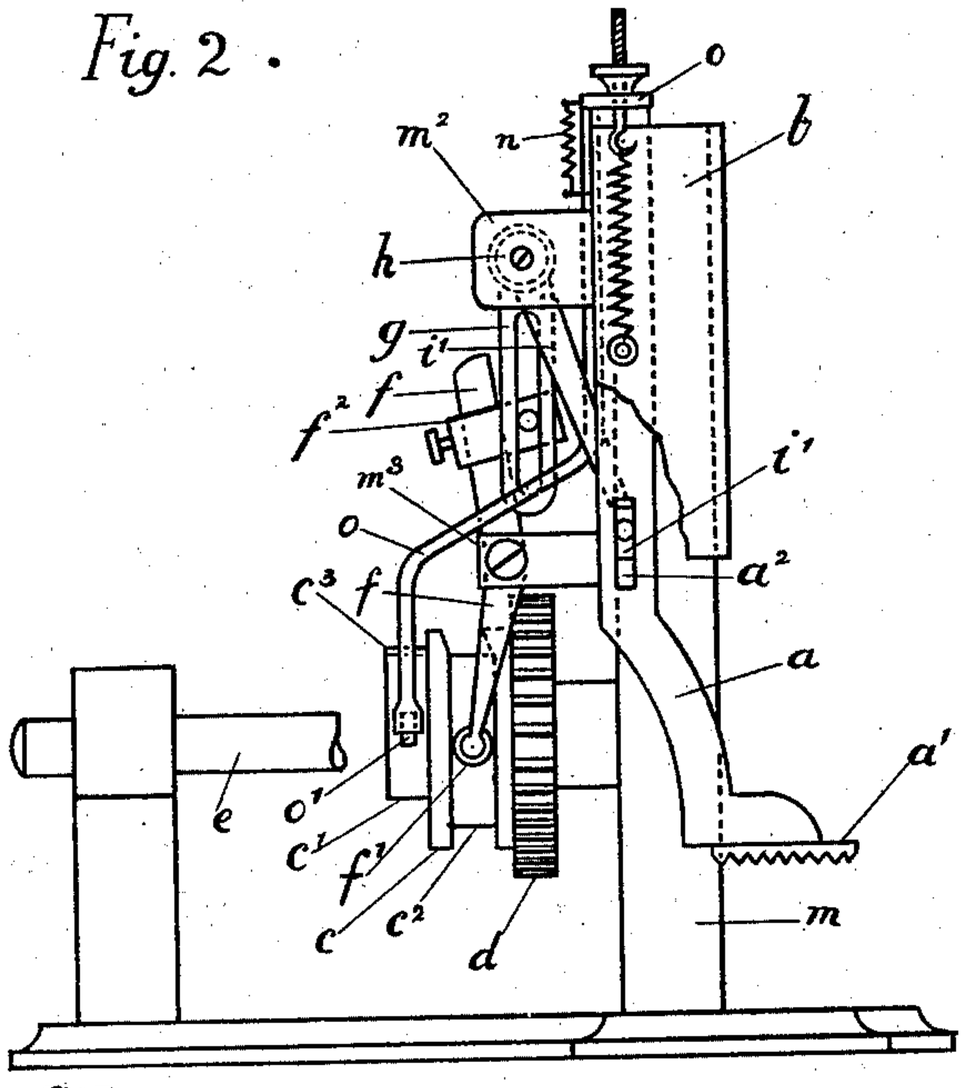
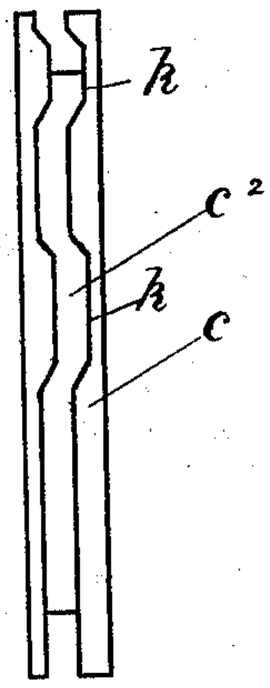


Fig. 3



Witnesses:

C. Brett.

R. Rogers.

Inventors:

J. A. Batchelor.

F. E. Hall

by Fairfax & Witter

Attorneys

UNITED STATES PATENT OFFICE.

JOHN ARTHUR BATCHELOR AND FRANCIS ERNEST HALL, OF LONDON, ENGLAND.

FEED MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 705,633, dated July 29, 1902.

Application filed December 16, 1899. Serial No. 740,546. (No model.)

To all whom it may concern:

Be it known that we, JOHN ARTHUR BATCHELOR and FRANCIS ERNEST HALL, subjects of the Queen of Great Britain, residing at 32 Cloth Fair, London, England, have invented a certain new and useful Improvement in the Feed Mechanism of Sewing-Machines, of which the following is a full, clear, and exact specification.

This invention relates to the feed mechanism of sewing-machines, and more particularly to top-feed mechanism of machines having a frame and main driving-shaft arranged as shown in the specification of Benson's English Patent No. 5,903 of 1893. In these machines the presser-foot receives motion from two distinct sets of mechanism, one of which produces the forward motion and the other the down motion of the same, while the motions in the opposite directions—viz., the backward and the up motion—are produced by springs. The two sets of mechanism mentioned above are driven from a pair of single-acting cams, which turn on an axis parallel to the driving-shaft of the machine. With the name "single-acting cam" we wish to designate a cam which acts on a friction-roller or analogous mechanism in one direction only—that is to say, which presses the same either toward the axis of the cam or away from the same, as the case may be—while the motion of the friction-roller in the opposite direction (away from the axis of the cam or toward the same, as the case may be) is produced by a spring, which always keeps the roller in contact with the cam. If such a machine works at a great speed, the cloth-feed becomes unreliable and irregular, because the oscillating forward and backward motion of the presser-foot depends partly on a spring.

The present improvement has for its object to render such machines suitable for high speed by imparting to the presser-foot a positive forward and backward motion.

In the accompanying drawings, Figure 1 is a side view, and Fig. 2 an end view, of a feed mechanism embodying our invention, while Fig. 3 shows a detail of construction.

The cloth-presser *a*, which shifts the cloth, is adapted to move both horizontally and vertically. The vertical motion is produced in the usual manner by causing the cloth-presser to slide up and down in a vertical guide-piece *b* placed at the head of the machine, while the horizontal motion is produced by the mechanism hereinafter described. Both motions are derived from a grooved disk or cam *c*, which is rigidly fixed to a spur-wheel *d*, set in motion from the main driving-shaft *e* by means of another spur-wheel *f*, commonly used in machines of the Thomas and Benson type, and therefore only indicated by dotted lines. The lifting of the presser-foot is produced by the nose c^3 of the small cam *c'*, fixed to the face of the double-acting cam or grooved disk *c*, said nose c^3 acting upon a friction-roller *o'*, held in the extremity of a two-armed intermediate lever *o*, which has its fulcrum at *p* and is connected with the cloth-presser *a* by a helical spring *n*. After the presser has been thus lifted it is drawn down again by a helical spring *q*, attached at one end to the guide-piece *b* by a hinge-pin and acting at the other end on the lever *o* by means of an adjustable screw-nut *r*. The horizontal motion of the presser-foot is produced by a specially-shaped groove c^2, formed in the circumference of the disk or cam *c* through the intermediary of a two-armed intermediate lever *f*, having at its lower end a friction-roller *f'* and at its upper end a sliding block f^2, secured to the lever, a forked lever *g*, having a longitudinal slot *g'*, in which slides the said block f^2, a horizontal shaft *h*, which is supported by pivotal bearings *m'* and m^2, projecting from the machine-frame *m*, and a lever *i*, adapted to act on the cloth-presser *a* by means of a sliding block *i'*, pivoted to the extremity of the lever *i*, and a vertical slot a^2, formed in the cloth-presser *a*. The rear lever *g* and front lever *i* are fixed to the shaft *h* and extend downward from the same. The fulcrum of the lever *f f* is supported in a bracket m^3, fixed to the frame *m*.

Fig. 3 represents the circumference of the grooved disk *c*, laid out into a plane, so as to show the shape of the groove c^2. As the groove has two lateral bends or deviations *k*, each revolution of the cam *c* will produce two forward and two backward motions of the cloth-presser *a*.

The effective length of the lever *f* may be

regulated by varying the position of the sliding block f^2, which has a set-screw for securing it in the desired position, as shown by Fig. 2. As the stroke or the amplitude of oscillation of the lever g depends on the effective length of the lever f and the cloth-feed depends on the length of the stroke or oscillation of the presser-foot a' in a horizontal direction, the cloth-feed may be regulated by varying the position of the sliding block f^2 on the lever f.

What we claim is—

1. In top-feed mechanism of high-speed sewing-machines having a horizontal rear driving-shaft, a vertically and horizontally movable presser, a rocking shaft together with a cam-and-lever mechanism situated between the driving-shaft and the presser, the combination of the said driving-shaft with a vertically and horizontally movable presser, means for imparting to it a vertical motion, a grooved cam adapted to receive continuous rotary motion from the driving-shaft, a rocking shaft situated between the presser and the driving-shaft and adapted to turn in bearings secured to the machine-frame, and adjustable lever mechanism adapted to transmit motion from the grooved cam to the rocking shaft and from the rocking shaft to the presser both forward and backward at an adjustable rate of transmission, without the aid of a spring, substantially as described and for the purpose specified.

2. In top-feed mechanism of high-speed sewing-machines having a horizontal rear driving-shaft, a vertically and horizontally movable presser, a rocking shaft together with a cam-and-lever mechanism situated between the driving-shaft and the presser, the combination of the driving-shaft, rocking shaft and presser, with means for imparting to the presser a vertical motion, a grooved cam adapted to receive continuous rotary motion from the driving-shaft, a one-armed lever mounted on the rear end of the rocking shaft, a two-armed lever adapted to receive motion from the grooved cam at one end, and to transmit it to the said rear lever at the other end by means of an adjustable pin and a slot adapted to vary the rate of transmission, and a one-armed lever mounted on the front end of the rocking shaft and connected with the presser by means of a pin and slot, adapted to produce the forward and backward motion of the same, substantially as described and for the purpose specified.

3. In top-feed mechanism of high-speed sewing-machines having a horizontal rear driving-shaft, a vertically and horizontally movable presser, and a rocking shaft together with cam-and-lever mechanism situated between the driving-shaft and the presser, the combination of the driving-shaft e, rocking shaft h and presser a, with means for imparting to the presser a vertical motion, a grooved cam c geared together with the driving-shaft, a slotted lever g mounted on the rear end of the rocking shaft, a lever f having on one arm a roller running in the groove of the cam c and on the other arm an adjustable block f connected with the slotted lever g, and a lever i mounted on the front end of the rocking shaft h and connected with the presser by means of a pin i' and a slot a^2, substantially as described and for the purpose specified.

In witness whereof we have hereunto set our hands in the presence of two subscribing witnesses.

JOHN ARTHUR BATCHELOR.
FRANCIS ERNEST HALL.

Witnesses:
J. WETTER,
GEO. BENSON.