

No. 645,924.

Patented Mar. 20, 1900.

J. E. TUTTLE.
KNITTING MACHINE.

(Application filed Jan. 25, 1898.)

(No Model.)

3 Sheets—Sheet 2.

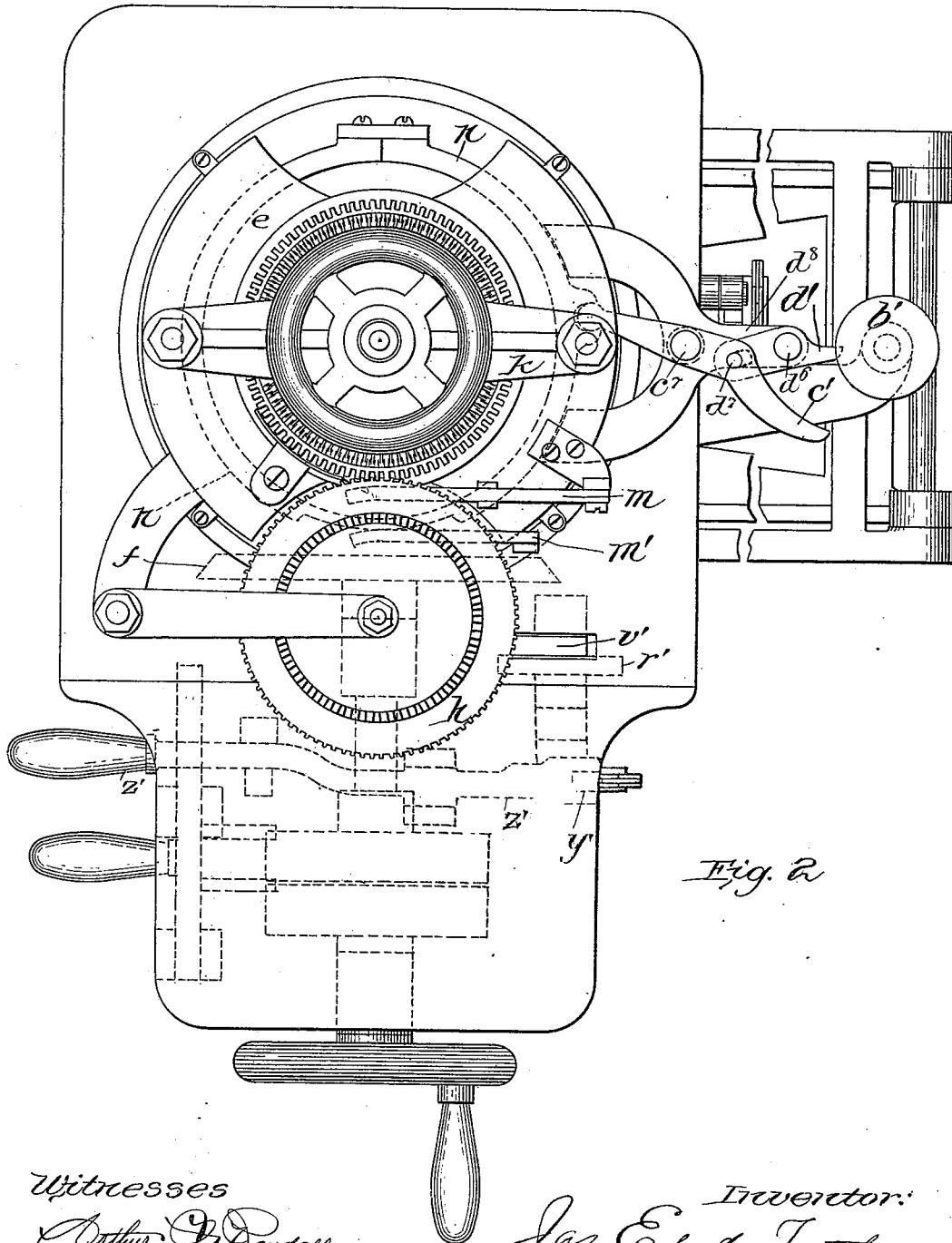


Fig. 2

Witnesses

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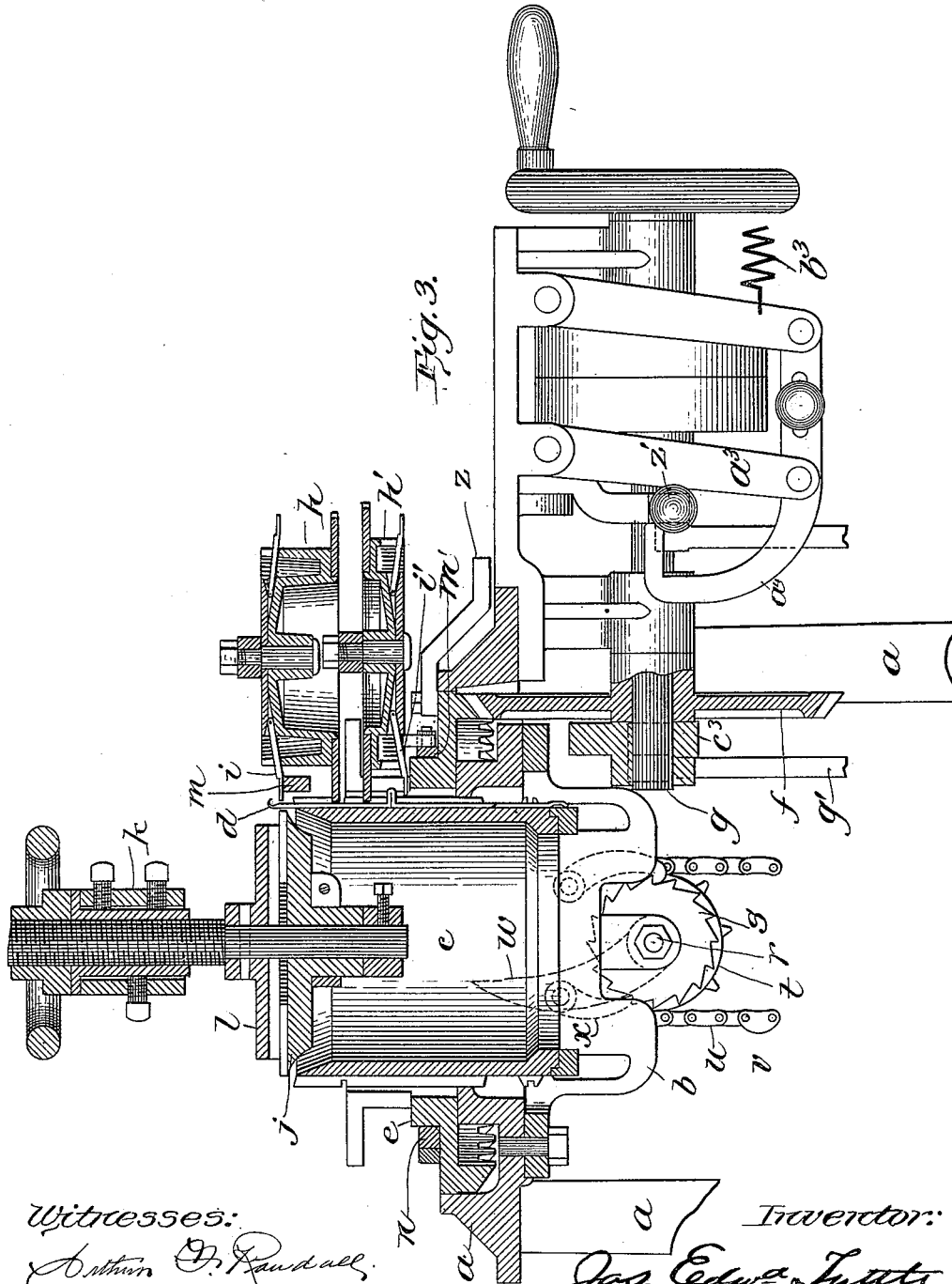
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UNITED STATES PATENT OFFICE.

JAMES EDWARD TUTTLE, OF MELROSE, MASSACHUSETTS, ASSIGNOR TO
CHARLES F. MURPHY, OF BOSTON, MASSACHUSETTS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 645,924, dated March 20, 1900.

Application filed January 25, 1898. Serial No. 667,931. (No model.)

To all whom it may concern:

Be it known that I, JAMES EDWARD TUTTLE, of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a description sufficiently full, clear, and exact to enable those skilled in the art to which it appertains or with which it is most nearly connected to make and use the same.

This invention has relation generally to knitting-machines of the so-called "circular" type, and particular features of my said invention have respect to that class of circular machines designed to knit figured fabrics by the employment of a plurality of sets of knitting-cams, various colored yarns, and the operation of the needles in a predetermined order. A kind of machine just described is shown in the patent granted to Charles F. Murphy on the petition of F. H. Moon, No. 594,353, dated November 23, 1897, and reference may be had thereto, if need be, for information as to the construction and operation of the machine beyond the parts concerned in these improvements.

It is the object of this invention to provide improved means for effecting the raising and lowering of the cam-levers, which in the revolution of the cam-cylinder raise the pickers, which in turn raise the needles out of the path of the needle-operating cams.

This invention consists in the attainment of these ends by the improvements hereinafter described in a general way and then more particularly pointed out in the claims.

Reference is to be had to the annexed drawings and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a front elevation of a knitting-machine equipped with my improvements. Fig. 2 is a plan view thereof. Fig. 3 is a vertical central sectional view taken on a line running parallel with the driving-shaft and showing some parts in elevation.

In the drawings, *a* designates the frame of the machine, upon or in which, by means of hangers *b*, the stationary tricked needle-cylinder *c* is supported. In the tricks or grooves

of the needle-cylinder the needles *d* are reciprocated in the usual way by knitting-cams, (not shown,) with which the cam-cylinder *e* is equipped. The cam-cylinder is arranged to be revolved around the needle-cylinder, movement being imparted to it by the gear *f* on the driving-shaft *g*.

h h' designate picker disks or plates provided on their peripheries with gear-teeth which engage the tricks of the needle-cylinder, and as the said picker-disks are supported from the cam-cylinder as the latter revolves around the needle-cylinder it will carry the disks with it, and the latter will, in addition, be turned on their own axes. The disks are provided with pickers *i i'*, hinged at their inner ends to their respective disks, the pickers *i* when raised being adapted to engage the hooks of the needles, while the pickers *i'* under like circumstances are adapted to engage the heels of the needles.

The machine may also be equipped with a dial *j*, supported by the yoke *k*, a dial cam-plate *l*, and dial-needles. (Not shown.)

m m' are cam-levers pivoted at their outer ends upon the machine and extend inward, so that their free ends may respectively project under the outer free ends of the pickers *i i'* at the point where the pickers are adapted to act upon the needles.

n is an annularly-movable ring provided on its upper face with a cam *o* and having a pin *q*, carrying an antifriction-roller projecting horizontally from its side or periphery. A rod *p*, suitably supported in vertical position and pivoted at its upper end to the cam-lever *m* and resting at its lower end upon the cam-ring *n* near the cam *o*, is adapted when the cam-ring is moved to have the said cam *o* passed under its foot, so as to raise it and the cam-lever *m*, and when the ring *n* is moved back again the cam *o* will pass from under the foot of the rod *p*, allowing the cam-lever *m* to fall or drop down. The cam-lever *m'* is provided at its free end with an inverted-V-shaped notch in its under side, which notch in the normal position of the ring *n* strides the antifriction-roll on the pin *q*, so that the shifting of the ring *n* to and fro will raise and lower the free end of the cam-lever *m'* as it would the cam-lever *m*, as just described. It will now be

seen that when the cam-levers are raised they will be in operative position, so as to raise the pickers, which may be brought into contact with the inclined cams on the free ends of the levers, and when the said cam-levers are lowered their cams will be rendered inoperative with respect to the pickers, all as will be clearly understood without further description and all as is shown in the patent hereinbefore referred to. It is to be noted, however, that the cam-ring *n* is not itself raised, but is provided with means for raising the cam-levers by a slight annular or revoluble movement of the cam-ring.

The means for imparting a partial revoluble movement to the cam-ring will next be described. Upon a stud *r*, secured to the frame, is fixed a ratchet-wheel *s*, with which there is compounded or secured a sprocket-wheel *t*, over which runs a sprocket-chain *u*, said sprocket-chain being provided at intervals with high or swell links *v*. Turning upon the stud *r* is an upwardly-projecting lever or finger *w*, provided with a pawl *x*, which pawl engages the ratchet-wheels *s*, so that when the said ratchet-wheel has a step-by-step movement imparted to it a like movement will be imparted to the chain *u*, running thereover.

The finger *w* extends upward into the path of movement of the projecting arm *z*, fixed to the revolving ring *e*, so that at each revolution of the cam-cylinder the arm *z* will strike the outer end of the finger *w* and move it forward, causing its carried pawl *x* to give the step-by-step movement to the ratchet-wheel *s*, as hereinbefore mentioned. The finger *w* may be moved back by the action thereon of a suitably-arranged spring. (Not shown.)

When a raised link *v* reaches the top of the sprocket-wheel *t*, it will ride under a lever *a'*, which extends under the lower end of the journal-pin of a roll *b'*, seated in a support connected with the frame of the machine, and said roll or disk will be raised, so as to come in the path of the end of a lever *c'*, moving it on its fulcrum *c'* and moving the ring *n*, so as to bring the cam *o* and the antifriction-roll on the pin *q* under the levers *m* and *m'*, respectively, with the result of raising them into operative position. After the raised link *v* shall have passed from under the support of the roll *b'* the said roll will drop into position to be struck by the outer end of the lever *d'*, fulcrumed at its middle, as at *d'*, on a support connected with the cam-cylinder *e* and loosely pivoted at its inner end, as at *d'*, to the outer arm of the lever *c'*, as shown, and thus move the lever *c'* in the opposite direction, effecting the movement of the ring, so as to allow the cam-levers *m* and *m'* to drop into inoperative position.

The inner end of the cam-lever *c'* has a loose connection with the ring *n*, so that by shifting it to and fro it will impart a like movement to the said cam-ring *n*, and the cam-lever *d'* is pivoted upon an independent

part *d'* and to the lever *c'*, so that when the outer end of the lever *d'* is moved in the same direction as the outer end of the lever *c'* was previously moved the lever *c'* will as a whole be operated in a contrary direction from that it would be if it were itself struck directly by the roller-disk *b'*, as before described. The lever *d'* is provided with a short slot at its point of connection with the lever *c'*, so that the pivot-pin *d'* may be allowed slight play to render the parts operative, as will be readily understood without further description.

The take-up and stopping mechanism (which, however, forms no part of this invention, but is made the subject of a separate application by me for a patent) will next be described.

e' e'' indicate take-up rolls for the fabric, which rolls are supported in suitable bearings below the needle-cylinder and in a suitable frame, which has a loose connection through the slot *f'* in the rod or bar *g'* with the machine. The roll *e'* is pressed toward the roll *e'* by means of a spring *h'*, acting upon the journal-box of said roll *e''*. The fabric as it is produced descends and is taken up between the rolls *e' e''*, and the latter are rotated step by step by means of a pawl *i''*, acting upon a ratchet-wheel *j'*, secured to the journal of the roll *e'*. *e'* designates an arm upon which a weight may be hung for keeping the knitted fabric under the required tension. The said pawl *i''* is pivoted upon a small take-up frame *k'*, having a loose connection at the lower end of a pendulous lever *l'*, pivoted at *m''*—that is to say, the support *k'* for the pawl *i''* is sustained in the pendulous lever *l'* by means of a block *n'*, extending through a slot in the lower end of the pendulous lever, so that a uniform tension may be kept upon the fabric. When the fabric becomes quite tight, the block *n'* will rise in the slot of the lever until the tailpiece *o'* of the pawl *i''* will strike the lower end of the set-screw *p'*, and so raise the operative end of the pawl out of engagement with the ratchet-wheel *j'* and stop the operation of the pawl and ratchet on the take-up rolls until the fabric becomes more slack.

Upon a stud *q'*, connected with the frame of the machine, is a ratchet-wheel *r'*, compounded with a sprocket-wheel *s'*, over which sprocket-wheel runs a chain *t'*, having at intervals raised links *u'*. A lever or finger *v'*, extending up from the shaft *q'*, carries a pawl *w'*, which takes into the teeth of the ratchet-wheel *r'* and moves it one step at each revolution of the cam-cylinder by the arm *z* coming in contact with the upper end of said lever *v'*. The finger or lever *v'* may be returned by a suitably-arranged spring. (Not shown.)

When a raised link *u'* reaches the top of the ratchet-wheel *r'*, it comes in contact with a roller *y'* on the inner end of a lever *z'*, raising said lever and allowing the belt-shipping device *a'* to be drawn by the spring *l'* onto

the loose pulley, (see Fig. 3,) and so ship the belt and stop the machine. This construction is arranged for automatically stopping the machine at a predetermined time, the construction being such that in addition to this the machine may be stopped when the thread breaks and the fabric runs off the needles of the machine, it being understood that the frame supporting the take-up rolls is held up by the tension on the fabric. It will become clear that when the fabric runs off the needles the frame will drop. Now it is so arranged that when this is done the frame will drop and draw down the rod g' , releasing the lever z' , with which the frame is pivotally connected, with the same effect and operation as when the machine was stopped automatically by the chain-link u' coming under the outer end of the lever z' .

It should have been stated that a cam or wiper c^3 on the driving-shaft of the machine acts against a roller d^3 on the upper end of the pendulous lever and so effects the swinging of said lever to operate the ratchet-wheel j' , as before described.

The belt-shipping device a^3 as it is shown in Fig. 3 is in position to maintain the belt on the fast pulley. The said shipping device is held in this position by the end of the hook extension a^4 being caught against the inner side of the outer arm of the lever z' . When the outer end of the said lever is depressed either by hand or by raising its inner end, as hereinbefore described, the hooked extension a^4 will be disengaged from the lever and the spring b^3 will operate to move the shipper and ship the belt from the fast to the loose pulley.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all the forms in which it may be made or all the modes of its use, it is declared that what is claimed is—

1. The combination, with the cam-cylinder, needle-cylinder and needles, of a picker-dial toothed on its periphery to engage the needle-cylinder and to be rotated thereby, swinging pickers carried by the picker-dial to engage the needles and raise them, movable cams adapted to be raised into and lowered out of operative position with respect to said pickers, a revoluble ring n , and operative connections between the same and the movable cams to raise the latter without raising the ring.

2. The combination, with the cam-cylinder, needle-cylinder and needles, of a picker-dial toothed on its periphery to engage the needle-cylinder and to be rotated thereby, swinging pickers carried by the picker-dial to engage the needles and raise them, movable cams adapted to be raised into and lowered out of operative position with respect to said pickers, a revoluble ring n , operative connections between the same and the movable cams to raise the latter without raising the ring, a shifting lever loosely connected at one end with the ring, and automatically-operated means at the other end of the lever to shift it at predetermined times.

3. The combination, with the picker-dial and its pickers, revoluble ring n provided with the cam o and antifriction-roller q , cams m m' , arranged in relationship to the said cam and antifriction-roller to adapt them to be acted upon thereby to raise the pickers and operative connections between the cams m m' and the cam o and antifriction-roller q on the ring.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of January, A. D. 1898.

JAMES EDWARD TUTTLE.

Witnesses:

ARTHUR W. CROSSLEY,
A. J. DAILEY.