(No Model.)

J. M. STEVENS.

AUTOMATIC STOP MOTION FOR KNITTING MACHINES.

No. 413,741. Patented Oct. 29, 1889.

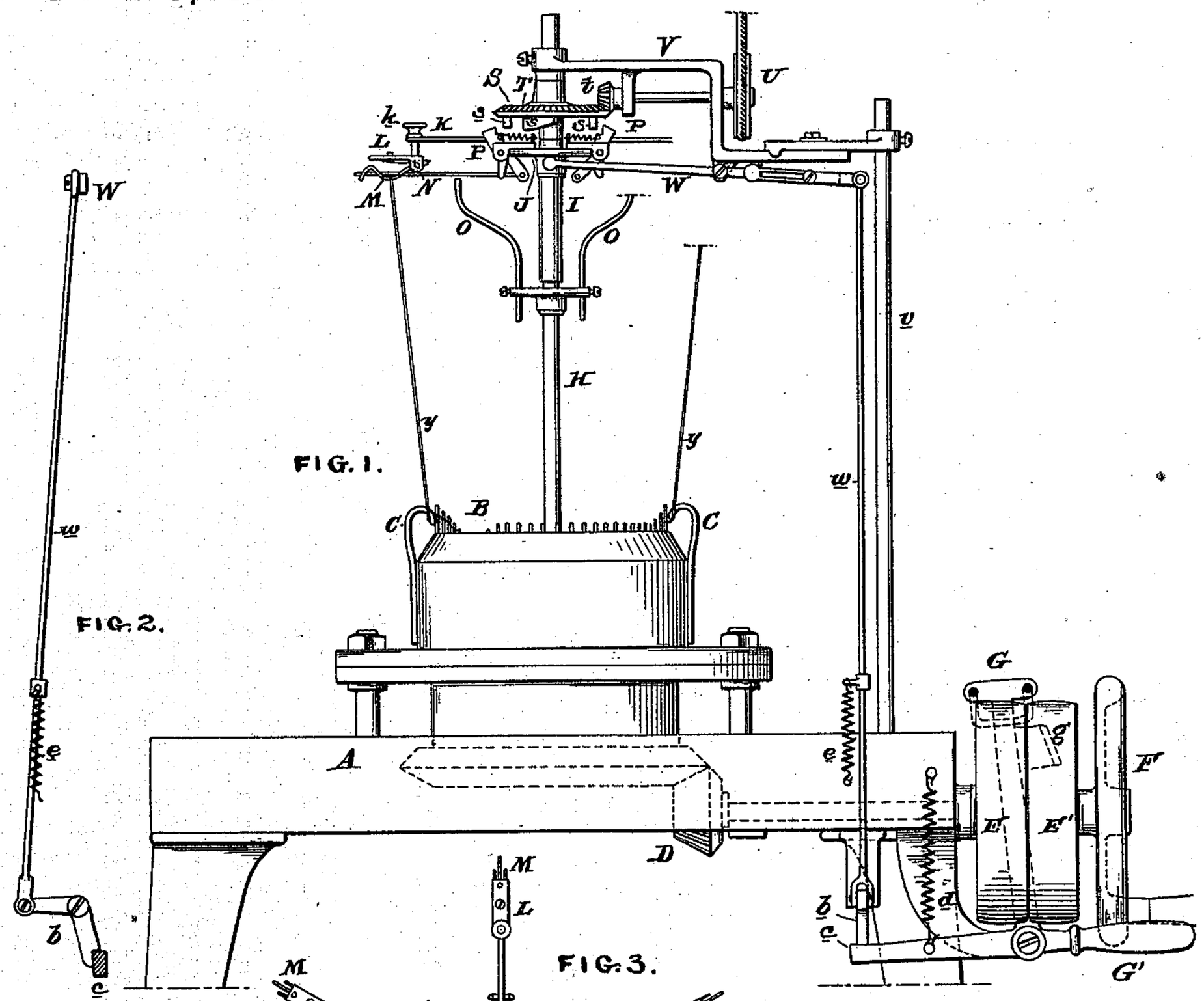

FIG. 1.

FIG. 2.

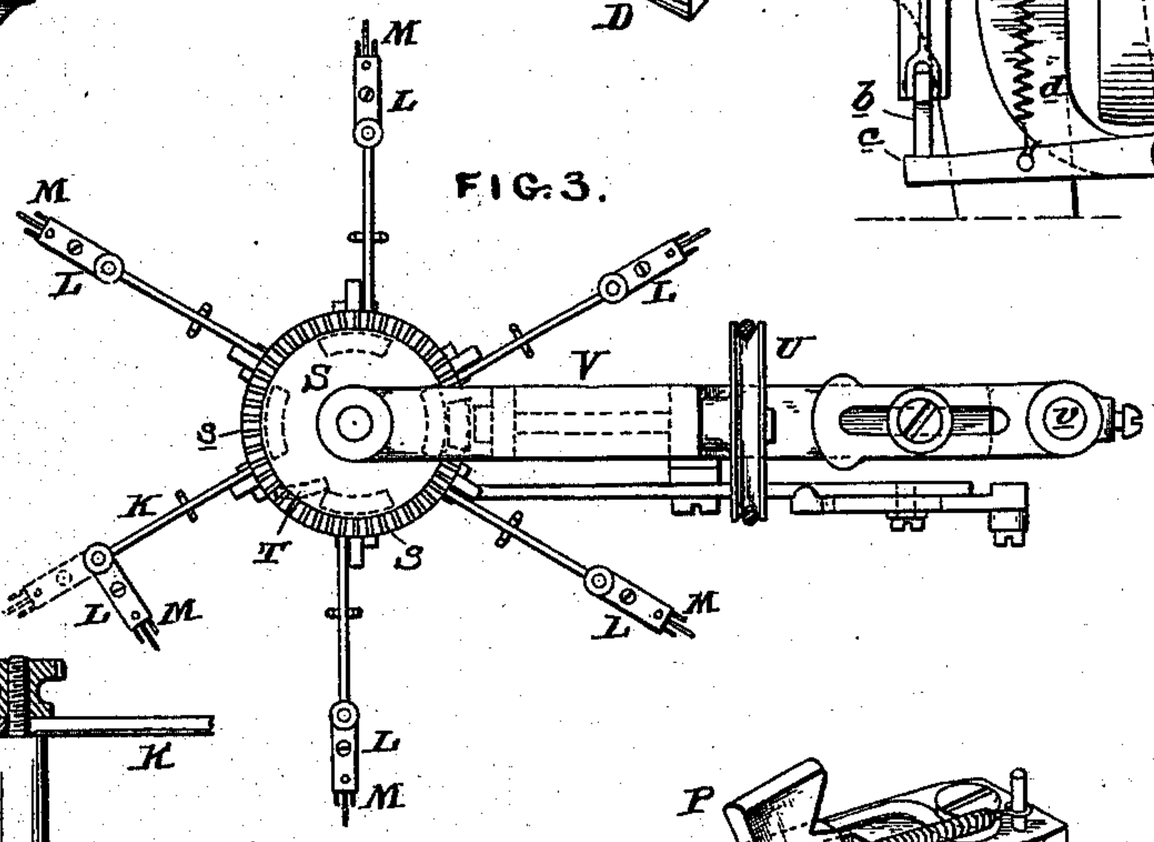

FIG. 3.

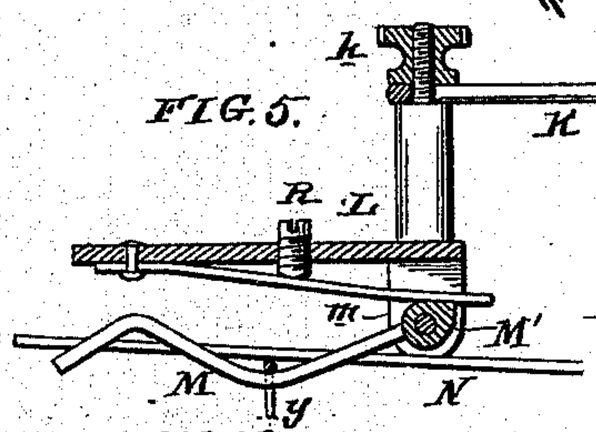

FIG. 5.

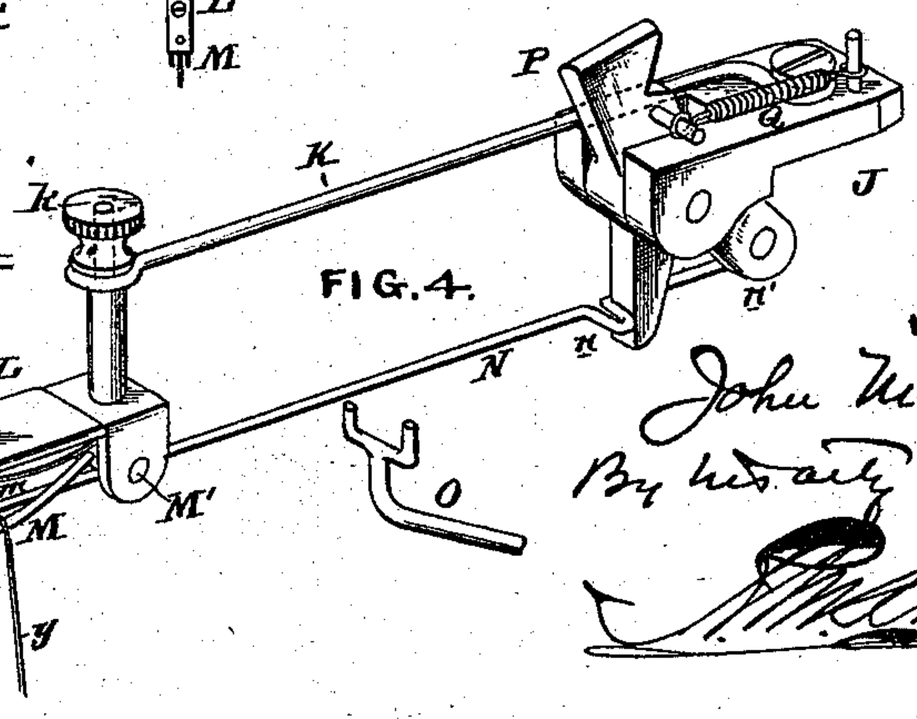

FIG. 4.

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AUTOMATIC STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 413,741, dated October 29, 1889.

Application filed May 22, 1889. Serial No. 311,672. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. STEVENS, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Automatic Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention has reference to automatic stop-motions for knitting-machines; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

My invention is designed to automatically stop the rotation of the needle-head and other parts of the machine if one or more threads leading to the needles should become broken.

In carrying out my invention I provide the machine with a standard, upon the upper part of which is a vertically-movable sleeve, from which radiate the thread-guides of the stop-motion. These thread-guides are formed with pivoted parts, which may be pulled down to liberate the thread without breaking it in case of a binding or the presence of a knot, and also with pivoted arms, which control the position of certain pivoted lever-pieces on the sleeve. Working in connection with the pivoted lever-pieces is a continually-rotating head having cam-surfaces for depressing the said pivoted pieces and the sleeve when they are thrown into the path of the cam-surfaces by the action of the thread in the guide. This rotating head has also a cam for resetting the pivoted pieces if the thread is in position. A lever is operated by this thread, and this in turn actuates a trip and applies the shifter and brake to stop the machine.

In the drawings, Figure 1 is an elevation of a knitting-machine embodying my invention. Fig. 2 is a detail view of the trip to apply the brake. Fig. 3 is a plan view of the stop-motion device. Fig. 4 is a perspective view of one of the thread-guides of the stop-motion mechanism, and Fig. 5 is a section through the thread-guide of the stop-motion mechanism.

A is the main frame of the machine.

B is the needle-head, and C are the usual thread-guides therefor.

D is the gearing for driving the needle-head from the belt-pulley E.

E′ is the loose or idler pulley.

F is a hand-wheel for operating the machine by hand when desired.

G is a pivoted lever belt-shifter device for shifting the belt from pulley E to E′, and vice versa, and forms also a brake-shoe *g* for working against the face of the wheel F to quickly arrest the momentum of the machine when the stop-motion has operated. The brake is applied simultaneously with shifting the belt from the power-pulley E to the idler-pulley E′. The belt-shifter is moved to shift the belt by a spring *d*.

H is a standard extending upwardly concentric with the machine, and may be centrally located, or thereabout, with the needle-head. This standard is provided at the top with the stop-motion device, and is supported by the frame V and rod *v*, or in any other convenient manner.

I is a sleeve supported near the top of standard H, and is vertically movable and operates a lever W, connecting with a rod *w*, which at its bottom actuates a pivoted trip *b*, shaped to lock the inner end *c* of the shifting-lever G against the action of the spring *d*. The sleeve I is provided with a flange J, to which the parts shown in Fig. 4 are secured and from which they radiate, Fig. 3.

Extending out laterally are the arms K, to which are adjustably secured the thread-guide frames L by nuts *k*. The frame L is provided with the pivoted guides M, curved to support the thread and pivoted at M′. These guides M are each held up in position by the spring *m*, which is adjusted as to tension by a screw R. The spring *m* acts upon a rear extension of the guide M, (see Fig. 5,) and this holds the outward or free end up into the position shown.

N is a vertically-movable arm pivoted at *n*′ to the frame or sleeve indirectly, and is provided with a catch *n* to lock the pivoted lever-piece P. The outer or free end of the arm N extends between the fingers of the guide M (see Fig. 4) and is held up by the thread *y*.

O are the vertically-adjustable supports for supporting the pivoted arms N when the thread has become broken, and are carried by the standard H.

P are pivoted lever-pieces, and have their lower extensions adapted to lock back of the catches *n* of the arms N. These lever-pieces

P are pivoted to the frame or flange of the sleeve I and are pulled at the top toward the standard by springs Q. If the arm N drops down, the spring pulls the top of the pivoted lever-pieces P over, so as to come into contact with the rotating cam-surfaces *s* on the under surface of the rotating gear S. This wheel S is concentric with the sleeve I and standard, and is rotated by a pinion *t*, in turn rotated by a wheel V, or in any other suitable manner. In addition to the cam-surfaces *s*, which act only on the tops of the pivoted lever-pieces P, there is a cam T, which acts upon the inner faces of the said lever parts *p* and rocks them sufficiently to push the lower ends back of the catch *n* of the arm N.

The operation will now be understood. The machine being put into operation, the parts are in the positions shown. The threads *y*, passing over the guides M, hold up the arms N, and thereby lock the lever-pieces P out of reach of the rotating cam parts *s* T of the wheels S. If now the thread of any guide should break, the arm N would fall and rest on the support O. This releases the pivoted lever P, and the spring Q pulls its upper part into the path of the rotating cam-surfaces *s*, which instantly act upon its upper edge and force the sleeve down. This action through the lever W and rod *w* trips the catch *b* and releases the shifting-lever G, and its spring *d* immediately shifts it, throwing the belt from the power-pulley E to the idler-pulley E′, and simultaneously applies the brake *g* to the hand-wheel F. This instantly stops the rotation of the needle-head B. If instead of the thread breaking it is simply caught, then the tension on the thread would pull down the guide M against the action of the spring *m* and release the arm N, with the same effect as before. As soon as the pivoted lever-piece P is drawn in and the sleeve shifted, the cam T strikes the inner face of the piece P and throws it out again, and when the thread has been once more placed in the guide M under the arm N the piece P is automatically locked out of further reach of the cam parts *s* T, and the continued rotation of the wheel S is without effect. By putting a number of cam-surfaces *s* on the wheel S the mechanism is quick to respond to stop the machine.

The sleeve and its appendages may be counterbalanced by the rod *w* and the lever-connections, or a spring *e* may be employed to hold the said sleeve and its thread-guides up to an operative position with respect to the cam-wheel. Any number of thread-guides L may be employed to suit the number of thread-guides *c* of the needle-head, and they may be adjusted at an angle to the rod K, if desired, as shown in Fig. 3; but in this case the arm or lever M is bent to correspond.

I do not limit myself to the mere details of construction, as they may be modified in various ways without departing from the spirit of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a knitting-machine, the combination of the needle-head and power mechanism for operating it, a brake-wheel on the power-shaft, having a brake-surface rotating in the plane of the wheel, a brake therefor adapted to press laterally against the surface of said brake-wheel, a spring to apply said brake, thread-guides for guiding the thread to the needle-head, a rotating part provided with a projection, a movable part controlled by the thread and normally held out of the path of the projection of the rotating part, and intermediate lever mechanism between the brake and movable part for releasing the brake when the projection of the rotating part acts upon and moves the movable part.

2. In a knitting-machine, the combination of the needle-head and power mechanism for operating it, a brake-wheel, a brake therefor, and automatic stop-motion mechanism controlled by the thread leading to the knitting-head to apply the brake in case the said thread should break or have too high a tension put upon it, said stop-motion mechanism consisting of a power cam-wheel continually rotating, a pivoted thread-supporting guide and arm, a pivoted lever controlled by said arm, a spring to move it in the path of the cam-wheel when released by the pivoted arm, and trip mechanism controlled by the movement of the pivoted lever when acted on by the cam-wheel to apply the brake.

3. In a knitting-machine, a needle-head and power mechanism to operate it, having a belt-shifter to stop the machine, in combination with an automatic stop-motion mechanism consisting of a rotating cam-wheel, a thread-guide having a pivoted arm supported by the thread passing through the guide, a vertically-movable frame or sleeve, a pivoted lever held by said arm away from the path of the cams on the cam-wheel, a spring to pull said lever into the path of the cams when the arm should be liberated from the thread, and trip devices for controlling the belt-shifter actuated by the movable frame or sleeve.

4. In a knitting-machine, a needle-head and power mechanism to operate it, having a belt-shifter to stop the machine, in combination with an automatic stop-motion mechanism consisting of a rotating cam-wheel having stop-motion cams and a resetting-cam, a thread-guide having a pivoted arm supported by the thread passing through the guide, a vertically-movable frame or sleeve, a pivoted lever held by said arm away from the path of the stop-motion cams on the cam-wheel, a spring to pull said lever into the path of the cams when the arm should be liberated from the thread, and trip devices for controlling the belt-shifter actuated by the movable frame or sleeve, and in which the continued rotation of the cam-wheel will by its resetting-cams automatically reset said pivoted le-

ver back of the catch of the pivoted arm when the thread is readjusted in the thread-guide.

5. In a stop-motion mechanism, the thread-guide consisting of the frame L, having the two pivoted fingers or guides M, the spring *m*, to hold said fingers up against normal tensions of the thread, and the pivoted locking-arm N, arranged in a space between the pivoted fingers and supported by the thread passing over said fingers.

6. In a stop-motion mechanism, the thread-guide consisting of the frame L, having the two pivoted fingers or guides M, the spring *m*, to hold said fingers up against normal tensions of the thread, the adjusting-screw R, to vary the tension of the thread, and the pivoted locking-arm N, arranged in a space between the pivoted fingers and supported by the thread passing over said fingers.

7. In a stop-motion mechanism, the thread-guide consisting of the frame L, having the two pivoted fingers or guides M, the spring *m*, to hold said fingers up against normal tensions of the thread, the pivoted locking-arm N, arranged in a space between the pivoted fingers and supported by the thread passing over said fingers, the supporting-arm K, an adjustable connection between the frame L and said arm, and a support for the locking-arm N and the supporting-arm K.

8. The combination of a knitting-machine, a standard H, a vertically-movable frame or sleeve I, having arms K extending therefrom, thread-guides secured to the ends of said arms, a rotating cam-wheel S, having cams *s* T, pivoted levers P, carried by the sleeve, springs whereby said levers P are pulled into position to be acted on by the said cams, a pivoted arm supported by the thread passing through the thread-guide and adapted to lock the pivoted levers P away from the path of the cams, and mechanism to stop the motion of the knitting-machine actuated by the sleeve or movable frame.

9. In a stop-motion for a knitting-machine, the combination of a standard, a stop-motion sleeve or frame capable of vertical movement, a rotating cam-wheel journaled on the standard, one or more radiating thread-guides about said standard, spring-actuated levers actuated by the cam-wheel to move the sleeve or frame, and latches controlled by the threads in the thread-guides to normally hold the levers out of the path of the cams on the cam-wheel.

10. In a knitting-machine, the combination of the needle-head with a series of thread-guides arranged about said head, a stop-motion mechanism arranged above and substantially central with respect to the needle-head and having a series of radiating thread-guide arms provided with thread-guides adjustable upon their arms about a vertical axis and arranged substantially above the thread-guides for the needle-head, mechanism to stop the motion of the knitting-machine, and means, substantially as shown, centrally located with respect to said radiating thread-guides and controlled thereby to operate said mechanism to stop the knitting-machine.

In testimony of which invention I have hereunto set my hand.

JOHN M. STEVENS.

Witnesses:
R. M. HUNTER,
ERNEST HOWARD HUNTER.