W. PEARSON.

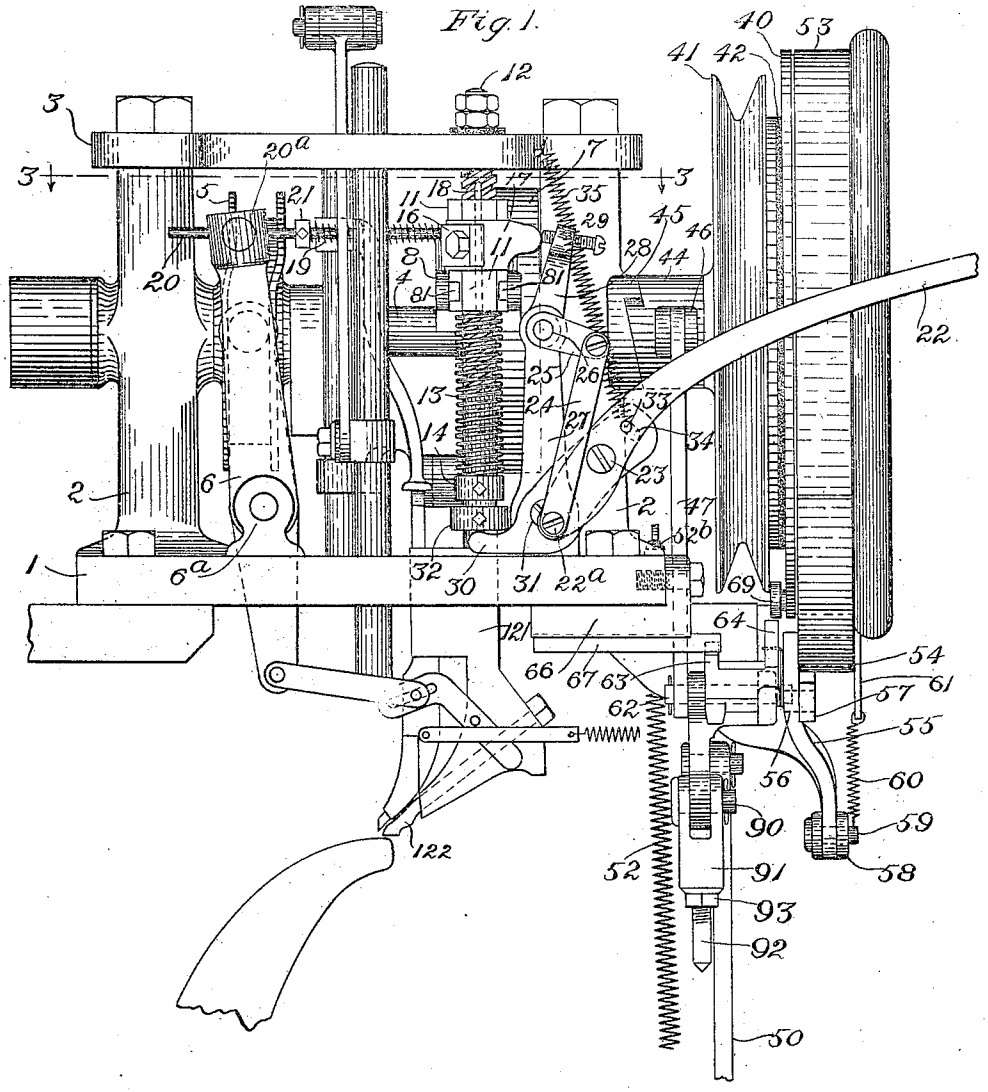
SEWING MACHINE.

APPLICATION FILED JUNE 29, 1914.

1,375,415. **Patented Apr. 19, 1921.**

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

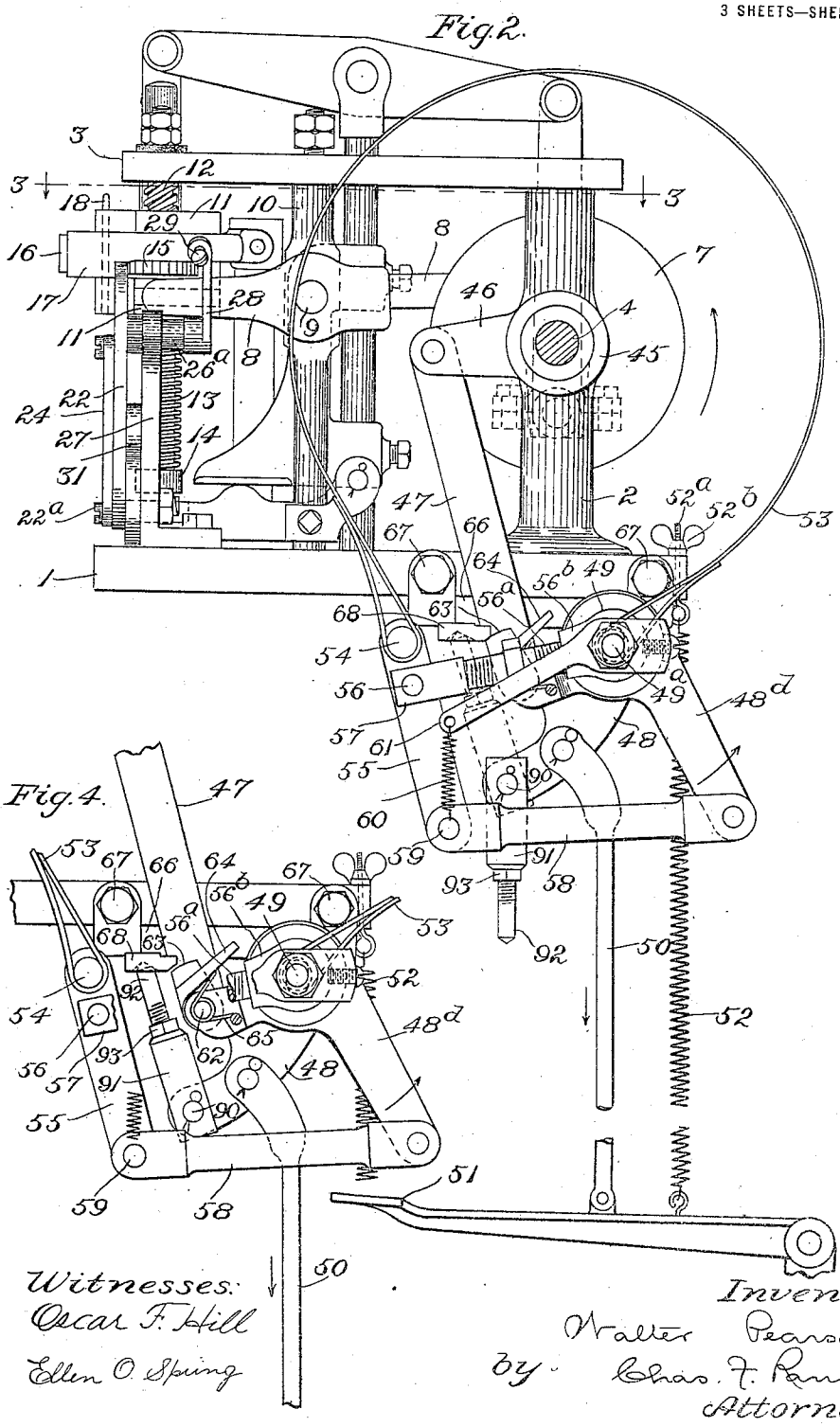


Fig. 4.

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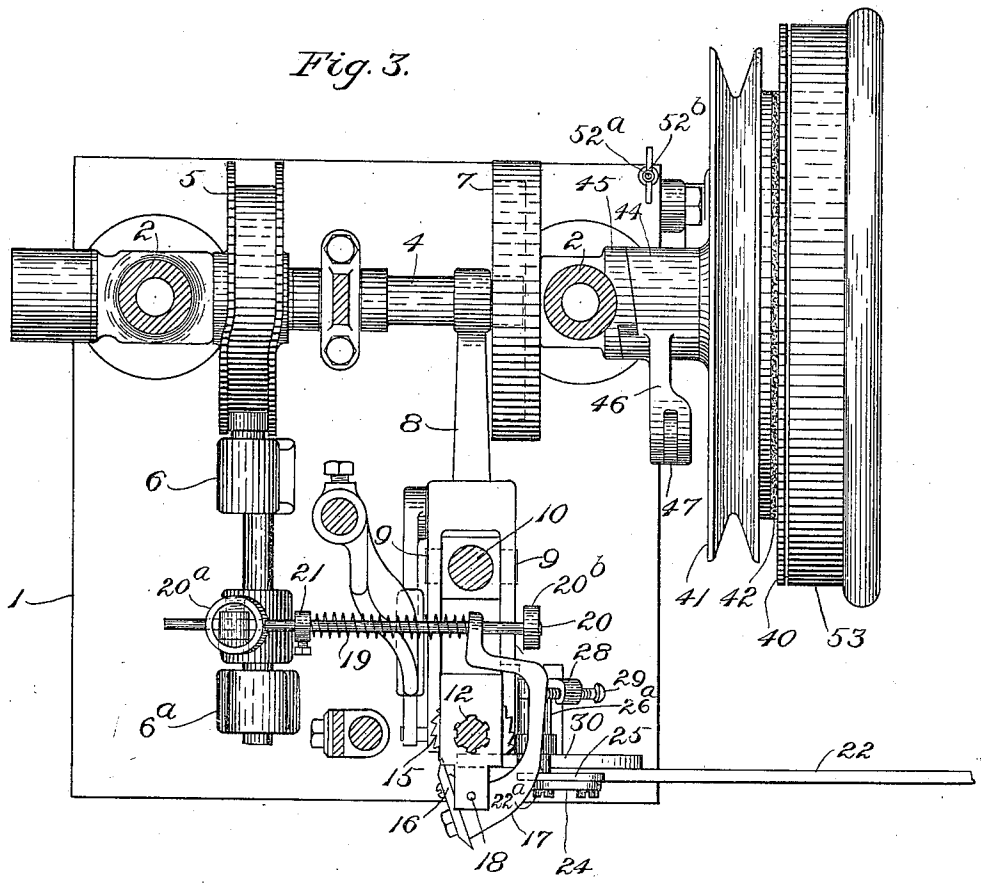
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER PEARSON, OF WHITMAN, MASSACHUSETTS.

SEWING-MACHINE.

1,375,415. Specification of Letters Patent. Patented Apr. 19, 1921.

Application filed June 29, 1914. Serial No. 847,865.

To all whom it may concern:

Be it known that I, WALTER PEARSON, a citizen of the United States, residing at Whitman, in the county of Plymouth, State of Massachusetts, have invented a certain new and useful Improvement in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The features of the invention are especially useful in machines for sewing shoes, but they are not restricted to employment in sewing machines for that particular class of work.

The invention has relation to devices for driving a sewing machine and for enabling the operator to vary the speed thereof; and to means for stopping the machine at the will of the operator with the parts in a predetermined position, as for instance upon the completion of a given stitch with the needle out of the work, without slack or jar and resulting injury to the machine.

The devices which, in carrying the invention into effect, I employ for driving a sewing machine and for enabling the operator to vary the speed thereof, are contrived to enable the machine to be run at the will of the operator at any desired rate of speed between the minimum and the maximum of the range for which the said devices are adapted, and also are contrived to permit the speed to be varied at will while the machine is in operation. The said devices enable the operator, if he is skilful, to adopt a higher rate of speed; if he is not so competent and must take a lower speed, they enable him to select such speed as he can take care of to the best advantage. This is preferable to having simply two predetermined speeds, namely a high speed and a relatively low speed without intermediate variation, for there frequently is necessity for a greater range of speed than thereby is given; that is to say, an intermediate speed sometimes is more suitable for the work in hand.

The said devices also enable the operator to vary the speed at will during the running of the machine to suit the varying character and difficulty of different portions of the article being stitched. Thereby, for instance, he is enabled to cause the machine to run at a higher rate of speed in sewing along the sides of a shoe and in the shank thereof, and at a lower rate in sewing around the toe, and in addition, in sewing either portion of the work, to suit the speed to his own skill and capacity, or to the character of the work and the conditions under which the sewing is being performed.

The invention will be explained as applied to a sewing machine of the well-known McKay type.

In the drawings,—

Figure 1 shows in front elevation certain portions of a sewing machine of the McKay type, with embodiments of the different features of the invention applied thereto.

Fig. 2 is a side elevation of certain of the parts of Fig. 1, the wheel 40 and band-pulley 41 being omitted.

Fig. 3, Sheet 3, is a view in horizontal section in the plane indicated by dotted lines 3, 3, in Figs. 1 and 2.

Fig. 4, Sheet 2, is a view showing certain of the operating devices for the clutch and brake, and represents them as locked so as to permit the machine to be turned by hand.

Having reference to the drawings,—

The bed-plate of the stitch-forming mechanism is shown at 1, and at 2, 2, are represented posts rising therefrom and supporting the top-plate 3. At 4 is the operating shaft, it being mounted in bearings in the said posts 2, 2, and having fixed thereon the cam 5 for actuating the feed-rocker 6, and the cam 7 for actuating the presser-lifting lever 8. The feed-rocker 6 is mounted in bearings upon the bed-plate, one thereof being shown at 6^a, Figs. 1 and 3. The presser-lifting mechanism is, in general, of known character, and may be briefly described as follows: The lever 8 is mounted upon pivots 9, 9, Figs. 2 and 3, in connection with the supporting post 10 having capacity for a limited amount of vertical movement, and its forked front-end is provided with pins or projections 81, Fig. 1, working in horizontal grooves extending from front to rear in the opposite sides of the ratchet-nut block 11. The said block fits loosely upon the exterior of the screw-threaded upper portion of the presser-bar 12, the said presser-bar having the presser-stock 121 carrying the presser 122. An expanding spiral spring 13 is confined between the under side of the said block and a collar 14 which is made fast upon the lower portion of the presser-bar. Spring 13 is the presser-depressing spring, it acting expansively upon the said collar 14 with a tendency to force the presser-bar, presser-shank, and

presser downward. The ratchet-nut 15 is mounted upon the said screw-threaded portion of the presser-bar between the upper and lower arms of the block 11, and 16 is the pawl or dog which engages with the ratchet-teeth at the required times to hold the ratchet-nut from turning. The said pawl or dog is carried by the horizontal lever 17, which is pivotally connected by means of a vertical pin 18 with the front end of the block 11, the tail of the said lever being acted upon by the expanding spiral spring 19 tending to swing the lever on its pivot so as to move the dog into engagement with the teeth of the ratchet-nut, and hold it in such engagement. Spring 19 is threaded upon a rod 20 which is connected at one end to a collar 20^a swiveled by a horizontal pivotal connection upon the upper end of an arm of the feed-rocker 6. Thereby said rod is caused to move in unison with the feed-rocker, its other end working in a hole through the tail of the lever 17. The said spring 19 is compressed between the lever 17 and a collar 21 that is made fast upon the rod 20. A collar 20^b is provided upon the portion of rod 19 that projects to the right in Fig. 3 of the tail of lever 17. As thus far described, the construction is as heretofore, and in the operation of the machine the pawl or dog is caused to lock and unlock the ratchet-nut 15 at the required times. The automatic elevation and depression of the presser take place as usual.

The devices for enabling the presser to be manually unlocked and raised comprise a lever 22, which is conveniently arranged to enable it to be operated by the operator. In this instance the lever 22 is designed to be moved by hand to occasion the unlocking and raising of the presser. For the purpose of enabling the unlocking to be effected through movement of the operating lever 22, which is mounted upon the pivot 23, Fig. 1, the lower end of the said lever is connected by means of a pivot 22^a to the lower end of a link 24 having its upper end connected to an arm 25, Figs. 1 and 3, of a small rocker 26, Fig. 1, journaled in a bearing 26^a, Figs. 2 and 3, at the top of a small fixed stand 27. A second arm, 28, of the said rocker is provided with an adjustable contact-screw 29 for engagement with the pawl-carrying lever 17. Movement of the lever 22 operating the rocker to carry the acting end of the contact-screw 29 against the said pawl-carrying lever 17, will cause the said lever 17 to be moved, overcoming the resistance of the spring 19, and will disengage the pawl or dog 16 from the ratchet-nut 15 and thereby unlock the presser.

For the purpose of enabling the presser to be raised through the actuation of the lever 22, following the unlocking of the presser, a presser-lifting lever 30 is mounted upon a pivot 31, Fig. 1, carried by the stand 27, the toe of this lever extending under a collar 32 that is made fast upon the lower portion of the presser-bar 12. This lever 30 carries the pivot 23, so that the lever 22 is mounted pivotally upon lever 30. Lever 22 is movable upon the pivot 23 relative to the carrying lever 30, the extent of the relative movement or play of lever 22 with respect to lever 30 being limited by means of a pin 33 carried by lever 22 and working in a slot 34 (shown in dotted lines in Fig. 1) in the lever 30. A contracting spiral spring 35, (shown only in Fig. 1) having one end thereof connected to the top-plate 3 and the other to the pin 33, acts with a tendency to move lever 22 about the pivot 23 so as to carry the pin 33 into engagement with one end of the slot 34 and also acts through such engagement and the continued movement of lever 22 to operate the lever 30 so as to hold the toe thereof close against the bed-plate 1. The movement of lever 22 under the action of spring 35 draws the arm 28 and contact-screw 29 of the unlocking device outward and away from the pawl-carrying lever 17, so that pawl or dog 16 is permitted to engage the teeth of the ratchet and the final portion of such movement releases the said lever 17. In the position of rest of the two levers 22, 30, the pivot 22^a connecting the lower end of lever 22 to the link 24 is slightly out of line with pivot 31 of lever 30, namely a little below the same, as shown in Fig. 1. Spring 35 is weaker than the presser-spring 13, so that when the outstanding portion of the lever 22 is moved downward by the operator, the spring 35 extends, permitting the said lever 22 at first to move relative to the presser-lifting lever 30, which is held from movement by the tension of the presser-spring 13. This relative movement of lever 22 serves to operate the unlocking device to effect the unlocking of the ratchet-nut. After this unlocking has been effected by the relative movement of one lever with respect to the other, the pin 35 brings up against the other end of the slot 34, and in the further movement of the lever 22 it actuates the lever 30 so that the latter is thereby caused to raise the presser. The length of the slot 34 is such that by the time the pin has reached the lower end of the said slot, the pivot 22^a has come into register with pivot 31. Consequently, during the lifting of the presser the two levers turn conjointly about the pivot 31, without any further inward movement being transmitted to the unlocking device from the lever 22.

The provisions for enabling the machine to be run at a rate of speed controlled by the operator will now be described. Upon the shaft 4 is fixed a wheel 40. This wheel serves as a member of a driving clutch, and also as a fly-wheel and as a brake-wheel.

Alongside the wheel 40 a band-pulley 41 is mounted upon the shaft 4 with capacity to turn thereon. This pulley 41 is rotated in practice by means of a driving-band, not shown, which passes around the same. It serves as one member of a clutch and acts through clutch-engagement with the wheel 40 to rotate the shaft 4. The proximate sides of the two wheels 40 and 41 are faced with frictional material 42, Figs. 1 and 3, to provide for the proper frictional engagement of the two wheels with each other, so that when they are pressed together one thereof in rotating will serve to impart movement of rotation to the other. A clutch-actuating sleeve 44 is mounted upon the shaft 4 between the hub of wheel 41 and a boss 45 upon the adjacent post 2. One end of the said sleeve 44 is formed with a spiral cam, as shown, engaging with a coöperating spiral cam upon the boss 45 of the post 2. The clutch-operating sleeve 44 is capable of turning movement around the shaft 4. In the position of the said sleeve that is represented in Figs. 1 and 3 the lateral recess of the said sleeve is presented to the prominent portion of the cam-hub 45, so that the wheel 41 is permitted to occupy a position slightly separated from the wheel 40, or in which the contacting surfaces are only lightly in contact. For the purpose of causing the wheels 41, 40, to engage with each other so that rotary motion may be communicated from the wheel 41 to the wheel 40 to operate the machine, the clutch-sleeve 44 is to be turned around the shaft 4 so that the turning of the spiral edge of the sleeve relative to that of the hub 45 shall operate to shift the sleeve outward, lengthwise of the shaft 4. By this outward movement of the clutch-sleeve the contacting surface of the wheel 41 is moved into contact with the corresponding surface of the wheel 40, or into more intimate contact therewith, and thereby the driving of wheel 40 and shaft 4 and the machine is brought about. The clutch-sleeve 44 is manually controlled through connections comprising an arm 46 upon the said sleeve, a link 47 having its upper end connected pivotally to the arm 46, and having its lower end connected pivotally to the rocker 48, which is mounted pivotally at 49 upon a fixed support, and a link 50 extending from the rocker 48 to a treadle 51. The treadle 51 is acted upon by a spring 52 tending to hold it normally in such a position that the clutch sleeve 44 shall be retained in the position represented in Figs. 1 and 3, such position of the clutch-sleeve corresponding with the open or inactive clutch. Pressure applied by the operator to the treadle, serving to swing the same so as to turn the clutch-sleeve 44 around the shaft 4 will operate to close the clutch-members together. Relaxation of such pressure will permit spring 52 to operate the treadle and turn the clutch-sleeve reversely so as to reduce the pressure of the pulley 41 against the wheel 40. By moving the treadle more or less the clutch-members will be closed more or less completely together, or in other words will be pressed together with more or less force determined by the extent of the turning movement of the clutch-sleeve relative to the fixed cam-hub 45. If the clutch-members are pressed only lightly together more or less slipping will be permitted to occur so that the shaft 4 will not be rotated at the full speed of the wheel 41 and by varying the degree of the contact-pressure the amount of slip may be caused to vary. Relaxation of the pressure applied by the operator to the treadle will permit spring 52 to operate the treadle to turn the clutch-sleeve reversely so as to reduce the pressure of the pulley 41 against the wheel 40, and lessen the driving effect. It will be perceived that the speed of the machine may be controlled by the operator so as to secure at the will of the operator a comparatively wide range of speed-variation between the maximum speed represented by the speed of rotation of the wheel 41, and the minimum speed which is capable of being communicated to the machine.

To provide for regulation of the promptness with which the spring 52 acts to raise the treadle 51 and operate the clutch-hub 44 reversely to reduce the pressure of the one clutch-member upon the other or effectuate the unclutching and thereby provide for the stopping of the machine, I make provision for adjustment of the tension of the said spring. In the present instance the said provision is made through the employment of a bolt 52^a having the upper end of the spring 52 engaged with the eye at the lower end thereof. The stem of the said bolt passes up through a hole or slot in the bed-plate 1 and above the said bed-plate receives a nut 52^b. By turning this nut in one direction or the other so as to screw it up or down on the stem of the bolt the adjustment of the tension of the spring is effected.

I employ as a part of the stop-motion mechanism, friction-brake devices which comprise in the present instance, a band 53 having one end thereof formed into a loop and engaged with a reduced outward prolongation of the stud 49 upon which rocker 48 is pivotally mounted. The said band 53 extends from the said stud around the periphery of a cylindrical portion of the wheel 40, and a loop at its otherwise free end is engaged with a stud 54 projecting from a brake-band operating lever 55. The said lever 55 is connected by a pivot 56 with the outer portion or member 57 of a strut extending from the said supporting-stud 49, and the longer arm of the said lever

55 is connected by means of a link 58 with an arm 48^d projecting from the rocker 48. The strut aforesaid is loosely hung upon the supporting stud 49 so as to permit a vertical swinging movement of the same, and for the purpose of supporting the weight of the strut, brake-lever, and link, the pivotal stud 59 which connects the longer arm of the brake-lever 55 with the link 58 has attached thereto one end of a contracting spiral spring 60, the other end of which is engaged with an arm 61 fixedly mounted on the hub-portion of the rocker 48. The spring 60 exerts its tension with a tendency to hold the brake-lever 55 elevated so that when the brake is off the brake-band 53 shall be comparatively loose around the periphery of the brake-pulley. By reason of the connection of the brake-lever with the arm of the rocker 48 by means of the link 58 it follows that when the said rocker 48 is moved by means of treadle 51 for the purpose of turning the clutch-actuating sleeve 44 so as to close the clutch-members together and thereby cause shaft 4 to be rotated, the brake-lever will be turned upon its pivotal connection with the strut in the direction to slacken the brake-band. When, however, the rocker 48 is moved in the opposite direction so as to turn the clutch-actuator 44 in the direction to lessen the pressure and friction between the two clutch-members, or permit them to separate, the brake-lever is operated in the reverse direction to tighten the brake-band around the brake-pulley.

It will be perceived from the foregoing that in virtue of the connection of the clutch-actuator 44 and brake-lever with the same actuating rocker 48, it follows that the movement of the said rocker which serves to transmit movement to the clutch-actuator for the purpose of closing the clutch and rendering it operative, also serves to transmit movement to the brake-devices to render the same inoperative, while the movement of the rocker which serves to transmit movement to the clutch-actuator to provide for the opening of the clutch also transmits movement to the brake-devices to apply the brake.

For the purpose of adjusting the braking devices to insure the proper fit of the brake-band 53 upon the periphery of the brake-pulley, the strut with which the brake-lever 55 is connected pivotally is made adjustable in length. To this end it is made in three parts, namely, a hub-portion 56^b which fits around the supporting stud 49, an opposite end portion 57 which is in pivotal engagement with the brake-lever, and an intermediate portion 56^a having its opposite end-portions oppositely screw-threaded. The hub-portion and end-portion are correspondingly threaded internally to receive the oppositely or reversely externally threaded end-portions of the intermediate or connecting portion 57^a. The said externally threaded end-portions screw into the other two members on turning the intermediate or connecting member in one direction, and screw out of them in turning it in the other direction. Thereby the effective length of the strut is correspondingly varied, and by such variation the position of pivot 56 and of the lever 55 is adjusted.

From what has been described, it will be clear that the spring 52 normally holds the treadle 51 elevated, and thereby holds the rocker 48 in position to maintain the clutch open and the brake in action so that the machine stands motionless and at rest. When the operator presses down upon the treadle 51 he thereby swings the rocker 48 in the proper direction to occasion the closing of the clutch and the opening of the brake, whereby the machine is caused to operate. When he relieves the pressure upon the treadle sufficiently to permit the treadle to rise fully, he thereby enables the spring 52 to open the clutch and apply the brake.

Referring now to the automatic stop motion, I have mounted by a pivot 62 upon one arm of the rocker 48, a detent-member 63 having an upwardly inclined projecting tail 64, and engaged by one arm of a spring 65, Fig. 4, which tends to hold it normally in its engaging position. Upon a casting 66 attached by bolts 67, 67, to the bed or plate 1 of the machine is provided a projecting plate 68 having a beveled edge for coaction with the detent-device 63. Upon one side of the wheel 40 is mounted a projecting pin or roll 69, Fig. 1.

When the spring 52 is permitted to hold treadle 51 elevated and thereby maintain the rocker 48 in position which corresponds with the open clutch and the closed brake, the detent-device or dog occupies an elevated position in which its tail lies within the circle described by the pin or roll 69. The depression of the treadle 51 to close the clutch and remove the brake, carries the detent-device or dog outside of the path in which the pin or roll rotates. So long as the machine is rotating at full speed or approximately at full speed, the tail of the detent-device or dog is entirely clear of the path in which the pin or roll rotates. This is true also with regard to the intermediate speeds, there being sufficient room to permit the clutch-operating devices to have a sufficient range of play to attain all the required speeds of operation without interconnection between the tail of the detent-device or dog and the pin or roll. When, however, it is desired to bring about the stopping of the machine, the operator relieves the pressure upon the treadle 51 sufficiently to permit spring 52 to raise the treadle and swing the rocker 48 until the detent-device or dog en-

gages with the plate 68. When, now, in the continued rotation of the wheel 40 the pin or roll comes around it encounters the tail of the detent-device or dog and disengages the latter from the plate 68, freeing the rocker 48 to the action of the spring 52. The said spring thereupon completes the upward movement of the rocker, completing the disengaging of the clutch-members and also bringing the brake into action, with the desired effect of bringing about the arrest of rotation of the shaft 4 with the parts of the machine in, or substantially in, the predetermined position.

The employment of a manually-operated presser-unlocking and lifting means renders it immaterial whether or not the machine is stopped in a precise given position, so long as the machine comes to rest with the needle upraised and out of the work. Considerable latitude or leeway, amounting to several degrees in the circle of rotation of the main shaft, is thereby permitted, which renders it practicable to employ stop-motion mechanism acting to bring the machine to rest through the use of a friction-braking device rather than a positive stop. A machine running at the high rate of speed at which I run a machine embodying the herein-disclosed features of invention would not stand sudden and instantaneous stoppage. It would break. I am enabled to ease up on the machine a stitch or two before the final arrest, so as to spare shock. This enables a higher working speed to be attained.

Means for locking the brake out of action so as to permit the machine to be turned by hand is shown in Figs. 1, 2 and 4. It comprises, essentially, a brace 91, 92, by means of which the rocker 48 may be held, when required, in a position operating to maintain the brake-band in a slightly slackened state in connection with the wheel 40, without closing the frictional driving members together far enough to cause the driving shaft to rotate. The brace 91, 92 is pivotally connected at 90 with an arm of the rocker 48 and is adapted to be engaged with the plate 68, as in Fig. 4, and in dotted lines in Fig. 2, to hold the rocker 48 in the said position. Normally, the brace hangs pendant as in full lines in Fig. 2, permitting the rocker 48 to move under the action of spring 52 to the extent requisite for the effective application of the pressure of the brake-band. A slight downward movement of the treadle 51 will move the rocker 48 sufficiently to slacken the brake-band and to permit the brace to be swung from its inoperative position shown in full lines in Fig. 2 into its operative position in Fig. 4. In the latter position, the free extremity of the member 92 of the brace is seated in a notch in the underside of the plate 68 so that it has no tendency to slip and become disengaged from such plate. The brace is made adjustable in length, to provide for slackening the brake-band to the requisite extent. In this instance the member 92 thereof screws into or out of the member 91, a lock-nut 93 being provided to guard against accidental loss of adjustment.

What is claimed as the invention is:—

1. In a sewing machine, in combination, the driving shaft from which the stitch-forming instrumentalities are actuated, friction-driving devices for said shaft, manually-operated means for closing said devices together with graduated force to drive the machine with varying degrees of speed, a spring tending to open said devices to suspend the driving action, a detent for holding said devices closed together but under partly decreased pressure and driving with reduced energy, and a tripping device moving in unison with the driving shaft by which said detent is tripped to occasion arrest of the driving action.

2. In a sewing machine, in combination, the driving shaft from which the stitch-forming instrumentalities are actuated, friction driving-devices for said shaft, a member operatively combined with said driving devices and acting when moved in one direction to close them together, movement in the reverse direction providing for the opening of the said friction driving-devices, a spring tending to occasion movement of said member in the latter direction, means for manually controlling the said member, a detent for holding said member in an intermediate position with the friction driving-devices closed together under partly decreased pressure and driving with reduced energy, a tripping device moving in unison with the driving-shaft and by which said detent is tripped to occasion arrest of the driving action, and a brake operatively connected with the said member and operating to arrest the movements of the machine with the parts in a predetermined position.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER PEARSON.

Witnesses:

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NATHAN B. DAY.