April 15, 1930. K. HOWIE 1,754,681

FULL FASHIONED KNITTING MACHINE

Original Filed Nov. 3, 1928 3 Sheets-Sheet 1

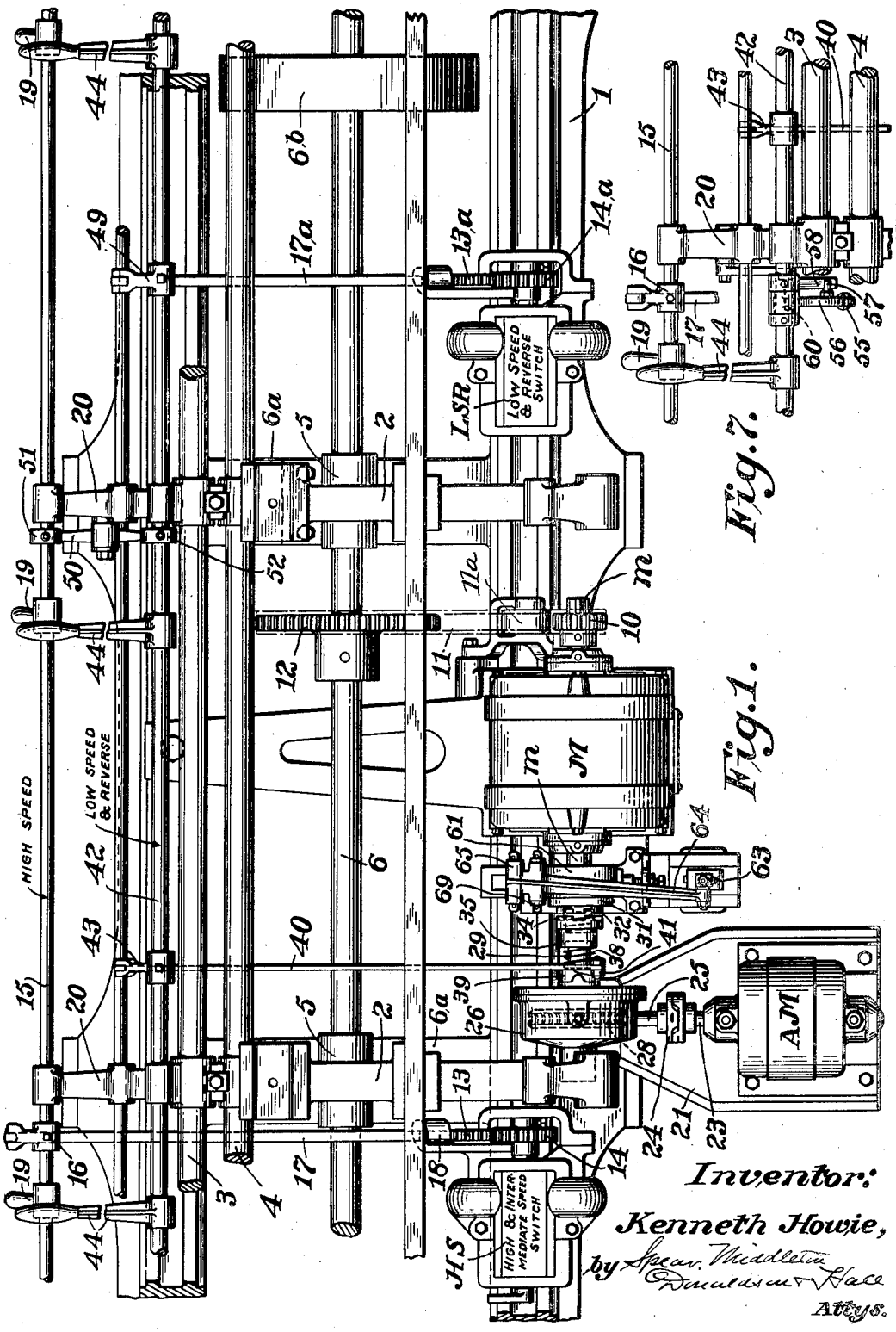


Fig. 7.

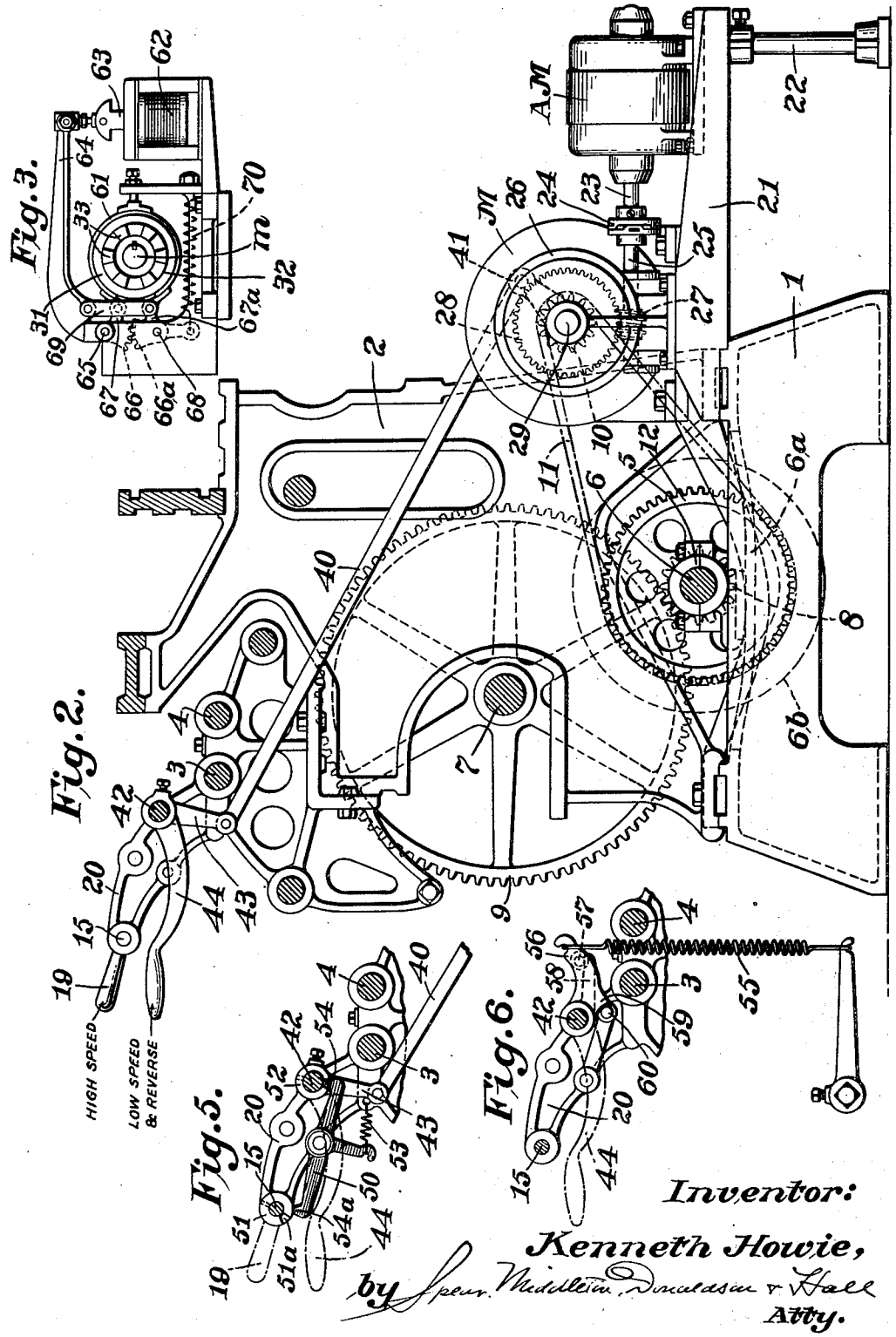
Fig. 1.

Inventor:
Kenneth Howie,
by Spear, Middleton, Donaldson & Hall
Attys.

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FULL FASHIONED KNITTING MACHINE

Original Filed Nov. 3, 1928 3 Sheets-Sheet 2



Inventor:
Kenneth Howie,
by Spencer, Middleton, Donaldson & Hall
Attys.

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FULL FASHIONED KNITTING MACHINE

Original Filed Nov. 3, 1928 3 Sheets-Sheet 3

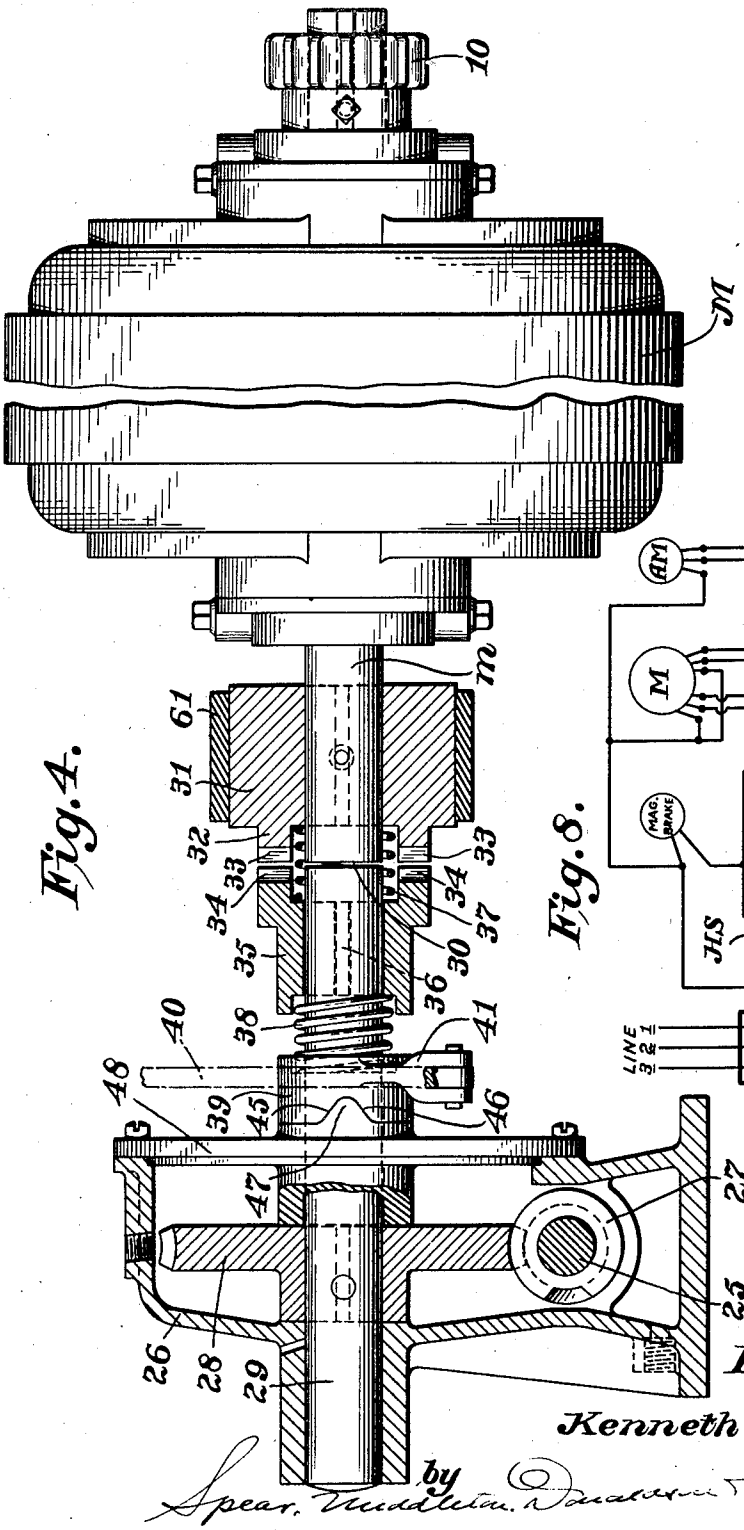


Fig. 4.

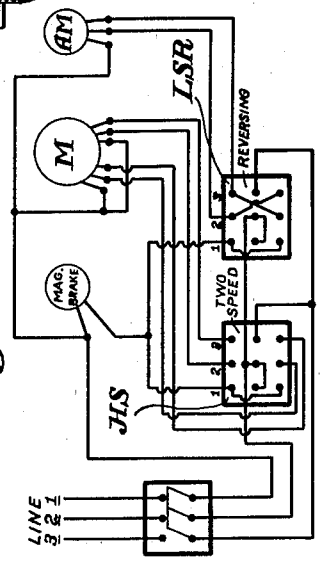


Fig. 8.

Inventor:
Kenneth Howie,
by Spear, Middleton, Donaldson & Hall
Attys.

Patented Apr. 15, 1930 1,754,681

UNITED STATES PATENT OFFICE

KENNETH HOWIE, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO WILDMAN MFG. CO., OF NORRISTOWN, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

FULL-FASHIONED-KNITTING MACHINE

Application filed November 3, 1928, Serial No. 317,046. Renewed November 2, 1929.

The invention concerns slow speed driving means for full fashioned knitting machines of the cotton frame type; one object being ease and flexibility of control and simplicity of construction.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the drawings Fig. 1 is a plan view of part of a cotton frame with the improvement applied thereto, many of the standard parts being omitted.

Fig. 2 is a vertical cross sectional view.

Fig. 3 is a detail view of magnetic brake mechanism.

Fig. 4 is a sectional view along the shaft of the main motor shaft, showing also the clutch and worm gearing for driving the main motor shaft from the auxiliary or slow speed motor.

Fig. 5 is a detail view of the lock for insuring that when the high speed motor is being employed, the low speed motor can not be thrown into service and vice versa.

Fig. 6 is a detail view of the low speed controller handle and parts associated with the low speed controller rod for stressing it in one direction rotatively.

Fig. 7 is a detail plan view of parts shown in Fig. 6.

Fig. 8 is the wiring diagram, including the high and low speed motors, the magnetic brake and the control switches.

In these drawings 1 indicates a base frame, like that made the subject of Letters Patent of the United States granted to me May 29th, 1928, No. 1,671,191. Like in said patent, the cross frames 2 are mounted on said base frame, and these cross frames are connected by certain bars extending lengthwise of the machine, such for instance, as shown at 3, 4. This invention embodies improvements upon the machine disclosed in an application filed by me April 29, 1927, Ser. No. 187,614.

In my present invention I hang or support the main driving shaft low down in respect to the structure considered as a whole, for which purpose bearings are provided, one of which is shown at 5 on the base frame in which said main driving shaft 6 is mounted. These bearings rest on cross bars 6^a of the base frame.

This shaft 6 carries fly wheels, one of which is shown at 6^b, which is located in part within the base frame, one purpose being to reduce vibration by locating the driving shaft with its fly wheels as low as possible and directly on the massive base, instead of mounting said shaft near the top and at the front of the machine where it was exposed and endangered the operatives, and where it gave rise to considerable vibration of the machine due to what may be termed its overhead mounting, as distinguished from the present low hung arrangement of this driving unit.

This main shaft is not only located low down in the machine but it is situated about midway of the width of the machine, where it is shielded from accidental contact with the operative or his or her clothing. In other words, the main driving shaft is housed by the frame and other parts of the machine. The power from this drive shaft is transmitted to the cam shaft 7 by gearing 8, 9.

For driving the main shaft I employ an electric motor M, suitably mounted on the base frame of the machine. The shaft *m* of this motor has a chain or sprocket wheel 10, which through a chain 11 drives the sprocket wheel 12 fixed on the main driving shaft. The current to the main motor is controlled by any suitable form of switch of standard pattern. I have indicated conventionally such a switch box at HS, for high or intermediate speeds of the main motor. The switch in this switch box is operated by a rack bar 13 and pinion 14, the rack being operated from a rock shaft 15 having an arm 16 fixed thereon, to which is connected the rod 17 which forms an exten-

sion of the rack 13. This rod is guided through a suitable bracket at 18.

The control shaft or rock shaft 15 for high and intermediate speeds extends along the upper front part of the machine and is operable by anyone of a number of hand levers 19, one for each section or head of the machine, distributed along the length of the machine, where they are within convenient reach of the operator from any point along the machine. This rock shaft or rotary control rod is mounted in brackets 20 forming extensions of the main cross frames 2.

For low speed and for reverse movement of the machine, I employ an auxiliary motor AM axially disposed at right angles to the axis of the main motor M. This auxiliary or slow speed electric motor is mounted on a suitable bracket 21 mounted in part upon the base frame of the machine and in part by a standard 22, Fig. 2, resting upon the floor.

The shaft 23 of this auxiliary motor is connected by a flexible coupling 24 with a worm shaft 25 mounted in suitable bearings in a housing 26. A worm 27 on this shaft meshes with a worm wheel 28 fixed to a shaft 29 mounted in said housing and arranged with its axis coinciding with the axis of the main motor shaft, the abutting ends of said shafts being slightly spaced apart as at 30, Fig. 4.

On the shaft *m* of the main motor is fixed a cylindrical block or drum 31 having formed thereon a clutch 32 composed of radially extending teeth or projections 33, Figs. 3 and 4, spaced apart and adapted to be engaged by the teeth 34 of a clutch member 35 slidably mounted on the shaft 29 and fixed rotatably relative to said shaft by a spline connection at 36. There is a spring 37 between the faces of the clutch members 31 and 35 enclosed in part by the overhanging teeth 33 and 34 and there is a stronger spring 38 between the rear end of the sliding clutch member 35 and a collar 39 which is loosely mounted on the shaft 29 so as to be turned about the same by a rod 40 connected to an arm 41 integral with the collar. The rod 40 is operated from a control rod or shaft 42 mounted in the said bracket 20 and extending along the entire length of the machine. This rod has an arm 43 fixed thereto connected with the rod 40 which operates the collar 39. The control rod or shaft has an operating handle or lever 44 extending forward, there being one of these handles or operating levers for each head or section of the machine, so that the operator can operate the rod and consequently the collar 39 from any point along the machine.

This collar 39 has a V-shaped notch in its side edge presenting cam inclines 45, 46 reversed in respect to each other. This notch receives a projection 47 or like V-shape, said projection constituting a cam carried rigidly by a stationary plate 48 secured to and forming a part of the housing 26, which encloses the worm wheel 28.

It now will be observed that by operating the collar 39 rotatively it will at the same time move axially along the shaft 29 (to the right in Fig. 4) because of its inclined edge 45 or 46, as the case may be, riding up the inclined edge of the fixed cam projection 47. This movement of the collar will compress the spring 38 and as this is stronger than the spring 37 it will overcome the resistance of said spring and allow the clutch 35 to engage its teeth 34 with the teeth of the clutch member 31—33 fixed on the main motor shaft so that this shaft now will be driven at slow speed to turn the machine over slowly by the power of the auxiliary motor AM, it being understood, of course, that when the slow speed motor is energized, the high speed motor has been de-energized, and therefore the machine will be turned over at such a slow speed as will enable the operator to observe the action of the knitting elements. In ordinary practice it has been customary to mount the main driving shaft, as above stated, near the top of the machine and at the extreme front thereof and to provide it with a series of hand wheels fixed thereon.

These wheels were distributed at various points along the said elevated main shaft, one for each section or head of the machine so that the operator standing at any point along the machine could turn the adjacent hand wheel by hand and while so engaged the operator would have to perform the additional or main duty of observing the action of the knitting elements. With my improvement, the operator by simply operating a hand lever can cause the auxiliary motor to be energized and the slow speed clutch thrown in to make said motor perform the work of turning the machine over slowly while the operator devotes his attention almost exclusively to the operation of the knitting elements, he being free from the duty and physical labor of turning the machine over by hand.

It will be observed therefore that for energizing the auxiliary motor a connection is made to a switch box LSR through a pinion 14^a, rack 13^a, rod 17^a, and arm 49 to the rotary control rod or shaft 42 heretofore mentioned, so that when this is operated by means of any one of the number of finger levers 44 thereon, two things take place; the clutch 34—35 is thrown into engagement with the clutch member 31, 33 on the main motor shaft *m*, and the auxiliary motor is energized to drive the machine at slow speed.

Before the slow speed motor can be energized, however, it is necessary that the high speed or main motor be de-energized. In order to insure this, a safety device is provided so that only one motor can be energized at the same time. Further, the safety device in-

sures that the auxiliary motor must have been disconnected, by release of the clutch, before the high speed motor can be energized.

This safety device consists of a latch or locking device 50 pivoted to one of the brackets 20 and acting in conjunction with collars 51 and 52 fixed respectively on the high and low speed controller rods or shafts 15 and 42. The latch is normally pressed by a spring 53 to make its catch tooth 54 engage a notch in the collar 52 when said notch is in registration therewith. The catch tooth 54^a at the other end of the latch is adapted to engage, when operated, a notch 51^a in the collar 51, provided said collar has been turned so that the notch registers with the catch. In the drawing, Fig. 5, the safety latch is shown engaging the notch in the collar 52 fixed on the low speed controller shaft. This holds the said shaft against turning so long as the high part, or rather the periphery of the collar 51^a, rides on the other end of the catch lever. The high speed shaft, under the setting of the latch shown, can be operated by any one of the handles 19 distributed along and fixed to the high speed controller rod or shaft, and thus the high speed motor can be controlled from any one of the sections of the machine at which the operator may happen to be standing. It would be impossible to throw into action the low speed motor because the locking latch is maintained in locking engagement with the notch of collar 52.

If now it is desired to drive the machine by the low speed motor, the operator operates one of the handles 19 so that the rock shaft 15 is turned to a position to open the switch HS. When this is done, the collar 51 will have been turned to a position at which the notch 51^a registers with the tooth 54^a of the locking lever 50, whereupon the operator may turn the low speed controller shaft 42 by operating any one of the handles 44 distributed along the machine at the various sections. The turning of this control shaft 42 will turn the collar 52 and the inclined side of the notch now acting as a cam against the inclined side of the tooth or projection 54 will throw the locking lever out of engagement with the notch in collar 52, thus releasing the shaft 42, and at the same time the other end of the locking member will be thrown into the notch 51^a, thus locking the high speed control rod or shaft against being turned, and this locking action will be maintained so long as the high part or peripheral portion of the collar 52 rides against the tooth 54, and until the notch in said collar 52 is again brought into registration with the tooth 54, whereupon the spring 53 will throw the locking lever into engagement with said notch and then the high speed controller rod again can be operated, and when so operated it maintains the low speed controller rod locked against action.

The low speed controller rod is pressed in one direction by a spring 55, Fig. 6, connected to any suitable part of the frame at one end, and at its upper end it is connected to an arm 56 pivotally mounted on the low speed controller rod. This spring pressed arm has a pin 57 overlying a finger 58 fixed to the rock shaft 42.

The spring pressed arm 56 has a shoulder 59 resting against a stop pin 60 mounted on a part of the fixed frame.

From this construction it will be seen that when the controller handle 44 is pressed downwardly, it is against the resistance of the spring 55 which is stressed when the finger 58, connected with the arm 44, through shaft 42 is raised because the finger lifts on the pin 57 and thus lifts the pivoted arm 56 to which the spring is connected. Hence when the handle 44 is pressed down for slow speed forward, it must be held down by the operator for as long a time as he desires the slow drive to be in operation. On release of the downward pressure on the handle 44, the spring 55 returns said handle to neutral position and throws the slow speed switch to open position.

When the handle 44 is raised it reverses the switch so that the machine is slowly driven backwards so long as the handle 44 is held in its raised position. The handle is free to be raised by reason of the arrangement of the connections to the spring 55 which do not stress the spring during this action.

The operator must hold the handle raised so long as he desires the machine to turn over slowly backwards. When he desires this action to stop, he returns the handle to its neutral position against the pin 57, or the handle drops into this position by gravity, if desired.

It will be understood that the spring and stop mechanism just described is located at any one point along the machine. There is only one of such group of mechanism. It can be associated with any one of the set of low speed handles, yet it acts in common with all of them. In other words, this mechanism is associated with the low speed shaft and acts when any one of the handles is used to operate said shaft.

It will be observed that by reason of the organization described, only one clutch is used in the drive. This is out of service when the high speed drive is in action. This clutch serves both for the forward slow motion or the reverse slow motion. In either case, it is thrown in and out as a consequence of energizing or de-energizing the low speed drive. In either case, also, this clutch transmits the slow motion through the shaft of the main or high speed motor.

Automatic brake means is employed to stop the machine when either the high speed motor or the low speed motor is de-energized for arresting the machine. This brake may be of

standard pattern. It includes a brake band 61, Fig. 3, adapted to grip the drum or clutch member 31 fixed on the shaft of the main motor. This band is spread for the release of the drum when either motor is energized for which purpose there is a solenoid coil 62, the solenoid 63 of which, when the current is on, pulls down on a lever 64 pivoted at 65, and having a toothed segment 66 with an arm 67 connected to an end of the brake band, the other end of said brake band being connected to an arm 67^a of a tooth segment 66^a pivoted to the frame of the brake mechanism at 68. A link 69 transmits the power from lever 64 to the segments and the rocking of the segments spreads the brake band to allow the drum 31 and main shaft of the motor to run free when the current is on.

When the current is off a spring 70 operates the mechanism just described to contract the brake band onto the drum 31 and this stops the motion of the machine. This brake will act to stop the machine due to absence of current from any cause, whether due to the operation of the switches or to the blowing out of a fuse.

In prior machines, it has been the practice as above intimated to locate the main drive shaft at the top front portion of the machine convenient to the hand of the operator, for its manual operation for slow speed, through a plurality of hand wheels mounted thereon at various points along the machine. By employing a slow speed motor with connections leading therefrom for driving the machine by power at slow speed, I am enabled to do away with locating the main drive shaft in the elevated exposed position mentioned above and instead, I arrange this main drive shaft low down and centrally of the machine where it is no longer exposed to give rise to accidents. On the contrary, the main shaft with its fly wheel or wheels is housed, as it were, by the frame work and by the machine structure generally.

It is mounted in bearings supported on the massive base frame and vibration of the machine from this source is materially reduced and practically eliminated.

Because I employ a slow speed motor for turning the machine over slowly to take the place of turning by hand, I can locate the main driving shaft on the base frame as above described and at the same time avoid the use of any continuously rotating shaft at the front upper part of the machine, such as the constantly rotating hand wheel shaft heretofore used. It was necessary to have these hand wheels accessible to the operator while he inspected the operation of the knitting elements, hence, it was necessary to have this rotary shaft with its hand wheels located as stated in the elevated forward position.

I dispense with this shaft in this location and position it centrally of the lower part of the machine and control the drive thereto, either for high or low speed by hand levers on a rod extending along the machine which instead of rotating constantly during the operation of the machine, is turned only when the switch is to be operated, but remaining at rest during the working of the machine.

A roller 11^a, Fig. 1, may be used to guide the chain 11. This roller has been omitted in Fig. 2 for convenience of illustration.

At full speed the machine will make for example, say 50 to 56 courses per minute. At intermediate speed, it will make say, 38 to 42 courses per minute and at slow speed, it will make about 10 courses per minute, this latter speed as above set forth being equivalent to the speed heretofore derived by the hand, the operator turning the usual hand wheels on the elevated main shaft at the front of the machine.

I claim:

1. A full fashioned knitting machine having a slow speed motor and a high speed motor for driving it and a safety device for automatically locking either motor against operation until the other motor is thrown out of operation, substantially as described.

2. A full fashioned knitting machine having a slow speed motor and a high speed motor for driving it, electric switch means for controlling current to the motors, control rods extending along the machine, connections from the control rods to the switch means for operating the latter and means for automatically locking one connection against operation when the other is operable, substantially as described.

3. A full fashioned knitting machine having a main driving shaft, a main electric motor a shaft therefor, power transmitting means connecting the main driving shaft and the main motor shaft, an auxiliary electric motor, a shaft driven at slow speed from said auxiliary motor, a clutch for connecting said shaft with the shaft of the high speed motor for driving the latter from the auxiliary motor, electric switch means for controlling the current to the motors, means operable manually at various points along the machine for controlling the switch means, connections leading from said manually operable means to the clutch for setting the said clutch to render it effective in driving the high speed motor shaft from the auxiliary motor through said slow speed shaft when the switch means is set to deliver current to the auxiliary motor, substantially as described.

4. A knitting machine according to claim 3 in which the low speed shaft is coaxial with the shaft of the high speed motor, and the auxiliary motor is on a shaft extending at right angles to the low speed shaft, a worm mounted on the auxiliary motor shaft and a

worm wheel mounted on the low speed shaft, substantially as described.

5. A full fashioned knitting machine having a main shaft, a high speed motor having its shaft connected to the main drive shaft for operating the latter, a low speed shaft coaxial with the shaft of the high speed motor, an auxiliary motor with gearing for driving the low speed shaft, a clutch to connect the low and high speed shafts, a spring for moving said clutch to neutral position, a spring for transmitting to said clutch power for setting said clutch into action, a collar turnable on the low speed shaft and cam means for moving said collar axially when it is turned to compress the last mentioned spring for setting the clutch to drive the high speed motor shaft, a switch for controlling current to the auxiliary motor, controller means extending along the upper front part of the machine and manually operable at any part along said machine, said controller means operating the switch and said collar, substantially as described.

6. A full fashioned knitting machine having a main shaft, a high speed and a low speed shaft, a main motor for driving the high speed shaft, an auxiliary motor for driving the low speed shaft, a clutch for connecting said shafts, a reversing switch for controlling current to the auxiliary motor for forward or reverse running, controller means at the upper forward part of the machine operable from any point along the machine to set said clutch for driving the machine from the low speed shaft and to set said switch in position for forward or reverse rotation of the auxiliary motor.

7. A full fashioned knitting machine having a main driving shaft, a main and an auxiliary motor for severally driving the said main shaft, switches controlling current to the main and auxiliary motors, and electromagnetic brake means for stopping the machine when the current is cut off from the high speed motor when moving at high speed and when the current is cut off from the auxiliary motor when the machine is driven at low speed.

8. A full fashioned knitting machine comprising a main shaft, a high speed motor having its shaft connected to the main shaft for driving the latter, a low speed shaft arranged abutting and coaxially with the high speed motor shaft, a clutch for connecting the shafts, one member of which is affixed to the high speed motor shaft, electric switch means for the motors, controller means for said switch means arranged along the upper forward part of the machine operable manually at any point along the machine, connections operable by said controller means for setting the clutch to drive or stop driving the high speed motor shaft from the low speed shaft, and an electro-magnetic brake for arresting the high speed motor shaft when current for energizing the motors is absent, substantially as described.

9. A full fashioned knitting machine having a main shaft extending lengthwise thereof at the lower central portion of its frame work, a main electric motor having its high speed shaft extending parallel with the main shaft, a low speed shaft extending coaxially with the said high speed shaft, a clutch between the abutting ends of the said shafts, an auxiliary motor having its shaft extending at right angles to the low speed shaft, reduction gearing between said auxiliary motor shaft and the low speed shaft, controller means extending lengthwise of the machine at the upper front portion thereof and operable from any point along said machine, switch means for controlling current to the electric motors operated from said controller means, and a connection for operating the clutch from said controller means, substantially as described.

10. In a full fashioned knitting machine, a main high speed drive, a low speed drive, a clutch for transmitting the motion from the low speed drive, means for reversing the low speed drive to turn the machine backward, and controlling means for the low speed drive extending along the machine and accessible to the operator at various points along the machine for operating the same, said controlling means having one position for forward low speed driving and another position for reverse low speed driving, said controlling means when moved to either of said positions setting the clutch in operative position, substantially as described.

11. Apparatus according to claim 10 in which said controlling means has a neutral position to stop the slow speed drive, and brake mechanism which is set to arrest the machine when the said controlling means is in neutral position and is free when the controlling means is in either position for the forward or reverse drive, substantially as described.

12. A full fashioned knitting machine having a main shaft, a high speed motor having its shaft connected to the main drive shaft, a low speed shaft coaxial with the shaft of the high speed motor, an auxiliary motor with gearing for driving the low speed shaft, a clutch to connect the low and high speed shaft, a collar turnable about and movable axially along the low speed shaft for controlling the clutch, an electric switch for controlling current to the auxiliary motor, controller means extending along the front of the machine and manually operable at any point along said machine, said controller means operating the switch and said collar, substantially as described.

13. In combination in a full fashioned knitting machine, a main motor for driving

the machine at normal high speed, an auxiliary motor for driving the machine at low speed in simulation of turning the machine over by hand, a main drive shaft extending lengthwise of the machine at the lower part thereof, connections for driving said low positioned main shaft from either the main or the low speed motor, control means at the upper front of the machine accessible to the attendant for manual operation at various points along the machine front, said control means placing the machine under operation at either high or low speed, through the low positioned main driving shaft, substantially as described.

14. Apparatus according to claim 13 in which the control means includes a rock shaft extending along the upper front part of the machine with handles distributed at various points along said rock shaft.

15. In combination in a full fashioned knitting machine, power actuated driving means for operating the machine at either normal high speed, or at low speed in simulation of turning the machine over by hand, a main drive shaft extending lengthwise of the machine at the lower central part thereof, and to which the said driving means applies its power at either speed, manually operable control means accessible to the attendant for manual operation at various points along the machine front, said control means placing the machine under operation at either high or low speed, through the low positioned main driving shaft, and brake means for arresting the machine operating automatically as a consequence of discontinuing the driving of the machine from the said various points along the machine.

16. In combination in a full fashioned knitting machine, power actuated driving means for operating the machine at either normal high speed, or at low speed in simulation of turning the machine over by hand either forwardly or backwardly, brake means for stopping the machine as a consequence of and when either the forward normal high speed or the low forward or backward speed is discontinued, and manually operable means accessible at various points along the front of the machine for controlling the driving means to actuate the machine at either high speed or low forward or backward speed and for setting or releasing the brake means for either of said speeds, substantially as described.

17. In combination in a full fashioned knitting machine, motor actuated driving means for operating the machine at low speed either forward or backward in simulation of turning the machine over by hand, brake means for stopping the machine as a consequence of and when either the forward or backward low speed is discontinued, and manually operable means accessible to the operator at various points along the machine front for controlling the drive means to actuate the machine at low speed either forwardly or backwardly and for setting or releasing the brake means for either of said directions of movement, substantially as described.

18. Apparatus according to claim 17 in which the motor driving means is electrically operated and the brake means is electro-magnetic, said brake automatically setting itself to stop and thereafter hold the machine when current is cut off for either forward or reverse driving at said slow speed, and automatically releasing when current is turned on to actuate the drive means, said electro-magnetic brake being common to all positions of the operator along the machine front.

19. In combination in a full fashioned knitting machine, power actuated driving means for operating the machine at either normal high speed, or at low speed in simulation of turning the machine over by hand, said driving means being electrically operated, and an electro-magnetic brake for stopping the machine at either high or low speed and holding it at rest and means accessible to the operator at various points along the front of the machine for controlling current to or cutting it off from the driving means and electro-magnetic brake, said electro-magnetic brake being of the type in which the electromagnet when energized releases the brake substantially as described.

20. Apparatus according to claim 17 in which the brake means holds the machine in its arrested position, after movement in either direction substantially as described.

21. In combination, in a full-fashioned knitting machine, power operated means for driving the machine at either normal speed, or at a slow speed in simulation of turning the machine over by hand and manually operable means for controlling the slow speed drive from various points along the machine front, and an electromagnetic brake for stopping the machine, said brake being set automatically as a consequence of discontinuing the slow speed drive, substantially as described.

22. In combination, in a full-fashioned knitting machine, power operated means for driving the machine at either normal speed, or at a slow speed in simulation of turning the machine over by hand and manually operable means for controlling the slow speed drive from various points along the machine front, and an electromagnetic brake acting automatically to stop the machine as a consequence of discontinuing the slow speed drive and automatically maintaining the machine in its arrested position, substantially as described.

23. In combination in a full-fashioned knitting machine, power actuated driving means for operating the machine at either

normal speed or at slow speed in simulation of turning the machine over by hand, manually operable means accessible to the operator at various points along the machine front for controlling the drive means, and brake means for stopping the machine at either high or low speed and for maintaining the machine in its arrested position upon discontinuing either speed, said brake means being controlled from said manually operable means but when set exerting its said maintaining action independent of said manually operable means.

24. In combination in a full fashioned knitting machine, power actuated driving means for operating the machine at either normal speed or at slow reverse speed in simulation of turning the machine over by hand, manually operable means accessible to the operator at various points along the machine front for controlling the drive means, and brake means for stopping the reverse movement of the machine and for automatically maintaining the machine in its arrested reversed position, said brake means being controlled from said manually operable means as a consequence of actuating said manual means for controlling the reverse drive.

25. In combination, in a full fashioned knitting machine, power operated means for driving the machine at either normal speed, or at low speed in simulation of turning the machine over by hand, brake means operating automatically to stop the machine when power is cut off to discontinue driving at either of said speeds, and to release the machine as a consequence of throwing on the power to drive the machine at either speed, and manually operable means accessible to the attendant at various points along the front of the machine for controlling cutting the power off or throwing it on.

26. In combination in a full fashioned knitting machine, power operated means for driving it at normal speed, manually operable controlling means for the normal speed drive accessible to the attendant at various stations along the front of the machine for throwing the power on or cutting it off from any of said stations, automatic brake means common to all of said stations and controlled by said manually operable means to brake the machine simultaneously with and as a consequence of cutting off of the power at said normal speed and to release the machine simultaneously with and as a consequence of throwing on the power for said normal speed, means for driving the machine at a low speed and for releasing the brake from any of said stations for the performance of said low speed drive.

27. In a full fashioned knitting machine, means for operating the machine at normal speed and at a slow speed, manually operated controlling means accessible to the attendant at various stations along the machine front for throwing the power on or cutting it off from any of said stations, for driving at said normal speed or stopping, automatic brake means to brake the machine simultaneously with the cutting off of the power at said normal speed, and to release the machine simultaneously with throwing on the power from any of said stations for driving at said normal speed, and manually operable means accessible at various stations along the machine for releasing the brake for operating the machine at slow speed, substantially as described.

In testimony whereof, I affix my signature.

KENNETH HOWIE.