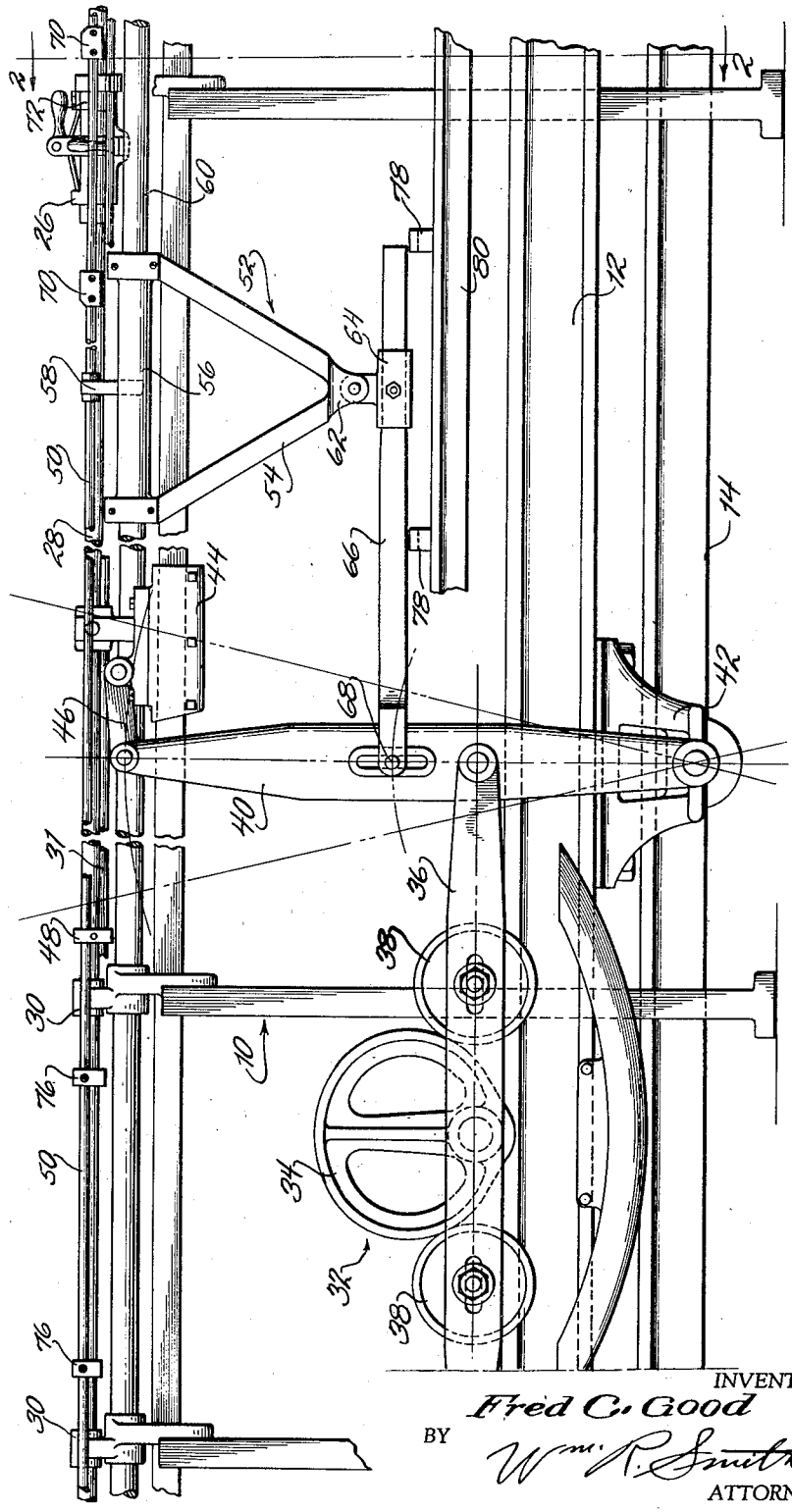
Oct. 3, 1939. F. C. GOOD 2,174,977

SPEED REDUCING AND SHOCK ABSORBING MECHANISM FOR FULL-FASHIONED KNITTING MACHINES

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Fig. 1.



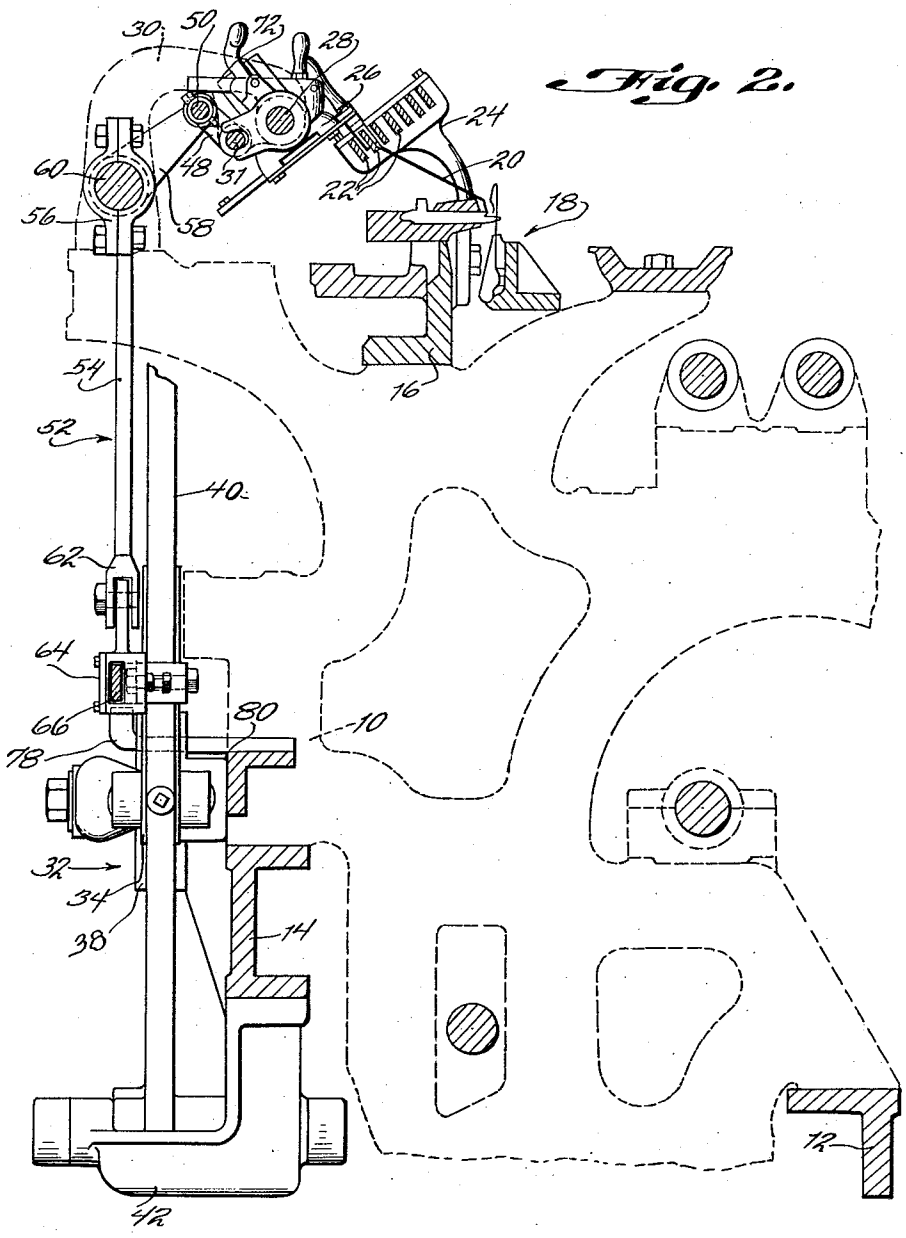

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Fig. 2.




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Fig. 3.

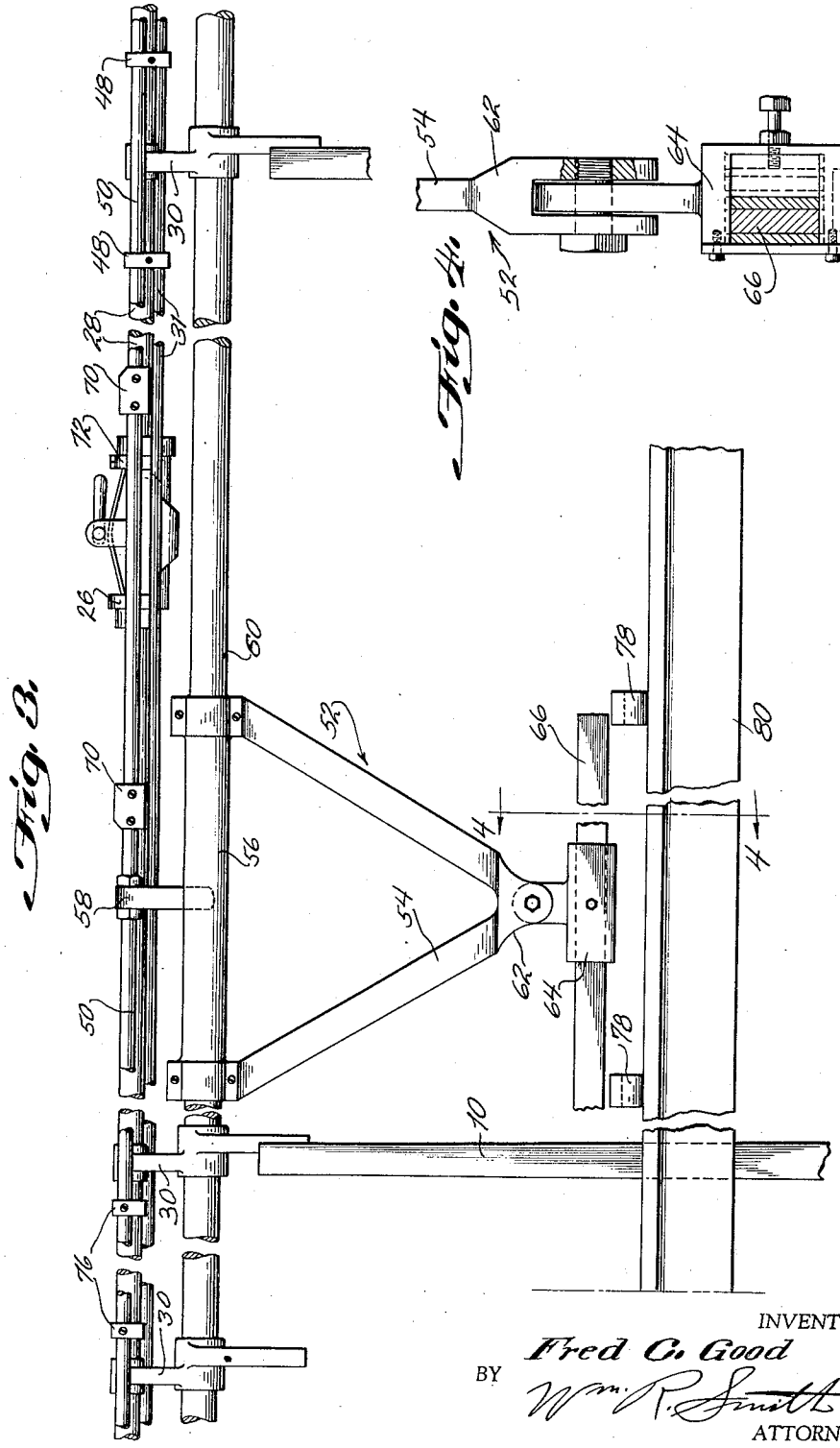



Fig. 4.




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Fig. 5.

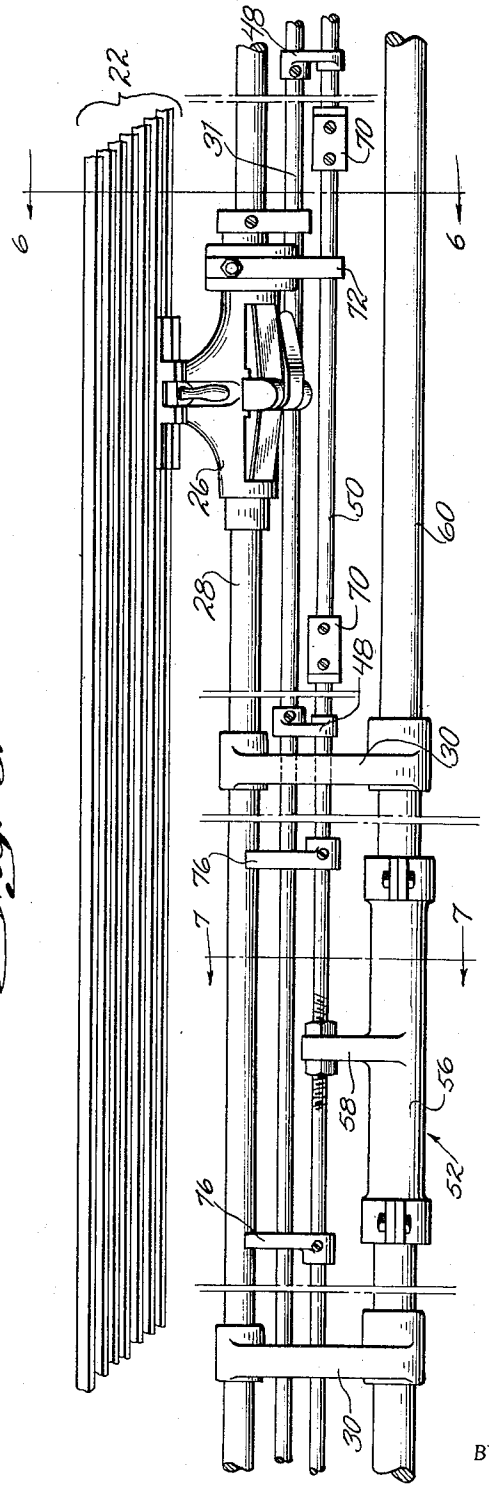



Fig. 6.

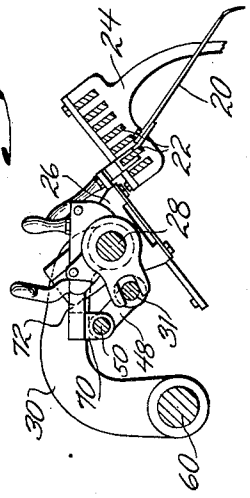
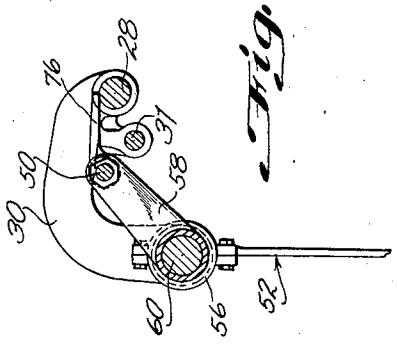



Fig. 7.




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Fig. 8.

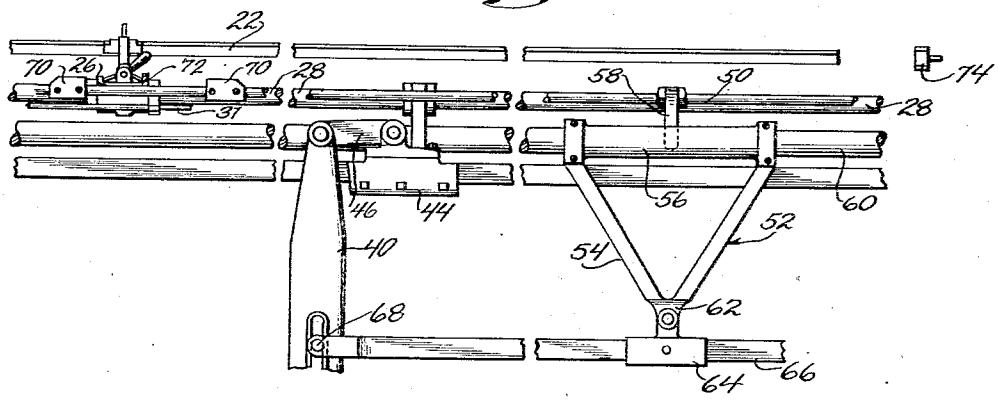



Fig. 9.

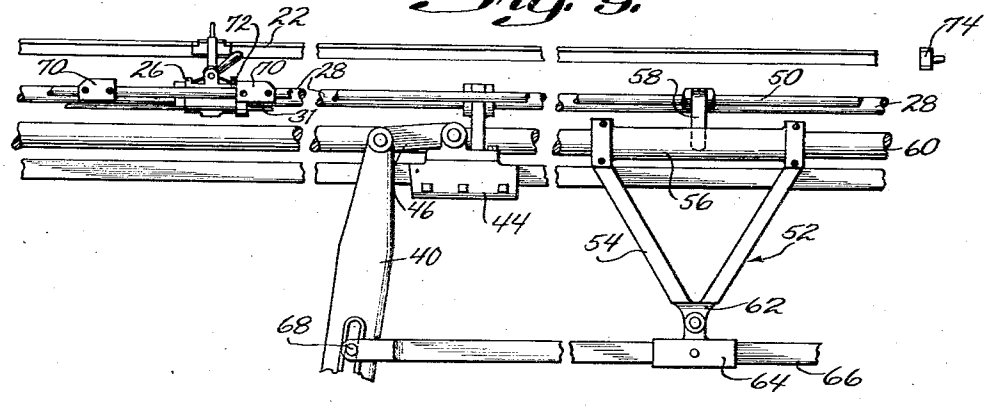
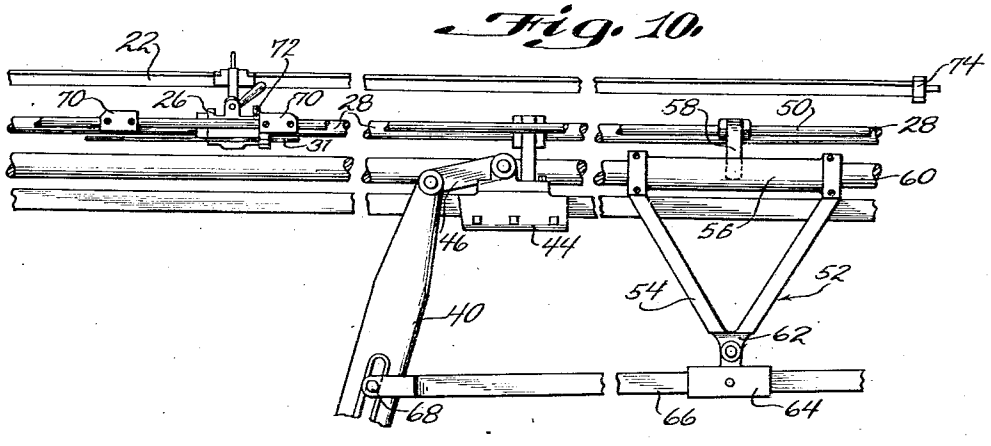



Fig. 10.




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2,174,977

# UNITED STATES PATENT OFFICE

2,174,977

## SPEED REDUCING AND SHOCK ABSORBING MECHANISM FOR FULL-FASHIONED KNITTING MACHINES

Frederick C. Good, Philadelphia, Pa.

Application September 2, 1938, Serial No. 228,100

11 Claims. (Cl. 66—130)

The present invention relates to full-fashioned knitting machines and more particularly to a speed reducing and shock absorbing mechanism for the carrier rods thereof.

As well known in the art of full-fashioned knitting, the carrier bars of the knitting machine are traversed over the knitting sections by means of friction boxes arranged on a friction rod reciprocated longitudinally at the normal rate of speed of the machine through a mechanism called the "Coulier" motion. In order to acquire the proper fashioning of the fabric, it is necessary to limit the yarn laying movement of the carrier bars to a certain distance and, for that purpose, there are provided so-called end stops disposed in the path of travel of said carrier bars to arrest the same. Because the normal speed rate of present-day full-fashioned knitting machines is relatively high, the carrier bars are brought forcibly into contact with their end stops, resulting in vibration, jarring, and rebound, causing the production of an imperfect knitted fabric.

Several attempts have heretofore been made to provide suitable attachments acting as shock absorbers for the intended purpose of overcoming the objectionable features stated, but such known attachments, because of their complicated rigid and dangerous nature, have proven to be of very little practical success.

The present invention, therefore, primarily aims to provide a simple, yet effective and practical mechanism capable of reducing the travelling speed of the carrier bars as the same approach their end stops, and of absorbing so much of the shock created by the impact of the carrier bars with the end stops as to render vibration, jarring, and rebound practically negligible.

Moreover, the invention contemplates the provision of a speed reducing and shock absorbing mechanism for the carrier bars of a full-fashioned knitting machine which requires no intricate safety devices and yet is so flexible in its operation that the same may be used safely and without danger of jamming the operative parts of the machine should the relative normal position of the associated elements of the mechanism become accidentally, or otherwise, displaced.

It is also an important feature of the invention to provide a mechanism of the type mentioned, including means functioning to automatically restore said mechanism to its normal operative relationship whenever such relationship is lost in the course of the operation of the knitting machine.

Other important objects and advantages of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by those skilled in the art, I have, in the accompanying drawings and in the detailed description based thereupon, set out a possible embodiment of the invention.

In these drawings:

Figure 1 is a rear elevation of a portion of a full-fashioned knitting machine embodying the invention and illustrating the associated parts in one of their operative poistions.

Figure 2 is an enlarged section taken on line 2—2 of Figure 1.

Figure 3 is an enlarged detail of certain parts represented in Figure 1.

Figure 4 is an enlarged section taken on line 4—4 of Figure 3, with certain portions taken away for the sake of clarity.

Figure 5 is an enlarged detail in plan elevation of a portion of the knitting machine as illustrated in Figure 1.

Figure 6 is a section taken on line 6—6 of Figure 5.

Figure 7 is a section taken on line 7—7 of Figure 5.

Figures 8, 9, and 10 are detailed illustrations of parts of the knitting machine showing the relative positions of said parts at different stages during the reciprocating stroke of the friction rod from the center to the right.

With more particular reference to the drawings, wherein like characters of reference will designate corresponding parts throughout, it is to be understood that I have shown only those parts of a full-fashioned knitting machine which are essential to the proper comprehension of the present invention, the knitting machine itself being of the usual standard construction well known in the art.

In these drawings, I have shown portions of the usual machine frame 10 provided with the front beam 12, the back beam 14, and the center bed 16. Arranged about the center bed 16 are the knitting sections, one of which is represented in Figure 2 and designated in its entirety for convenience herein by the reference character 18.

The yarn or yarns are fed to the knitting sections 18 by means of carriers 20 depending from the carrier bars 22 mounted for sliding movement in the carrier bar bracket 24. Each carrier bar receives its movement through actuation of a friction box 26 interconnected with said bar and frictionally engaging the main friction rod 28 supported for reciprocation in suitable bearings 30, said friction box being guided in its movement with the friction rod by means of a guide shaft 31 also supported in said bracket 30.

In order to impart reciprocating motion to the main friction rod 28 there is provided the usual Coulier motion 32 comprising a Coulier cam 34 adapted to impart a back and forth movement to a pitman 36 through rollers 38. This back

and forth movement is transmitted to a long rocker arm 40 pivotally supported in a bracket 42 on the rear beam 14 and connected to a reciprocable cross head 44 by means of a link 46, said cross head being rigidly secured to the main friction rod 28. It will therefore be understood that the reciprocating motion thus transmitted to the cross head 44 by means of the rocker arm 40 results in a corresponding movement of the friction rod 28 and its friction box 26.

Supported for reciprocation upon the friction guide shaft 31 by means of bearings 48 is a speed reducing or shock absorbing shaft 50. The shaft 50 is reciprocated by means of a connection, indicated in its entirety herein by the reference character 52, said connection coupling the shaft 50 to the long rocker arm 40 of the Coulier motion 32.

As shown in the drawings, the connection 52 consists of a triangular shaped casting 54 having a split tubular side 56 provided with a rigid extension 58 affixed to the speed reducing or shock absorbing shaft 50 and slidably engaging the back narrowing shaft 60 usually provided upon the ordinary full-fashioned knitting machine, the remaining two sides of the triangular shaped casting terminating with a forked extension 62 pivotally engaging a special friction box 64 in frictional engagement with a bar 66 pivoted to the intermediate portion of the long rocket arm 40, as indicated at 68. Because of the connection 52, it will be understood that the speed reducing or shock absorbing shaft 50 is caused to travel in the same direction as the main friction rod 28 but at approximately one-half the speed of the latter.

Adjustably secured upon the speed reducing or shock absorbing shaft 50 are relatively spaced stop members 70 disposed in the path of travel of a finger 72 fixed onto the carrier rod controlling friction box 26 for reciprocating motion therewith. In this manner, and since the speed reducing or shock absorbing shaft 50 travels at approximately one-half the speed of the friction rod 28, the finger 72 of the carrier engaging friction box 26 during reciprocation thereof will overtake and come in contact with the stop members 70, as more clearly illustrated in Figures 8, 9, and 10 and thus retard the movement of the carrier bar 22 as it approaches the end of its traversing stroke and, accordingly, prevent excessive detrimental rebound and vibration of said carrier bar upon abutting its end stop 74 provided in the well known manner on the full-fashioned knitting machine.

It will be appreciated that, at times, the speed reducing or shock absorbing shaft 50, the casting 54, and its friction box 64 may become displaced out of their normal relationship with respect to the friction rod 28 and bar 66. Therefore, in order to reposition said parts automatically, there may be provided a set of relatively spaced stops 76 adjustably positioned on said shaft 50 to extend for contact with convenient machine frame parts, such as brackets 30, thereby holding the shaft and associated elements against reciprocation while said friction rod 28 and bar 66 continue in their motion, thus reestablishing the proper relationship.

For that same purpose, there may likewise be provided a second set of relatively spaced stops 78 suitably mounted upon a convenient part of the machine frame, as indicated at 80, to lie in the path of travel of the special friction box 64 so that whenever the same and its associated elements move out of proper position, the special friction box will contact one or the other of said stops 78, depending upon the direction of movement and, accordingly, be held in place during further movement of the bar 66 to reset the mechanism.

In practice, either one of the sets of stops 76 or 78 may be dispensed with, or both sets may be used in conjunction with one another, depending upon the amount of friction or load to be overcome.

Of course, it is to be understood that, whereas I have shown and described herein the preferred embodiment of the invention, the same is subject to several constructional modifications and, therefore, any modifications coming within the scope of the subjoined claims are to be considered within the spirit of the invention.

What I claim is:

1. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction and a special friction box carried by said special friction bar for movement therewith, and a mechanism connected to said special friction box for movement therewith and having means engageable with the main friction to check the speed of the latter.

2. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction and a special friction box carried by said special friction bar for movement therewith, a mechanism connected to said special friction box for movement therewith and having means engageable with the main friction to check the speed of the latter, and means associated with said special friction for automatically resetting the same upon displacement thereof from its relationship to the main friction.

3. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction and a special friction box carried by said special friction bar for movement therewith, a shaft mounted on the machine for movement paralleling that of the main friction, a connection between said shaft and the special friction box for unison movement, and means carried by said shaft and engageable with the main friction to check the speed of the latter.

4. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction and a special friction box carried by said special friction bar for movement therewith, a shaft mounted on the machine for movement paralleling that of the main friction, a connection between said shaft and the special friction box for unison movement, means carried by said shaft and engageable with the main friction to check the speed of the latter, and means associated with said special friction for automatically resetting the same upon displacement thereof from its relationship to the main friction.

5. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting

machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction and a special friction box carried by said special friction bar for movement therewith, a shaft mounted on the machine for movement paralleling that of the main friction, a connection between said shaft and the special friction box for unison movement, means carried by said shaft and engageable with the main friction to check the speed of the latter, and means carried by said shaft and disposed for contact with stationary parts of the knitting machine for resetting said shaft, connection, and special friction box upon displacement thereof in relation to the main friction.

6. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to the main friction, and a special friction box carried by said special friction bar for movement therewith, a shaft mounted on the machine for movement paralleling that of the main friction, a connection between said shaft and the special friction box for unison movement, means carried by said shaft and engageable with the main friction to check the speed of the latter, and relatively spaced adjustable stops carried by said shaft and disposed for contact with stationary parts of the knitting machine for resetting said shaft, connection, and special friction box upon displacement thereof in relation to the main friction.

7. In combination with the main friction box, main friction rod and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to said main friction box and rod, and a special friction box carried by said special friction bar for movement therewith, a mechanism connected to said special friction box for movement therewith and having means engageable with the main friction box to check the speed of the latter, and relatively spaced stops disposed for engagement with said special friction box for resetting the same together with said mechanism upon displacement thereof from their normal relationship to the main friction box.

8. In combination with the main friction and Coulier rocker arm of a full-fashioned knitting machine, a special friction comprising a special friction bar attached to said rocker arm at a point for operating at a reduced speed with respect to the main friction and a special friction box carried by said special friction bar for movement therewith, a shaft mounted on the machine for movement paralleling that of the main friction, a connection between said shaft and the special friction box for unison movement, means carried by said shaft and engageable with the main friction to check the speed of the latter, a set of stops carried by said shaft and disposed for contact with parts of the knitting machine for resetting said shaft, connection, and special friction box upon displacement thereof in relation to the main friction, and a set of stops disposed for engagement with said special friction box for cooperation with the first mentioned stops in their resetting function.

9. In a knitting machine of the character described having a reciprocable carrier bar, the combination with a Coulier rocker arm, a main friction rod connected to said arm, and a main friction box mounted on said main friction rod and engaged with said carrier bar for normally reciprocating the latter at a full rate of speed, of: a shock absorbing mechanism comprising a speed reducing and shock absorbing shaft mounted on the machine for reciprocation in paralleling relationship to the main friction rod; a special friction box; means establishing a connection between said shaft and special friction box; a special friction bar carried by said special friction box and attached to the Coulier rocker arm at a point to reciprocate said shaft through the special friction box and connection means at a reduced rate of speed with respect to the main friction rod and main friction box; and means mounted on said shaft and engageable with the main friction box for checking the reciprocating speed thereof and accordingly reducing the travelling speed of the carrier bar.

10. In a knitting machine of the character described having a reciprocable carrier bar, the combination with a Coulier rocker arm, a main friction rod connected to said arm, and a main friction box mounted on said main friction rod and engaged with said carrier bar for normally reciprocating the latter at a full rate of speed, of: a shock absorbing mechanism comprising a speed reducing and shock absorbing shaft mounted on the machine for reciprocation in paralleling relationship to the main friction rod; a special friction box; means establishing a connection between said shaft and special friction box; a special friction bar carrying said special friction box and attached to the Coulier rocker arm at a point to reciprocate said shaft through the special friction box and connection means at a reduced rate of speed with respect to the main friction rod and main friction box; means mounted on said shaft and engageable with the main friction box for checking the reciprocating speed thereof and accordingly reducing the travelling speed of the carrier bar; and means arranged to act on said mechanism to automatically reset the same upon displacement thereof from its normal relationship to the main friction box.

11. In a knitting machine of the character described having a reciprocable carrier bar, the combination with a Coulier rocker arm, a main friction rod connected to said arm, and a main friction box mounted on said main friction rod and engaged with said carrier bar for normally reciprocating the latter at a full rate of speed, of: a shock absorbing mechanism comprising a speed reducing and shock absorbing shaft mounted on the machine for reciprocation in paralleling relationship to the main friction rod; a special friction box; means establishing a connection between said shaft and special friction box; a special friction bar carried by said special friction box and attached to the Coulier rocker arm at a point to reciprocate said shaft through the special friction box and connection means at a reduced rate of speed with respect to the main friction rod and main friction box; means mounted on said shaft and engageable with the main friction box for checking the reciprocating speed thereof and accordingly reducing the travelling speed of the carrier bar; and stops disposed to intercept said mechanism in its reciprocation to automatically reset the same upon displacement thereof from its normal relationship to the main friction box.

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