No. 862,033. PATENTED JULY 30, 1907.

E. J. TOOF.

INTERCHANGEABLE LOCK AND CHAIN STITCH SEWING MACHINE.

APPLICATION FILED JAN. 5, 1905.

4 SHEETS—SHEET 1.

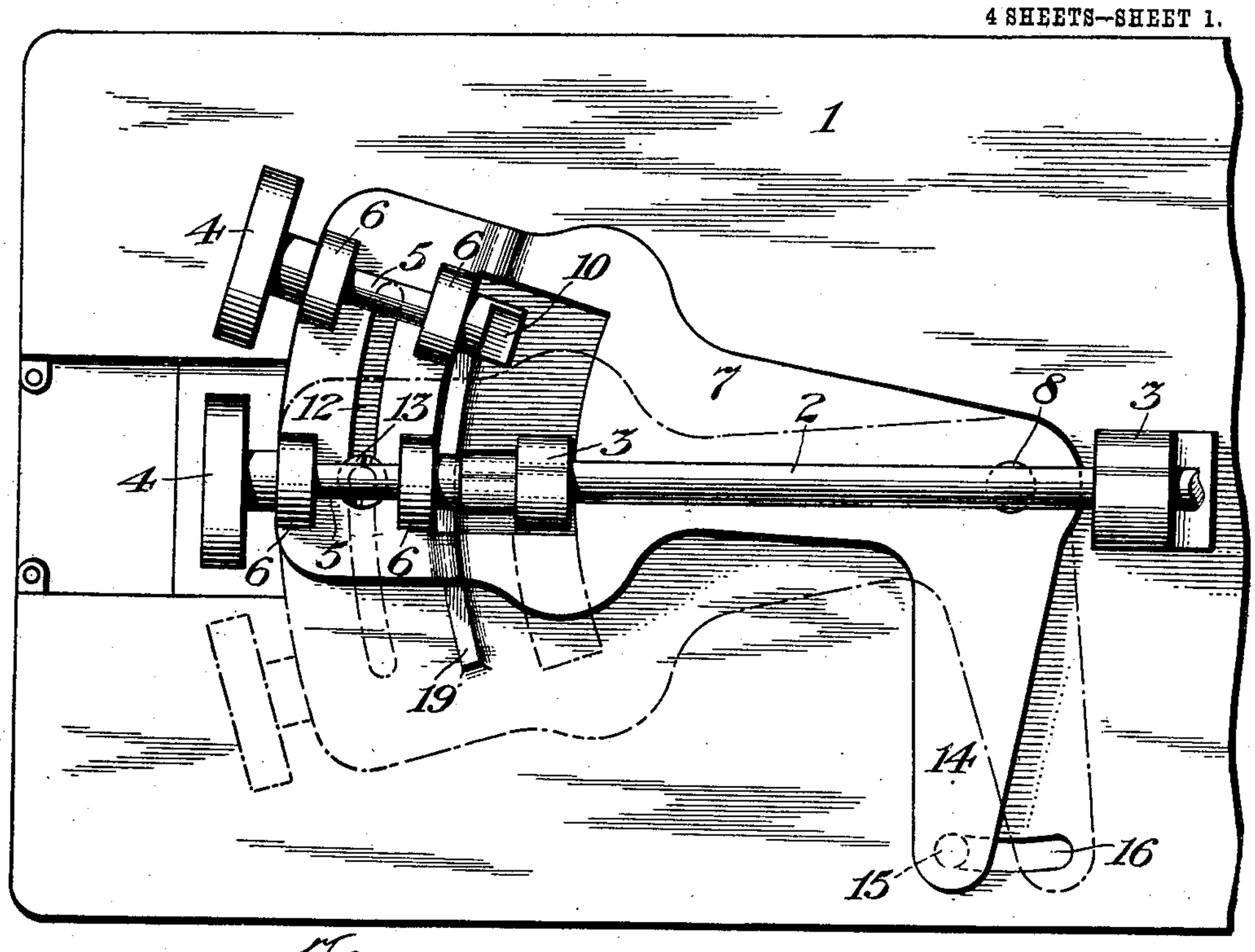


Fig. 1.

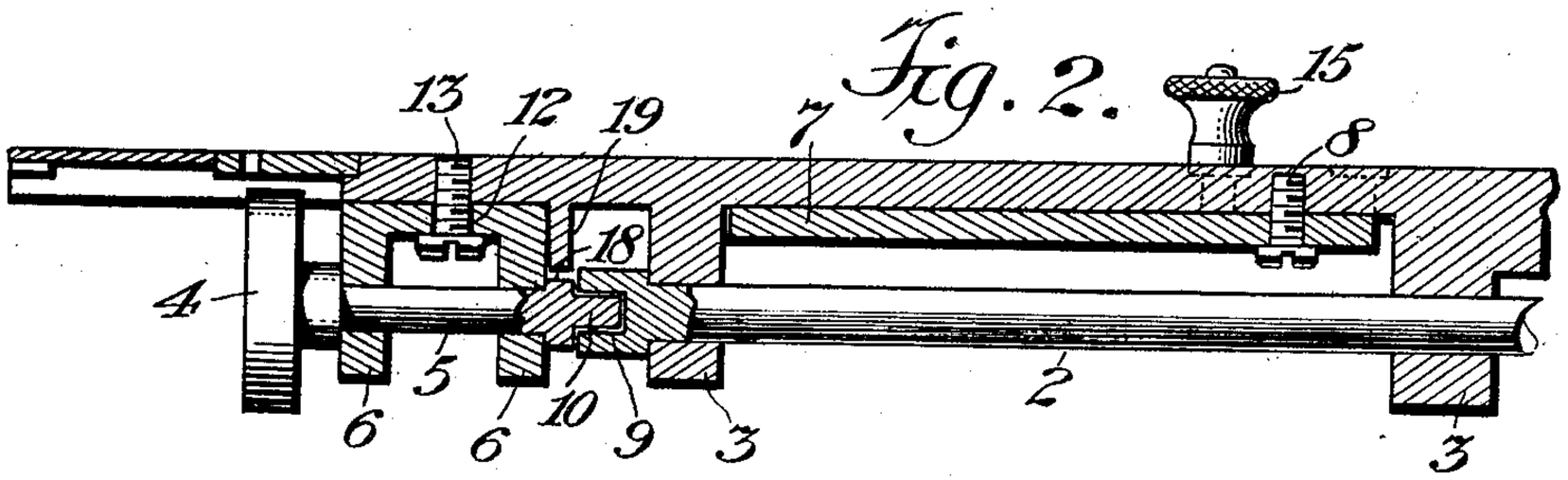
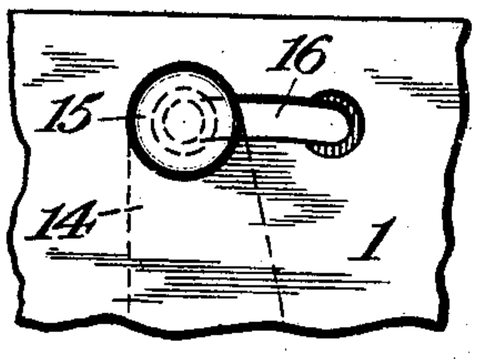
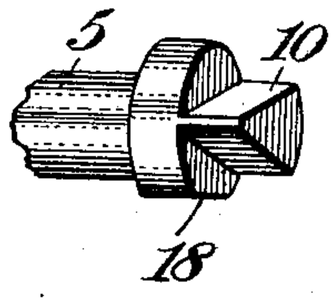


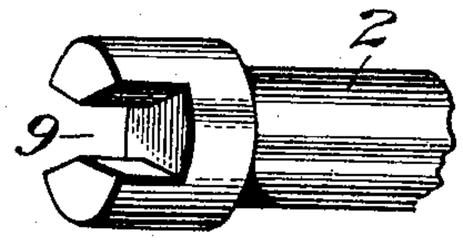
Fig. 2.

Fig. 3.

Fig. 4.







Witnesses
S. R. Appleman
E. M. Faith

Inventor
Edwin J. Toof
By his Attorney
Chas. H. Dorr

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4 SHEETS—SHEET 2.

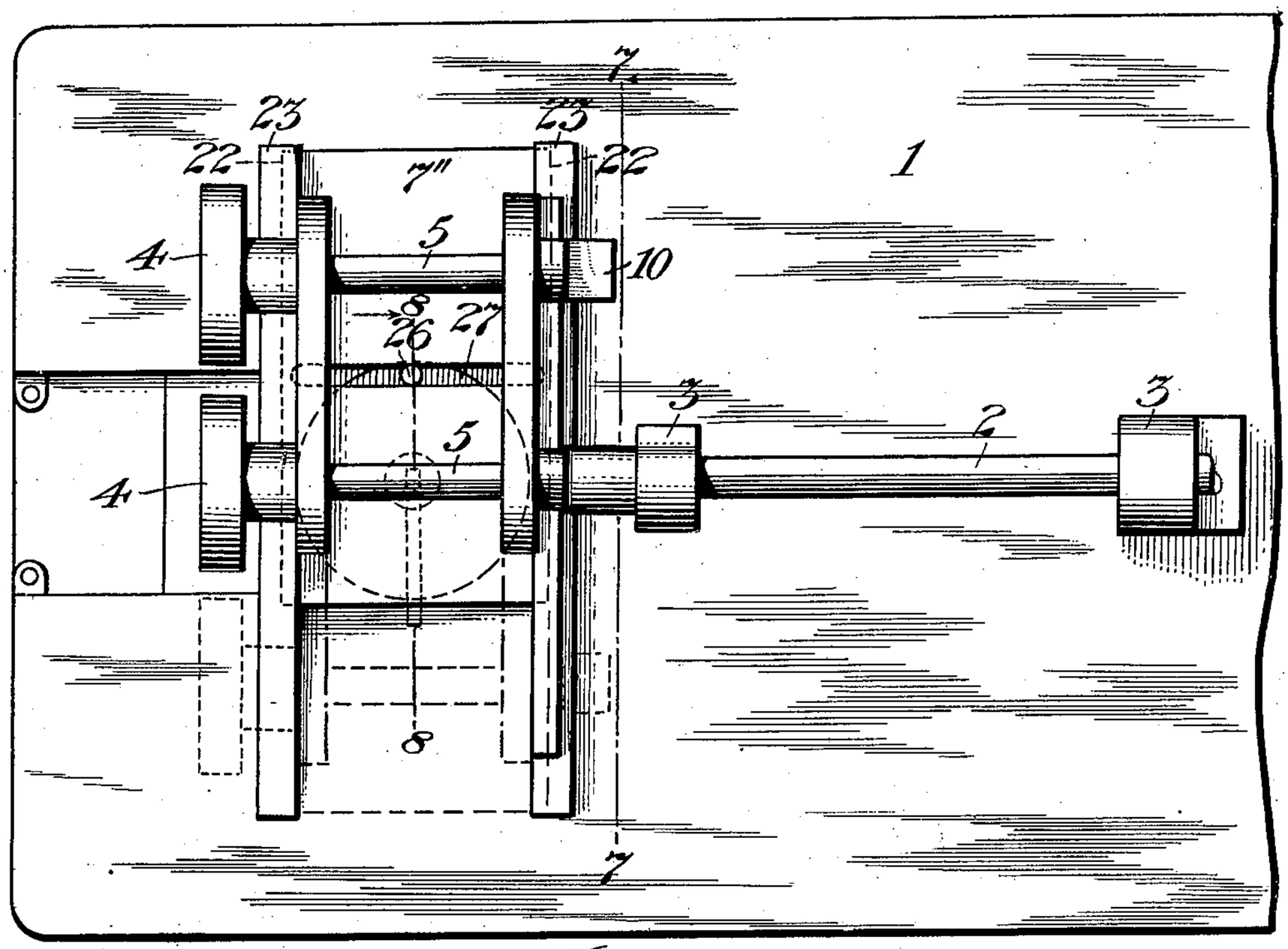

Fig. 5.

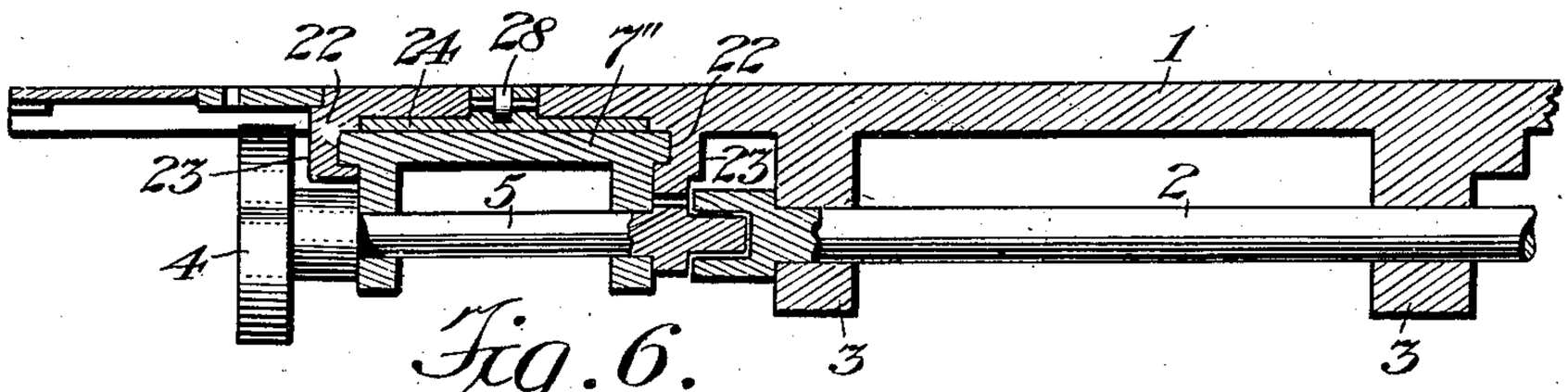

Fig. 6.

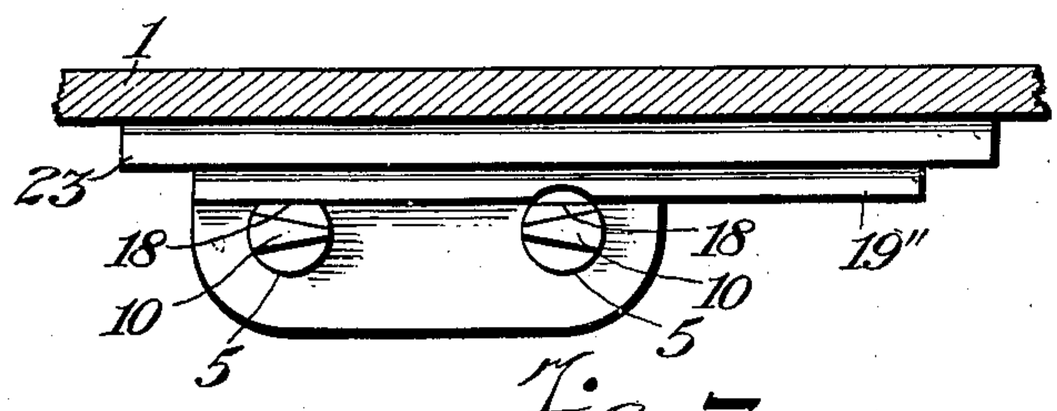

Fig. 7.

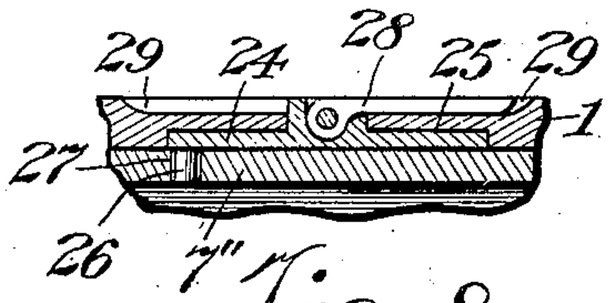

Fig. 8.

Witnesses
A. R. Appleman
E. M. Faith

Inventor
Edwin J. Toof
By his Attorney
Chas. F. Pond

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E. J. TOOF.

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4 SHEETS—SHEET 3.

Fig. 9

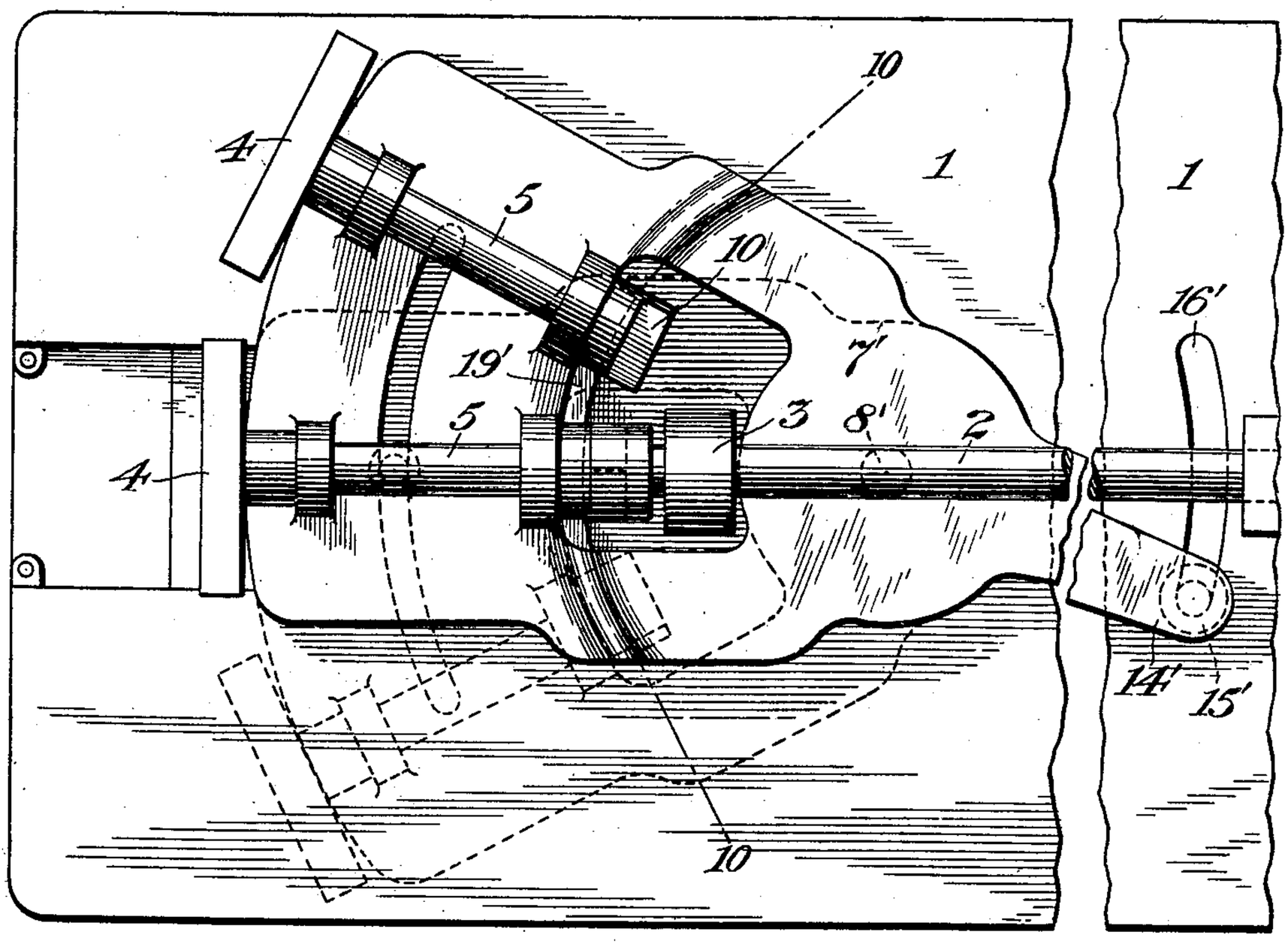


Fig. 10

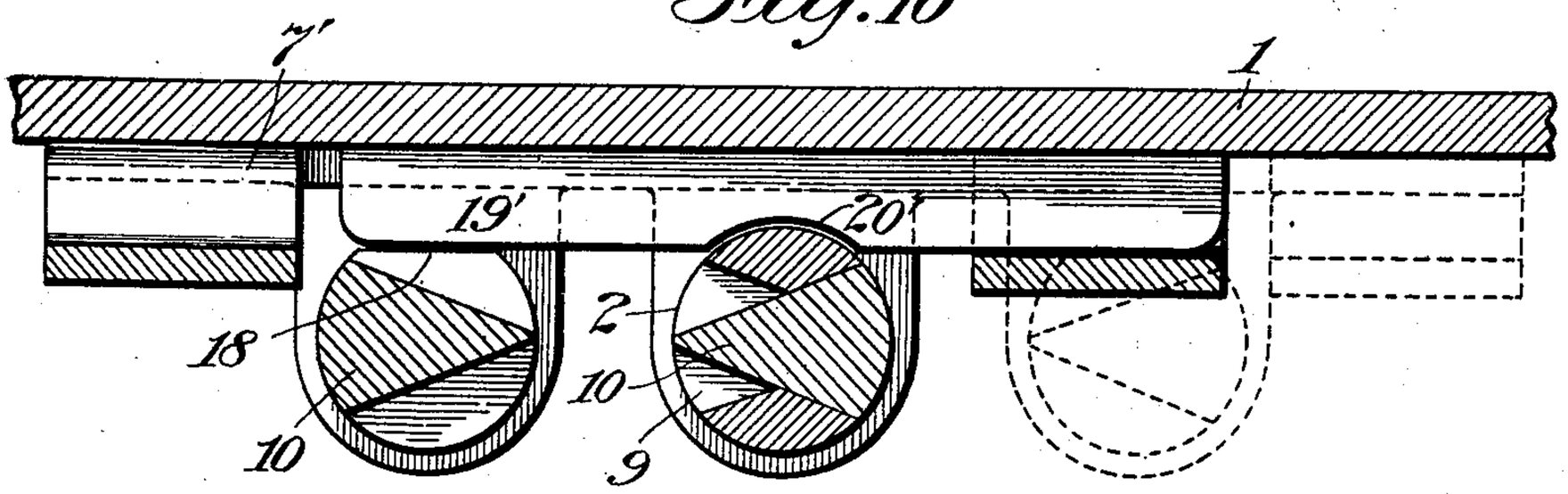
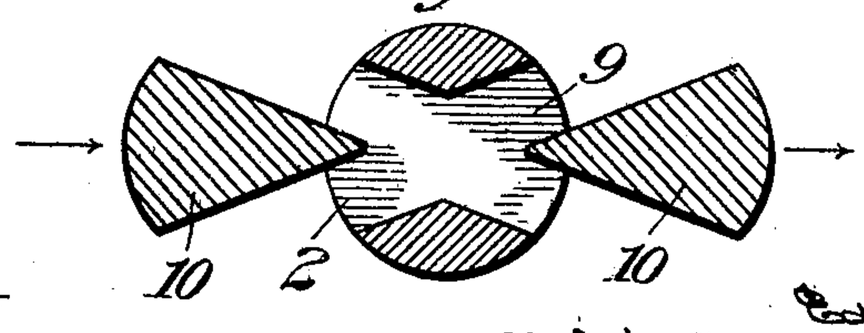


Fig. 11



Witnesses
Chas. J. Clagett
E. W. Faith

Inventor
Edwin J. Toof
By his Attorney
Chas. H. Dane

No. 862,033. PATENTED JULY 30, 1907.

E. J. TOOF.

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APPLICATION FILED JAN. 5, 1905.

4 SHEETS—SHEET 4.

Fig. 12

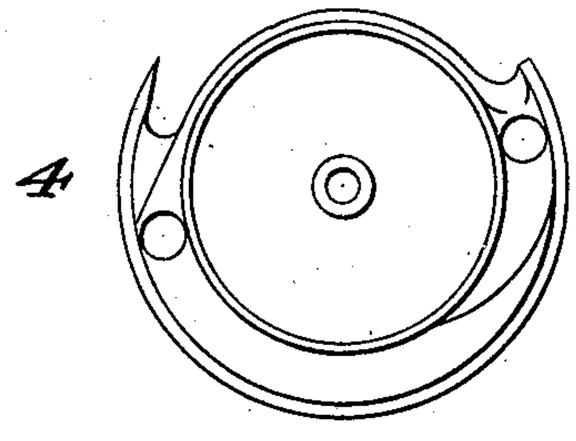
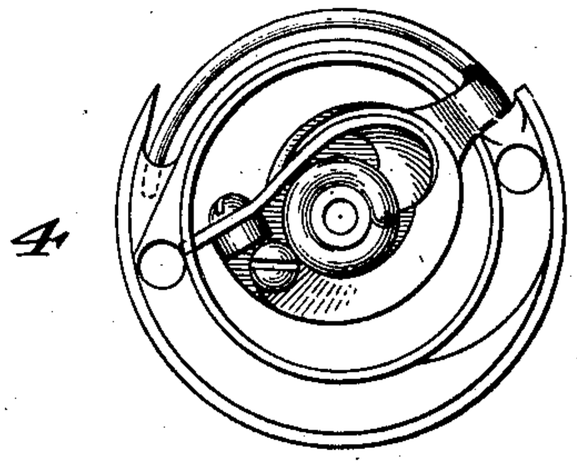


Fig. 13



Witnesses
Chas. F. Clagett
May E. Stanton

Inventor
Edwin J. Toof
By his Attorney
Chas. F. Dane

UNITED STATES PATENT OFFICE.

EDWIN J. TOOF, OF NEW HAVEN, CONNECTICUT.

INTERCHANGEABLE LOCK AND CHAIN STITCH SEWING-MACHINE.

No. 862,033. Specification of Letters Patent. Patented July 30, 1907.

Application filed January 5, 1905. Serial No. 239,696.

To all whom it may concern:

Be it known that I, EDWIN J. TOOF, a citizen of the United States, and resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Interchangeable Lock and Chain Stitch Sewing-Machines, of which the following is a specification.

This invention relates to improvements in sewing machines and more particularly to improvements in that class of sewing machines adapted to be used interchangeably for lock and chain stitch sewing. In some machines of this class, such for example as that shown in Letters Patent No. 687,511, dated Nov. 26, 1901, a change from lock to chain stitch sewing is effected by the removal from the usual shuttle or looper of the under-thread-carrying bobbin and the substitution therefor of a so-called chain-stitch attachment. Such removal and substitution of parts, however, is more or less troublesome, and it has been the main object of my present invention to provide a sewing machine having means whereby it may be readily and conveniently adapted for making either a lock or chain stitch without the removal or substitution of any parts.

To this end the invention, in one form thereof, comprises the combination with a single looper-driver, of a carrier having lock and chain stitch loopers supported thereby and being movable to shift the supported loopers severally to and from an operative position for connection with the looper-driver, and suitable means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other, the said parts being so constructed and organized that a mere shifting of the looper carrier a predetermined distance, preferably by an operating means arranged above the bed-plate in a convenient position to be reached by the operator, is all that is necessary to adapt the machine for either form of stitching.

Referring to the accompanying drawings forming part of this specification, in which I have shown only so much of a sewing machine as is necessary to illustrate my invention, Figure 1 is a partial under-side view of a sewing machine embodying my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a top plan of a part of the bed-plate of the machine containing the slot in which moves the carrier adjusting-screw. Fig. 4 is a detail perspective of the connecting ends of the looper-driver and one of the looper-shafts. Fig. 5 is a partial under-side view of a machine embodying another form of my invention. Fig. 6 is a central longitudinal section of the same. Figs. 7 and 8 are detail sectional views through lines 7—7 and 8—8 of Fig. 5 respectively. Fig. 9 is a partial under-side view of a machine embodying another form of the invention. Fig. 10 is an enlarged cross-section through line 10—10 of Fig. 9. Fig. 11 is a detail to be hereinafter referred to. Figs. 12 and 13 are front views of a lock-stitch looper and a chain-stitch looper, respectively.

Similar reference characters designate like parts in the several figures of the drawings.

As my present invention relates only to the looper mechanism of the sewing machine, and as such mechanism will coöperate with the other parts of the stitch-forming mechanism in the formation of stitches in the usual manner, I have deemed it unnecessary in the present case to illustrate and describe other than the said looper mechanism of the machine.

Referring now to the drawings, 1 indicates the bed-plate of a sewing machine, and 2 a shaft journaled in hangers 3, 3, at the under side of said bed-plate. This shaft 2, which constitutes a looper-driver, may be operated at its rear end in any usual or suitable manner, and at its front end is adapted to have operative connection with a looper to actuate the same.

In accordance with my invention, as before referred to, I employ a plurality of loopers, one being preferably a lock-stitch looper such as shown in Fig. 12, and the other a chain-stitch looper such as shown in Fig. 13, and support the same by a suitable carrier which may be movable in any suitable manner to shift the supported loopers severally to and from an operative position for connection with the said looper-driver to be actuated thereby. The said loopers, indicated at 4, 4, may be of any usual or suitable construction and may also be supported by their carrier in any desired or suitable manner, the same as shown in Figs. 1 and 2 being respectively mounted directly on short shafts 5, 5, which are journaled in hangers 6, 6, on the under side of the movable looper-carrier, which latter as shown in said Figs. 1 and 2 is in the form of a plate 7 pivoted to the under side of the bed-plate at 8 and being oscillatory to shift the supported loopers to and from an operative position for connection with the looper-driver. A connection between the respective loopers and the looper-driver when brought into operative position relatively to each other, whereby the loopers will be actuated by said driver, may be effected in any suitable manner, but as a simple and convenient means for effecting such connection I have provided the looper-driver at its front end with a transverse groove 9 and each of the respective looper-shafts 5, 5, with a tongue 10 for entering said groove, the said parts being so arranged that upon the shifting of the looper-carrier the proper distance the tongue of one looper-shaft will be withdrawn from the groove of the looper-driver and the tongue of the second looper-shaft entered therein, whereby the first looper will be moved to an inoperative position relatively to the looper-driver and the second looper moved to an operative position relatively

thereto, or, in other words, the first looper will be rendered inoperative and the second looper operative.

As it is obviously desirable that a close union should be effected between the looper-driver and the respective looper-shafts so as to avoid any undue noise or rattling such as might be caused by a loose connection between the parts, I have made the tongues on the looper-shafts tapering or wedge-shaped and have also made the groove in the driver of like form to closely receive the tongues; the said groove, however, being made with its walls converging toward the center from opposite sides thereof in order to receive and properly coact with the tongues when arranged to enter the same from opposite sides as shown in the present case. As a means to support the looper-carrier at its front or looper-supporting end, I have provided the same with an elongated slot 12 through which a screw 13 extends with one end threaded into the bed-plate and its opposite or headed end engaging the under side of the carrier and supporting the same as shown.

The looper-carrier 7 may be operated in any suitable or desired manner to shift the supported loopers to and from an operative position as described. It is desirable, however, that the carrier should be capable of being operated from some point convenient to the operator and preferably at a point above the bed-plate. To effect this, I have provided the carrier with an arm 14 extending to a point adjacent to the rear side of the bed-plate with which arm an adjusting-screw 15 at the upper side of the bed-plate connects through an elongated slot 16 in said bed-plate. By this means a movement of the said adjusting-screw 15 from one end of the slot 16 to the other is the only operation required on the part of the operator, other than the loosening and tightening of said screw, to change the machine from one form of stitching to another.

In shifting the respective loopers to and from an operative position in connection with the looper-driver, it is desirable that such parts should at all times be maintained in position to effect coupling or connection when brought into operative position relatively to each other, whereby no other operation to effect connection of the parts is required than the mere shifting of the looper-carrier. As a simple means for maintaining the parts in such position, and as shown in Figs. 9 to 11 inclusive, each of the looper shafts 5, 5, adjacent to their inner or driver connecting ends are provided with a flattened surface 18 which, when the looper is shifted to an inoperative position away from connection with the driver 2, will engage with the edge of a stationary rib 19′ projecting downwardly from the under side of the bed-plate and operate to hold the looper-shaft against rotation and with its tongue 10 in a position to enter groove 9 of the driver when the looper is again moved into operative position relatively to the latter, the said rib being formed with a cut-away portion 20′ at a point in line with the driver so as to permit rotation of the looper-shafts when in operative connection with the driver. Such described means operate to hold the loopers in a non-rotary driver-connecting position when disconnected from the driver, but as a means to maintain the driver with its groove in a position to receive the tongues of the looper-shafts as they are moved into connection therewith, I have so arranged the inner ends of the looper-shafts relatively to the looper-driver that upon the shifting of the looper-carrier 7′ to effect a change of loopers, the tongue of one looper-shaft will enter the groove of the looper-driver at one end thereof prior to the complete withdrawal of the tongue on the other looper-shaft from the opposite end of said groove, in a manner as clearly shown in Fig. 11. In this way, turning of the looper-driver such as would prevent the ready connection or engagement therewith of the looper-shafts is prevented.

In the construction shown in Figs. 1 and 2, a means is also provided similar to that shown in Figs. 9 and 11 for holding the loopers in driver-connecting position when disconnected from the driver, that is, the looper shafts are each provided with a flattened surface 18 which, when the loopers are shifted to an inoperative position away from connection with the driver, will engage with the edge of a stationary rib 19 projecting downwardly from the under side of the bed-plate and operate to hold the looper-shaft against rotation and with its tongue 10 in position to effect connection with the driver when moved into operative position relatively thereto. In this case, however, the looper-shafts are arranged farther apart at their rear ends than in the construction shown in Figs. 9 to 11 so that a complete disconnection of the driver from both looper-shafts takes place during the shifting of the loopers. As such disconnection is but momentary, however, there is but little liability of the looper-driver becoming so turned during the looper shifting operation as to prevent the connection therewith of the looper-shafts, and this can be avoided by the operator holding the driver stationary by means of the usual hand-wheel (not shown) during the said looper-shifting operation.

Another difference in the constructions illustrated in Figs. 1 to 3 inclusive and Figs. 9 to 11 inclusive, respectively, is the location of the carrier-adjusting-screw. In the construction shown in Figs. 1 to 3 the pivot 8 of the looper-carrier is located nearer the rear end of the machine and the said looper-carrier is provided with an arm 14 extending at substantially right-angles therefrom to a point adjacent to the rear side of the bed-plate for the connection therewith of the adjusting-screw 15, while in the construction shown in Figs. 9 to 11, in which the pivot 8′ of the looper-carrier is located nearer the front end of the bed-plate, I have extended the operating arm or end 14′ of the carrier substantially straight therefrom to a position to be engaged through a slot 16′ in the bed-plate by an adjusting-screw 15′ located adjacent to the base of the machine arm (not shown). As before stated, however, the particular means employed to shift the looper-carrier or the particular location of such means is immaterial to my invention.

Referring now to Figs. 5 to 8 inclusive, I have shown a form of my invention in which the looper-carrier, instead of being supported to have an oscillatory movement as in the other figures referred to, is supported to have a reciprocatory movement. In this case, the carrier, indicated at 7″, is slidably mounted in suitable guide-ways 22, 22, in hangers 23, 23, on the under side of the bed-plate in a manner to be movable transversely of the bed-plate in shifting the supported loopers and looper-shafts to and from an operative position for connection with the looper-driver. As a means for operating the carrier as thus supported, I have mounted a ro-

tatable crank-disk 24 in a seat or socket 25 of the bed-plate and provided the same with a crank-pin 26 arranged to extend and operate in a transverse groove 27 in the carrier 7″. With such construction and arrangement of parts, a rotary movement of the crank-disk in its seat will operate to shift the looper-carrier, and as a simple and convenient means for operating such crank-disk for the purpose stated I have provided the same with a pivoted handle 28 the free end of which may be raised above the bed-plate for the purpose of operating the crank-disk and thereafter be dropped or seated in a groove 29 in the bed-plate. When the handle 28 is seated in the said groove 29 it will be below or flush with the upper surface of the bed-plate so as not to interfere with the work passing thereover and will also operate to hold or lock the looper-carrier in its shifted or adjusted position. In the construction shown in these Figs. 5 to 8 inclusive, the loopers will also be held in driver-connecting position when disconnected from the driver in the same manner as illustrated in the other figures hereinbefore described, that is, each looper-shaft is provided with a flattened surface 18 which will engage with the edge of a stationary rib 19″ on the bed-plate when moved to an inoperative position away from connection with the looper-driver, in a manner as clearly shown in Fig. 7.

Having thus set forth certain embodiments of my invention, it will be understood that the same may be materially modified within wide limits without departure from the spirit of the invention, for

What I claim is:

1. In a sewing machine, the combination with a looper-driver, of a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, and means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other.

2. In a sewing machine, the combination with a looper-driver, of a carrier having chain and lock stitch loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, and means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other.

3. In a sewing machine, the combination of a looper-driver, and a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, the said looper-driver and the respective loopers having means for effecting detachable connection when brought into operative position relatively to each other.

4. In a sewing machine, the combination of a looper-driver, and a carrier having a looper supported thereby and being movable to shift the supported looper to and from an operative position for connection with said looper-driver, the said looper-driver and looper being provided, one with a tapering groove and the other with a tapering or wedge-shaped tongue to enter said groove, whereby detachable connection will be effected between the same when brought into operative position relatively to each other.

5. In a sewing machine, the combination of a looper-driver, a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, means for effecting connection between the respective loopers and the looper-driver when in operative position relatively to each other, and means for maintaining the said looper-driver in looper-connecting-position during the shifting of the respective loopers to and from a position for connection therewith.

6. In a sewing machine, the combination of a looper-driver, a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, means for effecting connection between the respective loopers and the looper-driver when in operative position relatively to each other, and means for maintaining the loopers in driver-connecting-position when disconnected from the driver.

7. In a sewing machine, the combination of a looper-driver, a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, the said looper-driver and the respective loopers having means for effecting detachable connection of the same when brought into operative position relatively to each other, and means for maintaining the said looper-driver in looper-connecting-position during the shifting of the respective loopers to and from a position for connection therewith.

8. In a sewing machine, the combination of a looper-driver, a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, the said looper-driver and each of the respective loopers being provided, one with a groove and the other with a tongue to enter said groove, whereby detachable connection will be effected between the driver and the respective loopers when brought into operative position relatively to each other, and the said tongue and grooved parts also being so arranged that during the shifting of the carrier a connection will be retained between the driver and one looper until a connection between the driver and a second looper is effected, for the purpose set forth.

9. In a sewing machine, the combination with a looper-driver, of a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other, and means for moving the carrier to shift the position of its supported loopers.

10. In a sewing machine, the combination with a looper-driver, of a carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers generally to and from an operative position for connection with said looper-driver, means for effecting connection of the respective loopers and looper-driver when in operative position relatively to each other, and means for moving the carrier and securing the same in adjusted position.

11. In a sewing machine, the combination with a rotary looper-driver, of a plurality of looper shafts having loopers connected therewith, a carrier supporting said looper shafts and being movable to shift the same to and from an operative position for connection with the looper-driver, and means for effecting connection of the respective looper shafts with the looper-driver when in operative position relatively to each other.

12. In a sewing machine, the combination with a rotary looper-driver, of a plurality of looper shafts having loopers connected therewith, and a carrier supporting said looper shafts and being movable to shift the same to and from an operative position for connection with the looper-driver, the said looper-driver and the respective looper shafts having means for effecting detachable connection when brought into operative position relatively to each other.

13. In a sewing machine, the combination with a looper-driver, of a pivoted carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers severally to and from an operative position for connection with said looper-driver, and means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other.

14. In a sewing machine, the combination with a looper-driver, of a pivoted carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other, and means for securing the carrier in a stationary adjusted position.

15. In a sewing machine, the combination with the bed-

plate and a looper-driver supported in bearings at the under side thereof, of a pivoted carrier having a plurality of loopers supported thereby and being movable to shift the supported loopers to and from an operative position for connection with said looper-driver, means for effecting connection of the respective loopers with the looper-driver when in operative position relatively to each other, and means located at the upper side of the bed-plate and connecting with the carrier through an elongated slot in said bed-plate to secure the carrier in stationary adjusted position.

Signed at New York in the county of New York and State of New York this 4th day of January A. D. 1905.

EDWIN J. TOOF.

Witnesses:
CHAS. F. DANE,
E. M. FAITH.