

1,018,653.

G. M. EAMES.
SEWING MACHINE.
APPLICATION FILED APR. 25, 1911.

Patented Feb. 27, 1912.

2 SHEETS—SHEET 1.

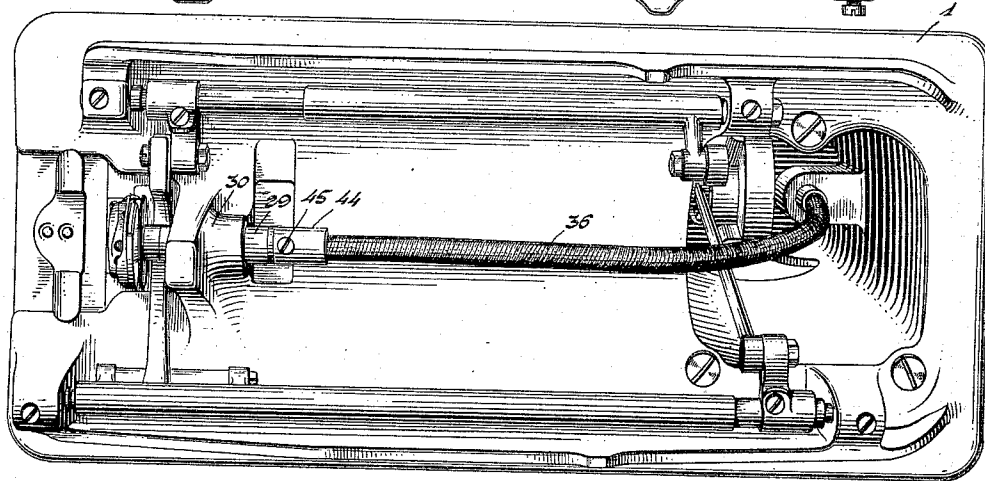
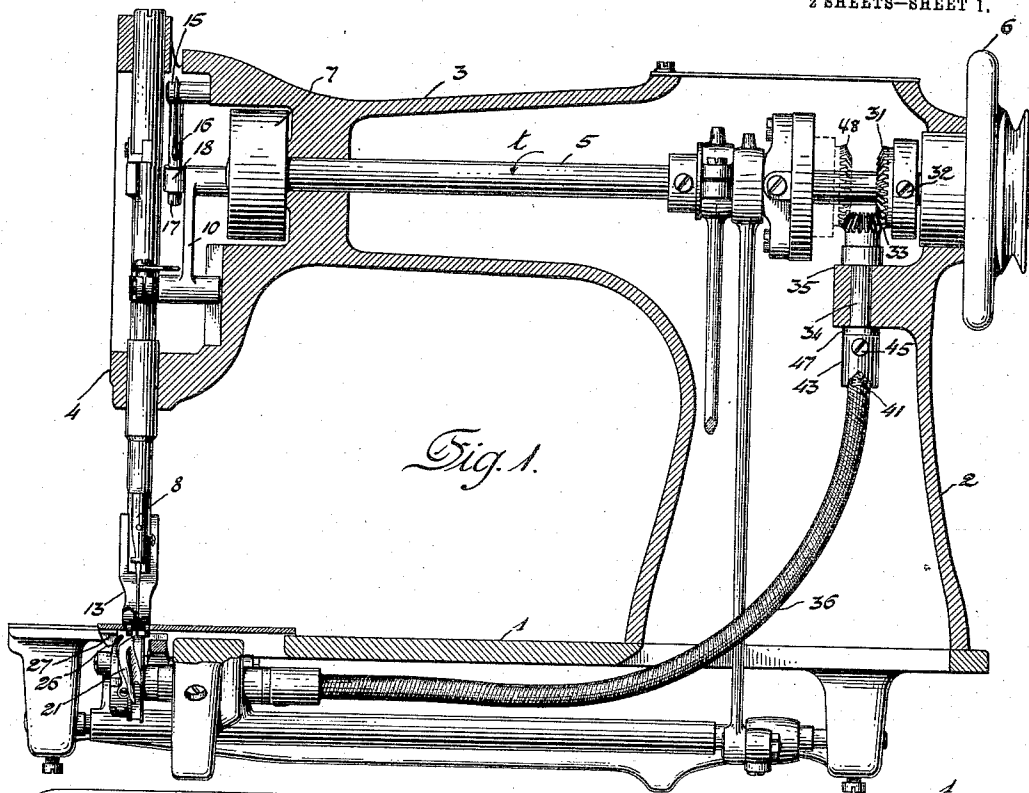


Fig. 2.

WITNESSES:

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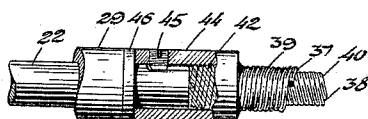


Fig. 6.

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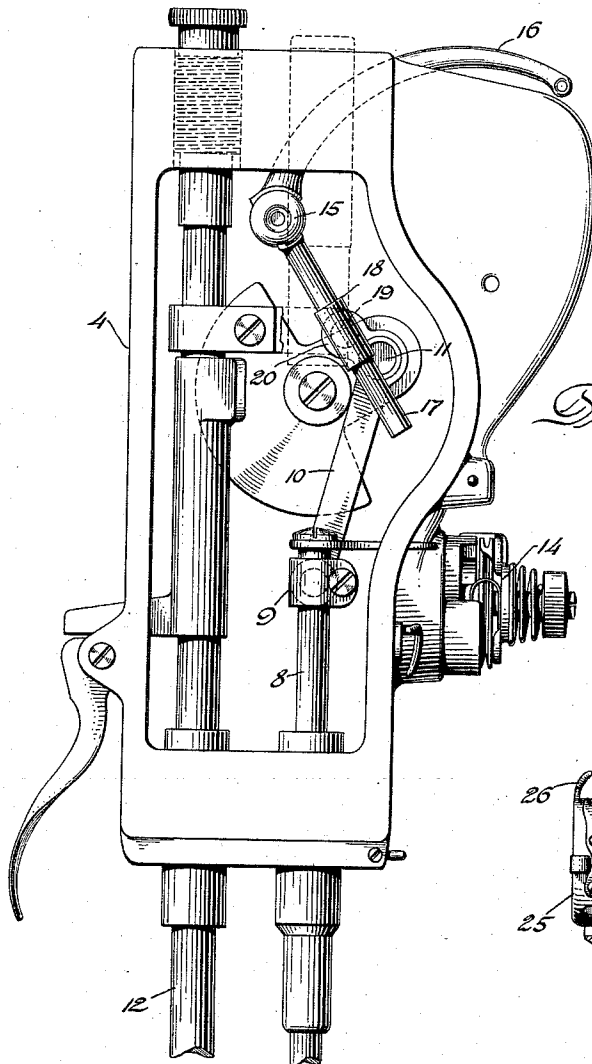


Fig. 3.

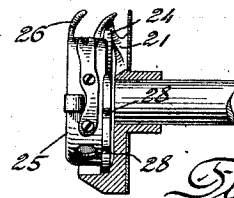


Fig. 5.

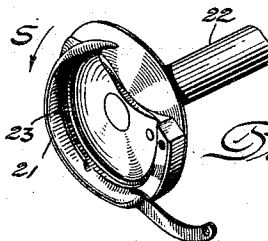


Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE M. EAMES, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,018,653.

Specification of Letters Patent.

Patented Feb. 27, 1912.

Application filed April 25, 1911. Serial No. 623,227.

To all whom it may concern:

Be it known that I, GEORGE M. EAMES, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in sewing machines, and has for its object to provide improved means for transmitting motion from the main or needle-bar-actuating shaft to the loop-taker.

15 In many of the patented sewing machine constructions of comparatively recent date, notably those relating particularly to increased speed, of the type represented by United States Patents No. 667,830, issued Feb. 12, 1901, to A. Steward, and No. 842,934, issued Feb. 5, 1907, to Bolton *et al.*, the tendency has been to eliminate, in so far as possible, from the connections employed for transmitting motion from the main shaft to the loop-taker such means as effect a variable speed of the loop-taker, and to limit such connections to the smallest possible number of parts and bearings, thus effecting a synchronous action of the elements best calculated to meet the requirements of high speed.

25 The substantially universal adoption of belt connections in the construction of high speed sewing machines, as distinguished from the employment of one or more crank connections, as in U. S. Patent No. 663,808, issued Dec. 11, 1900, to P. Diehl, proves conclusively the desirability of giving to the loop-taker unvariable movement, and in this connection it is to be understood that the present device not only transmits to the loop-taker the desired movement but dispenses with the belt, the employment of which adds a decided resistance to the light running of the machine in that it must, in order to insure the proper timing of loop-taker and needles, be stretched to its limit when positioned on its coacting pulleys, which results in forcing the driving and driven shafts against their bearings. Accordingly, the free action of the present device is lacking in constructions which employ belt connections.

55 In the present device the main shaft is

through a flexible shaft whose axis of rotation lies in transverse directions, suitable gears of a ratio to meet the requirements of multiple rotations of said loop-taker to one of said main shaft being employed to operatively connect the opposite end of said flexible shaft with said main shaft, thus effecting a simple and durable connection which, owing to its direct action, dispenses with the complication of elements common to the earlier means for transmitting motion to the loop-taker.

60 In addition to the advantages previously pointed out, is the convenient means provided for reversing the direction of rotation of the loop-taker if, for any reason, it is desired to substitute a loop-taker constructed to rotate in the opposite direction, as is common in connection with the loop-takers employed in high speed sewing machines, as in the device represented by United States Patent No. 663,808 previously referred to.

65 In the consideration of means for conveniently reversing the rotation of the loop-taker without interfering with the direction of rotation of the main shaft, it is to be understood that in machines employing a take-up operated from the main shaft to move in a vertical plane transverse to the axis of said shaft, as herein, it is impractical to reverse the movements of said shaft unless said take-up is mounted and arranged to meet the requirements of such reversed action, which would require that the effective or thread end of said take-up be at the rear of the bracket arm, instead of at the side nearest the operator, and necessitate the locating of the means for leading, tensioning and controlling the needle thread at the rear of said bracket arm, which arrangement, while not impractical, as will be readily understood by reference to the last mentioned patent, is undesirable owing to the inconvenience of manually passing the needle thread through the several thread tensioning and guiding elements.

70 In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a view in central elevation of the bracket arm and bed-plate of a sewing machine, together with full line views of the sewing machine actuating mechanism, including the present invention. Fig. 2 is 110

an underside view of the sewing machine shown in Fig. 1. Fig. 3 is a front end elevation of the sewing machine bracket arm. Fig. 4 is a view in perspective of the loop-taker. Fig. 5 is a view of the bobbin case, loop-taker shaft and loop-taker, the latter being shown in central section. Fig. 6 is a detail view partially in section, showing the means employed for connecting the flexible shaft with its driving and driven shafts.

Referring to the drawings, 1 represents the bed-plate of the sewing machine upon which is mounted the bracket arm comprising the standard 2, overhanging arm 3 and 4, and 5 the main or needle-bar-actuating shaft mounted to rotate in suitable bearings formed in said bracket arm and carrying at one end a hand or band wheel 6 and at its opposite end the shaft flange 7.

8 is the needle-bar mounted to move vertically in the head 4 and operatively connected with the flange 7 by stud collar 9, link 10 and shaft flange stud 11.

12 represents the cloth-presser-carrying bar of usual construction provided with a cloth-presser 13, and 14 one form of commonly-employed thread tensioning and controlling device.

In the head 4 is suitably secured a stud 15, upon which is pivotally mounted the needle thread take-up comprising the take-up arm 16 and actuating arm 17, the latter passing through a sleeve 18 provided with a stud 19 (shown in dotted lines only, Fig. 3) pivotally mounted in a bearing 20 formed integral with the link 10, thus transmitting motion from the main shaft 5 to said take-up.

21 represents the loop-taker carried by the shaft 22 and provided with an internal groove 23 for the reception of the flange 24 of the bobbin case 25, the latter being provided with a stop 26 which coacts with suitable members, as 27 (one only of which is shown, see Fig. 1), to hold said bobbin case against rotation with said loop-taker. 28 represents notches formed in the flange 24 to assist in clearing the groove 23 of any loose ends of sewing threads which might accidentally be carried into it by the action of said loop-taker, the shaft 22 being journaled in a bushing 29 suitably secured in a lug 30 forming a part of the bed-plate 1.

All of the hereinbefore referred to elements were common to the construction of the present machine prior to the application of the present invention, as was also the cloth-feeding mechanism, and as the latter has no particular bearing on either the construction or application of the present invention, specific reference to its elements is deemed unnecessary.

31 represents a bevel gear which is se-

cured by screw 32 to the main shaft 5 and meshes with a like gear 33 carried by the upright shaft 34 mounted in a suitable bearing in the lug 35, and as said gears are of the ratio of two to one, the gear 33 is given two rotations to one rotation of the gear 31.

The flexible shaft 36 consists of multiple plies of spirally wound wires, as 37 and 38, the separate plies 39 and 40 being wound in opposite directions and preferably with their coils in crowded relationship. Each of the opposite ends 41 and 42 of said shaft has its plies soldered or brazed together and is in like manner secured to the inner surface of the respective collars or receivers 43 and 44, thus effecting a construction of shaft which, owing to the small amount of power transmitted, is held against such torsional action as would interfere with the effective action of said loop-taker.

In the collars 43 and 44 are secured by screws, as 45, the ends of the respective shafts 34 and 22, the latter being provided with a washer 46 located between the collar 44 and bushing 29, a like washer 47 being carried by the shaft 34 and located between the collar 43 and lug 35.

In the practical application of a loop-taker provided with an internally journaled bobbin-case, as in the present construction, it frequently happens that the loose ends of the sewing threads are carried between the bobbin-case flange 24 and its coacting groove 23 in quantities sufficient to arrest the action of the machine, and to lessen this difficulty said flange is provided with the notches 28 which, in the majority of cases, act to break and throw out such loose ends. But if the notches fail to perform their function, the machine is suddenly brought to rest, which frequently causes the breaking of parts or their adjustment out of effective relationship; and if a belt connection is employed, the belt is frequently broken or unshipped from its coacting pulleys, or the elements carried by said belt for maintaining the proper timing of said main shaft and loop-taker are distorted or forced out of their given adjustments. In the present construction, when the loop-taker is brought to rest through the accidental interference of the sewing threads, the flexible shaft, owing to its increased labor, will be slightly torsioned and act as a yielding stop for the loop-taker, thus practically obviating the difficulties experienced when employing connections which are unyielding in the direction of their effective action.

From the foregoing it will be readily understood that a flexible shaft such as the one herein disclosed acts as a qualifying element to the action of the loop-taker, aside from its qualifying effect on the sewing machine actuating mechanism. It will also be

obvious that if the bevel gear 31 was positioned as shown by dotted lines 48, the loop-taker would be rotated in the opposite direction, or in the direction indicated by the arrow *s*, Fig. 4, while the main shaft would continue to rotate toward the operator, or in the direction indicated by the arrow *t*, Fig. 1.

Claims:—

1. In a sewing machine, a bracket arm, a bed-plate, a loop-taker located below the latter, a rotary main shaft mounted in said bracket arm, and connections for operatively connecting said loop-taker with said main shaft, said connections including a flexible shaft comprising right and left hand spirally wound plies of wire and having its axis of rotation in transverse planes.

2. In a sewing machine, a bracket-arm, a bed-plate, a loop-taker mounted below the latter, a rotary main-shaft mounted in said bracket-arm and a flexible shaft comprising right and left hand spirally wound plies of wire, the opposite ends of said shaft having its plies secured together to effect rigid portions, one of which latter is operatively connected with said loop-taker, the other being operatively connected with said main-shaft to effect multiple rotations of said loop-taker to one rotation of said main-shaft.

3. In a sewing machine, a bracket-arm, a bed-plate, a main-shaft and a loop-taker mounted below said bed-plate, a flexible shaft comprising right and left hand spirally wound plies of wire, the opposite ends of said shaft having its plies secured together and to the inner walls of a receiver to effect rigid portions, one of which latter

is operatively connected with said loop-taker, the other being geared to said main-shaft to effect multiple rotations of said loop-taker to one rotation of said main-shaft.

4. In a sewing machine, a bracket-arm, a bed-plate, a loop-taker mounted below the latter, a rotary main-shaft mounted in said bracket-arm, and a flexible shaft comprising right and left hand spirally wound plies of wire, the opposite ends of said shaft having its plies secured together to effect rigid portions, one of which latter is operatively connected with said loop-taker, the other being connected with said main shaft through bevel gears of the ratio of two to one to effect two rotations of said loop-taker to one rotation of said main-shaft.

5. In a sewing machine, a bracket-arm, a bed-plate, a main-shaft and a loop-taker mounted below said bed-plate, a flexible shaft comprising right and left hand spirally wound plies of wire, the opposite ends of said shaft having its plies secured together and to the inner walls of a receiver to effect rigid portions, one of which latter is operatively connected with said loop-taker, the other being connected with said main-shaft through bevel gears of the ratio of two to one to effect two rotations of said loop-taker to one rotation of said main-shaft.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE M. EAMES.

Witnesses:

ABBIE M. DONIHUE,
DONALD NOBLE.