

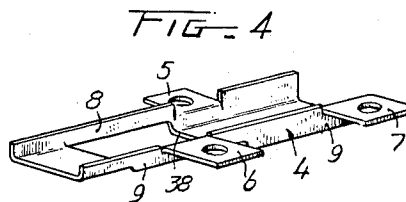
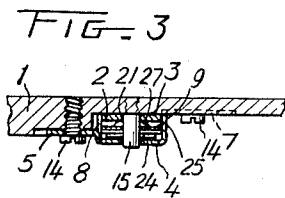
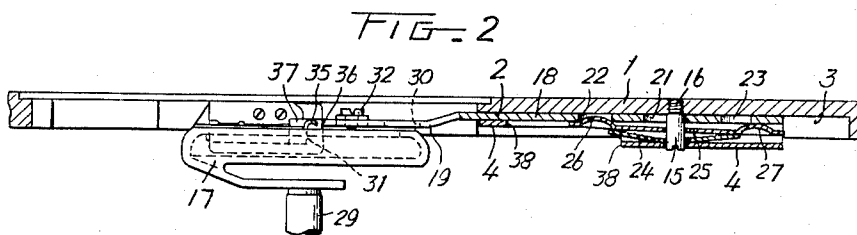
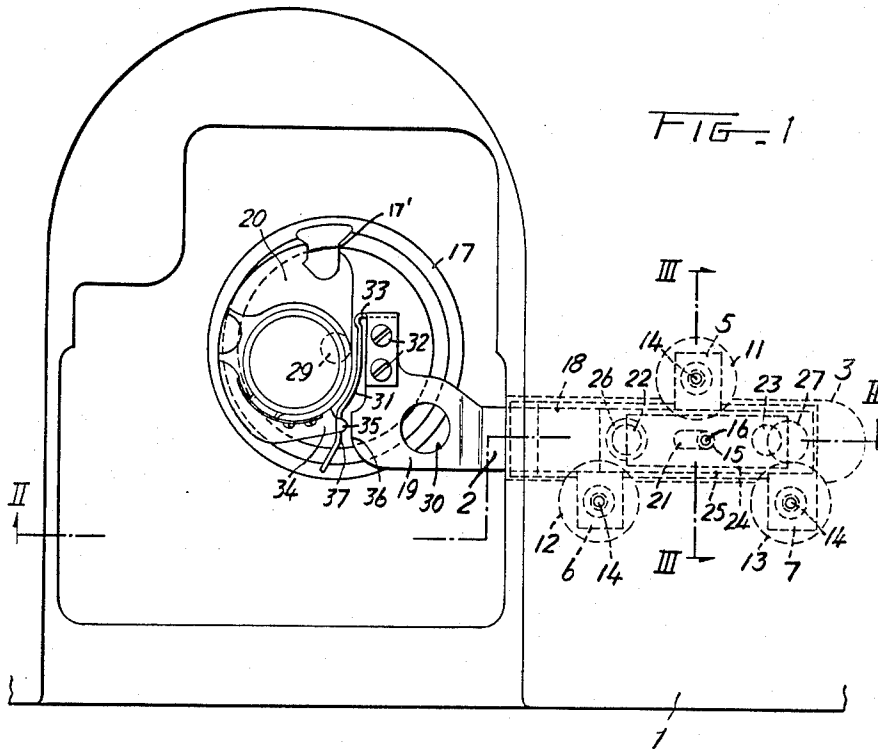
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BOBBIN CASE HOLDER

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3,211,116

BOBBIN CASE HOLDER

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The present invention relates to sewing machines.

More particularly, the present invention relates to sewing machine structure which cooperates with a bobbin case for retaining the bobbin case in its operative position as well as for releasing the bobbin case for removal from its operative position.

As is well known, in sewing machines of the type where a rotary hook passes through a thread loop so as to shift the loop past a stationary bobbin case, it is necessary to hold the bobbin case in its operative position while at the same time it is also necessary to be able to release the bobbin case for removal so that lint and the like can be removed and also so that a lubrication can be provided as required.

A considerable amount of difficulty has been involved in the past with the structure for releasably retaining the bobbin case in its operative position, and even though it is customary to provide detailed instructions as to how to remove and replace the bobbin case, nevertheless this operation is still fairly complex.

It is accordingly a primary object of the present invention to provide a structure which will make it exceedingly simple for the operator of the sewing machine to release the bobbin case for removal as well as to retain the bobbin case in its operative position.

A further object of the present invention is to provide a structure of the above type which not only will retain the bobbin casing in its operative position but which will also act to substantially prevent rotation of the bobbin case during operation of the sewing machine.

Still another object of the present invention is to provide a structure of the above type which will not only act to retain the bobbin case in its operative position but which will also participate in the guiding of the loop of thread around the bobbin case.

It is furthermore an object of the present invention to provide a structure of the above type which will automatically remain either in a position maintaining the bobbin case in its operative position or in a position releasing the bobbin case for removal from its operative position.

An additional object of the present invention is to provide a structure of the above type which can easily be manually operated so as to hold or release the bobbin case.

It is furthermore an object of the present invention to provide a structure of the above type which is exceedingly simple and at the same time very reliable in operation.

With the above objects in view the invention includes, in a sewing machine, a support plate having an upper side and an underside, and an elongated holding strip having an elongated portion located against the underside of the support plate. A guide means guides the holding strip at its elongated portion for shifting movement between holding and release positions, and a releasable resilient detent means cooperates with the holding means for re-

leasably retaining the latter in one or the other of said positions thereof. A resilient means is fixedly connected to the holding strip and is located in close proximity to the bobbin case when the holding strip is in its holding position for preventing removal of the bobbin case from its operative position, and when the holding strip is shifted from its holding to its release position, this latter means is displaced away from the bobbin case by a distance sufficient to release the latter for removal from its operative position.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary top plan view of that part of a sewing machine which is provided with the structure of the invention;

FIG. 2 is a sectional view taken along line II—II of FIG. 1 in the direction of the arrow;

FIG. 3 is a transverse sectional view taken along line III—III of FIG. 1 in the direction of the arrow; and

FIG. 4 is a perspective illustration of an elongated guiding channel which forms part of the structure of the invention.

Referring to the drawings, it will be seen that the structure illustrated includes a support means formed by a rigid horizontal support plate 1 which is provided at its underside 3 with an elongated holding means 2 which engages the underside 3 of the support means or plate 1. The underside 3 of the support plate 1 is stepped, as is apparent from FIG. 3. The elongated holding means 2 is in the form of an elongated strip of metal which has an elongated portion 18 located directly next to the underside 3 of the support plate 1, and the elongated holding strip 2 has a portion 19 which is located beyond an edge of the plate 1 so as to be accessible to the operator, this portion 19 being located beneath the conventional removable plate which gives access to the chamber in which the rotary shuttle is located, as is well known.

The plate 1 also carries at its underside a guide means 4 which guides the holding strip 2 for shifting movement between the holding position thereof, which is illustrated in FIGS. 1 and 2, and a release position where the strip 2 is shifted to the right, as viewed in FIGS. 1 and 2, from the holding position thereof shown in FIGS. 1 and 2.

As may be seen from FIG. 4, the elongated guide means 4 is in the form of a straight elongated channel member having an ear 5 on one side and a pair of ears 6 and 7 on its other side, the ears 6 and 7 being located at an elevation higher than the ear 5, and all of these ears being formed with openings through which the screw members 14 pass into threaded bores of the plate 1, as is apparent from FIG. 3. The threaded bores of the plate 1 are countersunk at the underside of the plate 1 so as to provide recesses 11—13 (FIG. 1) which respectively receive the ears 5—7. The elongated channel member 4 has a pair of opposite side walls 8 and 9, the ear 5 extending from the wall 8 while the ears 6 and 7 extend from the wall 9, and the bottom wall of the channel member 4 is interrupted by a cutout 38. As is apparent particularly from FIG. 2, the left portion of the

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bottom wall of the channel member 4, which is located on the left side of the cutout 38, as viewed, in FIG. 2, directly engages the underside of the elongated portion 18 of the holding strip 2, so that the holding strip 2 is directly guided for slidable shifting movement by the left portion of the channel 4, as viewed in FIG. 2. The right portion, however, is displaced beneath the elongated portion 18 of the holding strip 2 so as to provide a chamber in which a releasable detent means may be housed, as described below.

An elongated screw member 15 passes through an opening in the bottom wall of the channel member 4 and is threaded into a threaded bore 16 formed in the support plate 1. This member 15 passes through an elongated slot 21 which is formed in the elongated portion 18 of the holding strip 2, so that the pin 15 together with the slot 21 also serve to guide the holding strip 2 for movement between its holding and release positions, and in addition the ends of the slot 21 cooperate with the pin 15 for limiting the shifting movement of the holding strip 2.

In addition to performing the above functions, the pin 15 extends through openings of a pair of leaf springs, which form part of the releasable detent structure, and the pin 15 extends through the latter leaf spring openings with a clearance sufficient to provide, without any interference, the desired tilting movement of the leaf spring assembly. This leaf spring assembly includes an upper elongated leaf spring 25 provided at its end portions with a pair of bulging, upwardly directed projecting portions 26 and 27 respectively having upper convex surfaces, and the pin 15 extends through a central opening of this upper leaf spring 25. Beneath the leaf spring 25 between the latter and the bottom wall of the channel member 4 is located a second leaf spring 24 which is curved in the manner shown most clearly in FIG. 2 so that this leaf spring 24 has a lower convex surface directed toward and engaging the upper face of the bottom wall of the channel member 4, thus the leaf spring 24 acts on the leaf spring 25 to urge the latter upwardly toward the elongated portion 18 of the holding strip 2. This elongated portion 18 of the holding strip 2 is formed with a pair of openings 22 and 23, and in the illustrated holding position of the holding strip 2 the projection 26 is received in the opening 22, while when the holding strip 2 is shifted to its release position the projection 26 is automatically displaced out of the opening 22 while the opening 23 receives the projection 27, so that in this way the leaf spring assembly forms a releasable detent structure which will automatically and releasably retain the holding strip 2 in one or the other of its positions.

In order to render the holding means 2 easily operable, its portion 19, which is accessible to the operator as described above, is formed with an opening 30 capable of receiving the tip of a finger of the operator, for example, so that by engaging the holding means 2 in its opening 30 it is easy for the operator to shift the holding means 2 between its holding and release positions.

The portion 19 of the holding strip 2 extends over the holder or race 17, and FIG. 2 also shows a shaft 29. As is well known during operation the rotary hook 17' revolves and passes through a loop of thread during each revolution, the hook 17' moving around the bobbin case 20 so as to displace the loop of thread from one side to the other side of the bobbin case, and in this way the stitches are made with the thread coming from the bobbin, as is well known in the art. The bobbin case 20 of course should remain stationary, or at least substantially stationary during operation of the sewing machine, and for this purpose the holding strip 2 of the invention fixedly carries a resilient means 31 which is located closely adjacent to the bobbin case 20 when the holding strip 2 is in its holding position, shown in FIGS. 1 and 2, so that in this way the means 31 will prevent removal of

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the bobbin case from its operative position. This means 31 is in the form of an elongated springy metal member having a lug fixed by the screws 32 to a free end of the holding strip 2, and next to the lug 32 the elongated member 31 is provided with a curved projecting portion 33 which facilitates the guiding and slipping of a loop of thread past the bobbin case during operation of the sewing machine. In addition, the elongated member 31 has an end portion 37 which extends over a flange 34 of the bobbin case to prevent removal of the latter from its operating position, and the means 31 also serves to substantially prevent rotation of the bobbin case 20 when it is in its operative position, and for this purpose the elongated member 31 is provided at its arm 37 with a projection 35 directed toward and spaced slightly from an edge 36 of the strip 2 so that if there is any tendency of the bobbin case to rotate it will simply displace the elongated member 31 through the very small distance required to place the projection 35 in engagement with the edge 36, and then no further movement of the bobbin case is possible, so that in this way the means 31 acts not only to retain the bobbin case in its operative position but also to prevent, substantially, rotary movement thereof during rotation of the shuttle.

When it is desired to remove the bobbin case, either for cleaning purposes or for lubricating purposes or both, or for the purpose of removing an empty bobbin and replacing with a full bobbin, then it is only necessary for the operator to engage the strip 2 in its opening 30 and shift this strip 2 in a straight movement to the right, as viewed in FIGS. 1 and 2 to its release position where the left end of the slot 21 engages the pin 15 and where the projection 27 becomes located in the opening 23, as described above. During such movement portion 18 moves along the plane in which the underside of plate 1 is located and portion 19 moves in a parallel horizontal plane. When thus shifted from its holding to its release position, the holding strip 2 displaces the means 31 away from the bobbin case by a distance which is sufficient to release the latter for removal by the operator from its operative position, and of course after the bobbin case is replaced it is only necessary for the operator to shift the strip 2 back to the position thereof illustrated in FIGS. 1 and 2 so that the operator can again permit the operations to be resumed.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of sewing machines differing from the types described above.

While the invention has been illustrated and described as embodied in bobbin holders, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various application without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a sewing machine, in combination, a supporting plate; elongated rigid holding means located next to said supporting plate and including a resilient means; rigid guide means carried by said supporting plate and guiding said elongated releasable holding means for straight shifting movement in a plane between a holding position in which said resilient means is adapted to hold a bobbin case in an operative position thereof and a release position releasing the bobbin case for removal from said operative position thereof, said guide means including an

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elongated channel member fixed to said plate and receiving said elongated holding means for guiding the latter; and resilient detent means mounted on said support plate and acting transversely to the same for releasably arresting said holding means in said positions thereof and adapted to release said holding means when the same is moved from one of said positions to the other of said positions thereof.

2. In a sewing machine, in combination, a support plate having an upper side and an underside; an elongated holding strip having an elongated rigid portion located against the underside of said plate; rigid guide means carried by said plate at said underside thereof and guiding said strip for straight movement in a plane between a holding position and a release position; resilient means carried by said holding strip adjacent a free end thereof and located in close proximity to a bobbin case when said holding strip is in said holding position thereof for preventing removal of a bobbin case from an operative position thereof while simultaneously substantially preventing rotation of the bobbin case, said holding strip when shifted to said release position thereof displacing said means away from the bobbin case to release the latter for removal from said operative position thereof; and releasable resilient detent means cooperating with the elongated portion of said strip at said underside of said plate for releasably arresting said strip in said positions thereof and adapted to release said portion when said strip is shifted from one to the other of said positions.

3. In a sewing machine, in combination, a support plate having an upper side and an underside; an elongated holding strip having an elongated portion located against the underside of said plate; guide means carried by said plate at said underside thereof and guiding said strip for movement between a holding position and a release position; means carried by said holding strip adjacent a free end thereof and located in close proximity to a bobbin case when said holding strip is in said holding position thereof for preventing removal of a bobbin case from an operative position thereof while simultaneously substantially preventing rotation of the bobbin case, said holding strip when shifted to said release position thereof displacing said means away from the bobbin case to release the latter for removal from said operative position thereof; and releasable detent means cooperating with the elongated portion of said strip at said underside of said plate for releasably retaining said strip in one or the other of said positions thereof, said detent means including an elongated leaf spring having a pair of projecting portions, and said elongated portion of said holding strip being formed with a pair of openings one of which cooperates with one of said projecting portions of said leaf spring in one position of said holding strip and the other of which cooperates with the other projection of said leaf spring in the other position of said holding strip.

4. In a sewing machine, in combination, a rigid supporting plate having an upper side and an underside; an elongated rigid holding strip having an elongated rigid portion located next to the underside of said plate; an elongated guiding channel fixed to the underside of said plate and guiding said strip for shifting movement between holding and release positions, said channel having one rigid guiding portion which directly engages said strip to guide the latter for straight shifting movement in a plane between holding and release positions thereof and a second portion which is spaced from said strip; releasable resilient detent means housed in said second portion of said channel and cooperating with said elongated portion of said holding strip for releasably arresting the latter in said positions thereof and adapted to release said portion when said strip is shifted from one to the other of said positions; and means carried by said strip at an end portion thereof and located in close proximity to a bobbin case when said holding strip is in said hold-

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ing position thereof for preventing removal of the bobbin case from an operative position thereof, said strip when shifted from said holding to said release position thereof displacing said means away from the bobbin case to free the latter for removal from said operative position thereof.

5. In a sewing machine, in combination, a support plate having an upper side and an underside; an elongated holding strip having an elongated portion located against said underside of said plate; an elongated guiding channel fixed to the underside of said plate and guiding said elongated portion of said strip, said channel guiding said strip for movement between holding and release positions and said channel including a first guiding portion directly engaging said strip and a second guiding portion spaced from said strip; leaf spring means located in said second portion of said guiding channel and having a pair of projections directly engaging said strip, said strip being formed with a pair of openings one of which receives one of said projections in one position of said strip and the other of which receives the other of said projections in the other position of said strip so that said leaf spring means acts as a detent releasably retaining said holding strip in said positions thereof; and means fixedly carried by said strip adjacent a free end thereof and located in close proximity to a bobbin case for preventing removal of the bobbin case from an operative position thereof when said holding strip is in said holding position thereof, said holding strip upon being shifted to said release position thereof displacing said means away from said bobbin case to release the latter for removal from said operative position thereof.

6. In a sewing machine as recited in claim 5, said holding strip having a portion extending beyond an edge of said plate and accessible to the operator, and said portion being formed with an opening also accessible to the operator so that by engaging said strip in said opening thereof said strip may be manually shifted between said positions thereof.

7. In a sewing machine, in combination, support means; manually operable holding means including a member for holding a bobbin case and a portion guided exclusively for straight shifting movement in a plane between a holding position in which said member is adapted to hold a bobbin case and a release position in which said member is adapted to release the bobbin case for removal; and a resilient detent arrangement including first detent means on said portion of said manually operable holding means and second detent means on said support means, said first and second detent means being arranged so as to engage each other when said manually operable holding means is in said holding position thereof, and one of said detent means being resilient so as to resiliently disengage the other detent means and permit movement of said manually operable holding means from said holding position to said release position thereof by straight shifting movement of said manually operable holding means along said support from said holding to said release position thereof.

8. In a sewing machine, in combination, support means, manually operable holding means including a member for holding a bobbin case and a portion guided exclusively for straight shifting movement in a plane between a holding position in which said member is adapted to hold a bobbin case and a release position in which said member is adapted to release the bobbin case for removal; and a detent arrangement including two detent means on one of said aforementioned means, and one detent means on the other of said aforementioned means, the detent means on one of said aforementioned means being resilient, and the one detent means on the other of said aforementioned means resiliently engaging one of said two detent means on said one of said aforementioned means when said manually operable holding means is in said holding position thereof and resiliently engaging the other of said two detent means when said manually operable

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holding means is in said release position thereof, whereby upon manually straight shifting movement of said manually operable holding means in said plane from either of said positions into the other of said positions said detent means will become automatically disengaged and engaged respectively by such straight shifting movement of said manually operable holding means.

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