(No Model.)

P. DIEHL.

LOOP TAKER FOR SEWING MACHINES.

No. 523,334. Patented July 24, 1894.

Fig. 2.

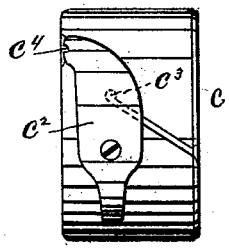

Fig. 1.

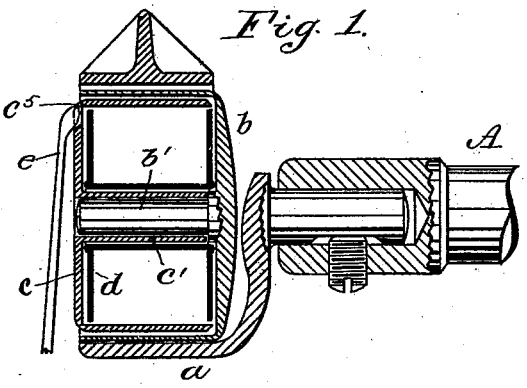

Fig. 3.

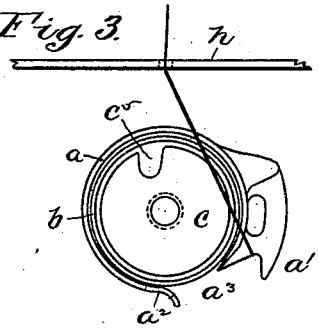

Fig. 4.

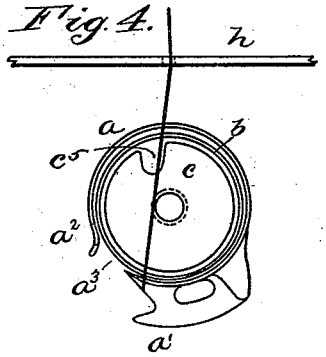

Fig. 5.

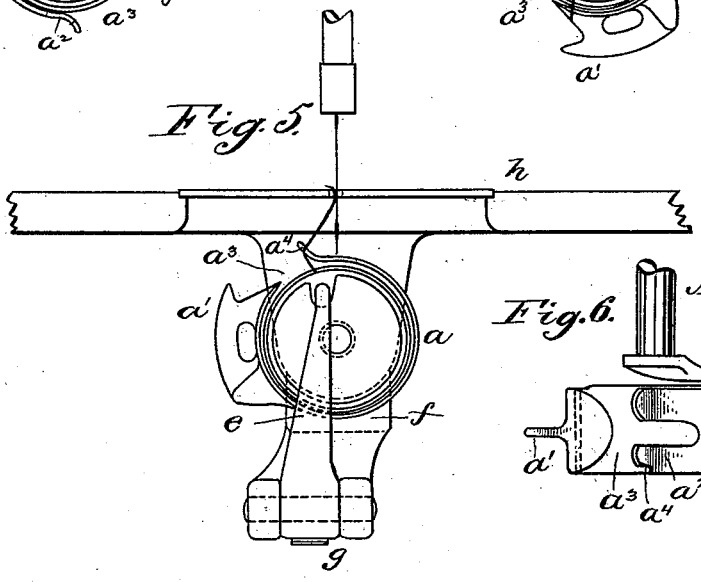

Fig. 6.

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UNITED STATES PATENT OFFICE.

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LOOP-TAKER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 523,334, dated July 24, 1894.

Application filed December 20, 1892. Renewed May 7, 1894. Serial No. 510,408. (No model.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, 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.

My invention has for its object to improve that class of lock-stitch sewing machines in which the lower or locking thread is supplied from a bobbin sustained by a bobbin-case or holder which is in turn supported in the cavity of a rotating or oscillating hook.

In machines of the class referred to the bobbin case or holder has heretofore been placed loosely within the hook so as to rest by gravity on the lower inner side of the hook, and thus have a peripheral contact therewith. This peripheral contact of the bobbin-case with the inside of the hook induces so much friction between the hook and bobbin case that the latter, partaking more or less of the movements of the hook, frequently rotates in such a manner as to twist or untwist the bobbin thread, even with an oscillating hook; as at high speeds the bobbin case, carrying the bobbin with it, sometimes starts to rotate continuously, thus causing this twisting or untwisting of the thread. While it is true that this objectionable movement of the bobbin-case might be avoided by holding the bobbin case stationary while the hook is in motion, this manner of obviating the difficulty would be objectionable with a bobbin case having a peripheral contact with the hook for the reason that at high rates of speed and running the parts dry there would be too much friction between the bobbin case and hook, and if the interior of the hook be oiled to avoid this friction the needle thread, which passes around the bobbin case within the hook will be greased and thereby soiled.

My invention has for its object to obviate the difficulty referred to by supporting the bobbin-case and its contained bobbin within the hook in such a manner that there will be no peripheral contact between the bobbin case proper and the hook, thereby permitting the bobbin case to be held stationary while the hook is in motion, without objectionable friction. This object I accomplish by interposing between the bobbin case proper and the hook a second or supplemental bobbin case of cylindrical form which is loosely fitted within the hook and which is furnished with a central pin or support which engages a central sleeve or support on the bobbin case proper. Thus the contact between the bobbin case proper and its support, instead of being at the periphery of the bobbin case, as heretofore, is at or near the center thereof, so that the friction between the bobbin case and its support is reduced to a minimum and is so slight that the objection heretofore existing to holding the bobbin-case stationary is obviated.

The auxiliary or supplemental bobbin case which is loosely interposed between the bobbin-case proper and the inner wall of the hook, by being made in cylindrical form, or without exterior projection, has no positive connection with the hook, but only moves by frictional contact therewith, so that there will be no noise occasioned by positive contact of metallic parts which would be objectionable, particularly with an oscillating hook, the movements of which are being constantly reversed; and while there is no appreciable friction between the auxiliary bobbin case and the hook, owing to the fact that both are practically moving together, there is still a certain slight "slip" between the parts incidental to the avoidance of the positive metallic contacts above referred to, and which "slip" results from the fact that the auxiliary cylindrical bobbin case is free to move within and independently of the hook.

In the accompanying drawings Figure 1 is an enlarged sectional view illustrating my invention. Fig. 2 is a plan view of the bobbin-case proper. Figs. 3, 4 and 5 are front end views of the hook and the bobbin-cases, in different positions, Fig. 5 showing also the needle and parts of the needle-bar and the work-plate of the machine. Fig. 6 is a plan view of the hook.

A denotes a part of a shaft which may be oscillated in any suitable manner, as, for example by the mechanism shown in United States Patent No. 388,324, or by that shown by my pending application, Serial No. 448,144,

filed October 7, 1892. To the said shaft is attached a hook *a* which is, or may be, substantially the same as that shown by the Vannette Patents Nos. 336,456 and 388,323 in that it is adapted to contain and support the bobbin-case inclosing the bobbin carrying the lower or locking thread, said hook having between its point or beak *a'* and heel a^2 a mouth or opening a^3 out of which, when the hook is turned so that said mouth is upward, the loops of needle thread are drawn after they have been passed around the bobbin case and bobbin carrying the lower or locking thread.

Fitting loosely within the hook *a* is a cylindrical case *b* which may be termed a supplemental or auxiliary bobbin case or bobbin case supporter in that it incloses the bobbin case proper *c* and is furnished with a central pin *b'* on which is loosely fitted a central sleeve *c'* with which said bobbin case *c* is provided, the bobbin *d* being loosely journaled on the said sleeve *c'* within the case *c*. The auxiliary bobbin case *b* is placed in the cavity of the hook *a* with its open end outward or toward the front of the hook, while the bobbin case proper *c* is placed within the hook with its open end toward the back of the latter. The said bobbin case *c* is furnished with a suitable tension device, as the spring c^2 on the periphery thereof, the lower thread being drawn upward and through a delivery hole or throat c^3 formed in the said bobbin case, the thread passing from said hole outward to the front edge of the bobbin case beneath said tension spring which is provided at its front edge with a guiding notch c^4 which holds the thread in place at the point of delivery.

It will thus be seen that the bobbin case proper *c* is supported at its center on the pin *b'* so that it has no peripheral contact with the interior of the hook, and it is thus adapted to be held stationary while the hook is in motion without involving such an amount of friction as is seriously detrimental. To hold the said bobbin-case stationary and to keep it in the hook *a* I have, as herein shown, provided a pivoted latch or finger *e* sustained by a bracket *f* depending from the work-plate *h* of the machine, the upper end of said latch or finger pressing lightly against the said bobbin case *c* at the cavity or recess c^5 formed in said bobbin case, and the said latch, being, as herein shown, held in place by a suitable plate spring *g*.

The outer or auxiliary bobbin case *b*, which is interposed between the bobbin case proper *c* and the interior of the hook *a*, being of cylindrical form or without exterior projection or projections, is free to be moved axially independently of the said hook, so that as the hook is rotated or oscillated, while said bobbin case will move mainly therewith, owing to its weight and its peripheral frictional contact with the hook, said bobbin case, having no positive connection with the hook, will be free to "slip" slightly on the latter, and thus with an oscillating hook objectionable blows, such as would result from positive metallic contacts, are avoided, while little or no friction is engendered between the auxiliary bobbin case and hook, the movements of the two being nearly co-extensive. It will also be clear that as the bobbin case proper is supported at or near its center, instead of at its periphery, as heretofore in the class of machines to which my invention relates, there will be but little friction thereon. Thus by my new combination of a hook a bobbin case proper and an auxiliary cylindrical bobbin case or bobbin support interposed between the said hook and bobbin case proper I am enabled to hold the latter bobbin case stationary without objectionable friction.

By the term "cylindrical" as used in the claims of this specification in connection with the auxiliary bobbin case I wish to be understood as meaning a bobbin case the extreme contour of which is in a true circle and which has no peripheral or other projection or projections such as would give it a positive connection with the hook which supports it.

The hook *a* is provided at the front edge of its outwardly curved heel a^2, with a notch or shoulder a^4 so arranged as to engage the bobbin thread (delivered from the front edge of the bobbin) when the hook is at its extreme backward position as shown in Fig. 5. At the moment when the hook is in this backward position and is about to commence its forward movement the take-up has tightened the stitch so that the bobbin thread is now drawn taut, and thus as the shoulder a^4 engages the bobbin thread a sufficient amount thereof for the next stitch is drawn from the bobbin.

In the operation of my invention the loops of needle thread caught by the point or beak *a'* of the hook *a* are, by the movements of said hook, carried around the outer or auxiliary bobbin case *b* to about the position shown in Fig. 4 when the said loops are drawn up by the said take-up and out of the mouth of the hook after the latter has moved around to about the position shown in Fig. 5, as is common with machines of the class to which my invention relates.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a sewing machine, the combination with a hook having a central cavity and a loop-seizing point or beak, of an auxiliary cylindrical bobbin-case having its extreme contour in a true circle and loosely fitting in said cavity so as to be inclosed and supported by said hook, said auxiliary bobbin-case having a central support, a bobbin-case proper fitting loosely within and inclosed by said auxiliary bobbin case and also having a central support engaging the central support of the said auxiliary bobbin-case, and means for holding said bobbin-case proper stationary when the said hook is in motion.

2. The combination with the hook *a* having a central cavity, of the cylindrical auxiliary bobbin case *b* having its extreme contour in a true circle and loosely fitting in said cavity, and provided with the central pin *b'*, the bobbin-case proper *c* inclosed within the said auxiliary bobbin case and having the central sleeve *c'* loosely fitting on said pin, and the finger or latch *e* for holding said bobbin-case *c* stationary when the said hook is in motion.

3. In a sewing machine, the combination with an oscillating hook having between its point and its heel an opening or mouth for delivering the loops of needle thread, and having at its heel on its front side a notch or shoulder, of a bobbin-case within said hook and having a closed outer end or head and also having a thread delivery at its front edge to hold the thread in the path of movement of said notch or shoulder, whereby the latter, when the hook is at its extreme backward position, is adapted to draw sufficient thread from the bobbin for the next stitch.

4. In a sewing machine, the combination with a hook having a central cavity and a loop seizing point or beak, of an auxiliary cylindrical bobbin case having its extreme contour in a true circle and fitting loosely in said cavity so as to be inclosed and supported by said hook, said auxiliary bobbin case having a central support and being placed in said cavity with its open end outward, or toward the front of the hook, the rear end of said auxiliary bobbin case being closed, a bobbin case proper fitting loosely within and being inclosed by the said auxiliary bobbin case, and also having a central support engaging the central support of the said auxiliary bobbin case, the said bobbin case proper having a closed outer end or head and being placed within the said hook with its open end toward the back of the latter, and means for holding the said bobbin case proper stationary when the said hook is in motion.

In testimony whereof I affix my signature in presence of two witnesses.

PHILIP DIEHL.

Witnesses:
J. G. GREENE,
CHAS. ELKIN.