

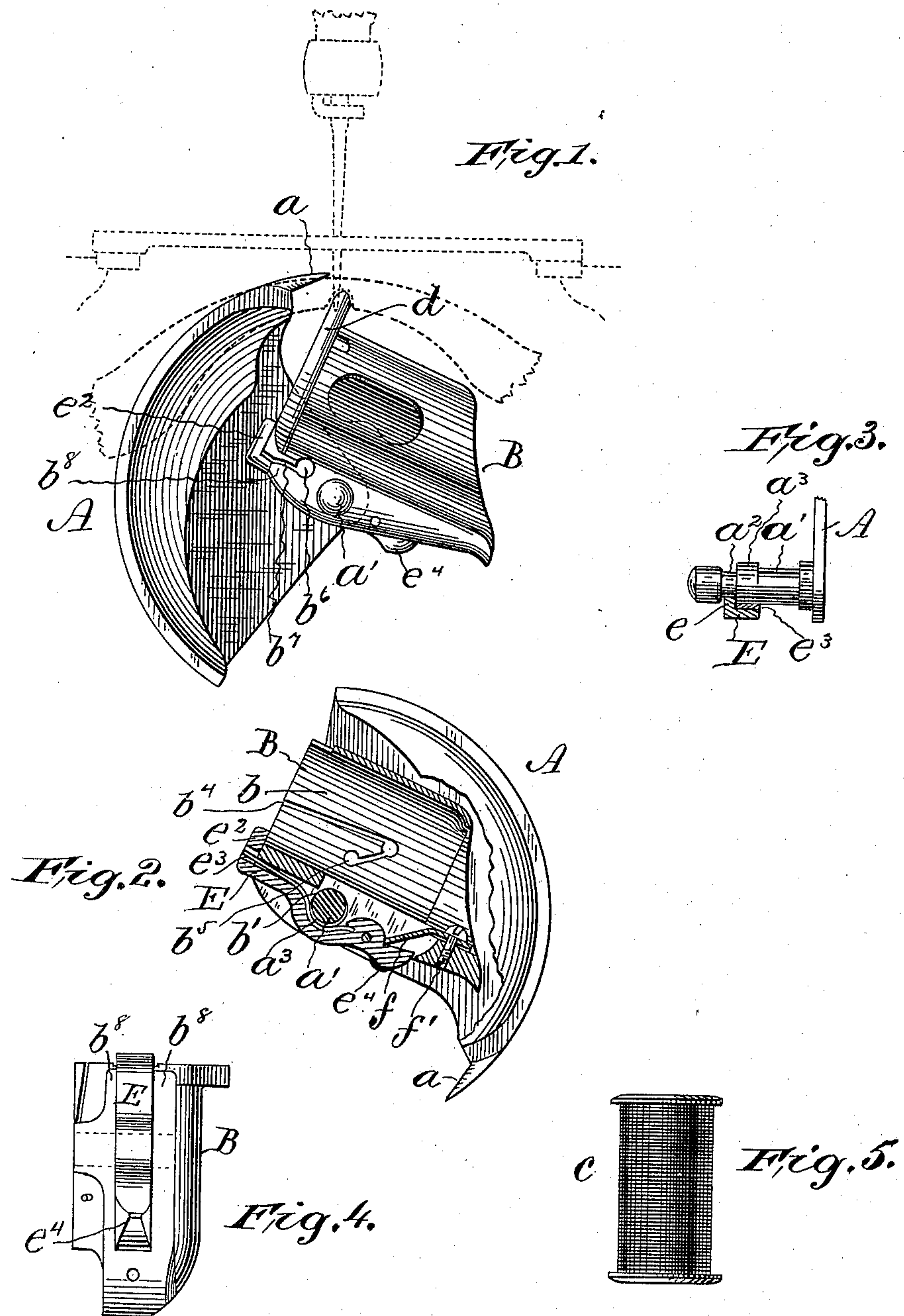
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Patented June 20, 1899.

P. DIEHL & M. HEMLEB.
SEWING MACHINE SHUTTLE.

(Application filed Apr. 13, 1897.)

(No Model.)



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SEWING-MACHINE SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 627,104, dated June 20, 1899.

Application filed April 13, 1897. Serial No. 631,960. (No model.)

To all whom it may concern:

Be it known that we, PHILIP DIEHL and MARTIN HEMLEB, citizens 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-Machine Shuttles, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to shuttles for that class of sewing-machines in which, to avoid moving more weight than is necessary with the circularly-moving, oscillating, or rotating shuttles, the bobbin or cop cases are held stationary while the shuttles move about them in expanding and carrying the loops of needle-thread around the lower or locking thread.

The present invention has for its object to provide a stationary bobbin-case of such construction that while it will contain a bobbin capable of holding a relatively large amount of thread said bobbin-case is so arranged relative to the shuttle that it may be encompassed by comparatively small loops of needle-thread, this construction and arrangement being such that said loops may be cast over the bobbin-case by a lesser circular movement of the shuttle than is required in carrying loops of needle-thread around the stationary bobbin-cases of "central-bobbin" shuttles or shuttles equipped with stationary bobbin-cases placed concentric with the axes of movement of said shuttles. This object is effected by providing a "barrel" or cylindrical bobbin-case adapted to contain a long or cylindrical bobbin, said barrel bobbin-case being held stationary in the usual manner by being provided with a prong or finger, which engages some part of the shuttle-race, and being supported on a pin on the shuttle arranged concentric with the axis of movement of the latter, or approximately so, but which pin passes through the bobbin-case at one side of the bobbin-chamber of the latter.

Another object of the invention is to provide the shuttle with an intermittingly-acting or "automatic" tension device, which will relax the tension of the shuttle-thread when the work is being advanced by the feed, so that said thread may at such times draw

freely from the bobbin or cop in the shuttle. This result is preferably effected by providing the bobbin-case-supporting pin of the shuttle with a small cam or eccentric, which at a certain predetermined period in the movement of the shuttle will slightly lift the bearing end of a spring-pressed tension-lever from the thread, and thus release the latter from the gripping-pressure of said lever.

In the accompanying drawings, Figure 1 is a front side view of the improved shuttle and its bobbin-case, the shuttle being represented in the position which it assumes when it is about to take a loop of needle-thread; and Fig. 2 is a similar rear view with the shuttle in a position far enough forward to have carried a loop of needle-thread to a cast-off position around the bobbin-case, the said bobbin-case being in section to illustrate the automatic tension. Fig. 3 is a detail view of the shuttle-pin and the locking and tension lever. Fig. 4 is a detail view of the bobbin-case, and Fig. 5 a detail view of the bobbin.

A denotes a segmental oscillating or rotating shuttle of well-known form, provided with a loop-seizing beak *a*, and having at or near its axis or center of movement a bobbin-case-supporting pin *a'*.

B is a barrel or cylindrical bobbin-case adapted to contain a long or cylindrical bobbin *c*, and provided at one side of its bobbin-chamber *b* with a hole *b'* to receive the pin *a'*.

The bobbin-case B is furnished with a prong or finger *d* to engage a stationary part of the shuttle-race to hold the said bobbin-case stationary while the shuttle oscillates or rotates about it.

E is a spring-pressed locking and tension lever provided with a small lug *e* to enter an annular groove *a²* in the bobbin-case-supporting pin *a'* to lock the said bobbin-case to said pin, the inner or lower end of said lever being engaged by a spring *f*, which presses the upper or outer end of said lever toward a bearing portion of the bobbin-case and between which bearing portion and said lever the bobbin-thread runs on its way from the bobbin to the work. The tension of the spring *f* may be regulated to vary the tension by the screw *f'*, which attaches said spring to the

bobbin-case. The lever E is provided with the lip e^2 , which overhangs the end of the bobbin-chamber b , and thus serves to retain the bobbin in said chamber. The pin a' is provided adjacent to the groove a^2 with a small eccentric or cam projection or portion a^3 , which is so arranged that when in the operation of the machine the feed is advancing the work said projection will engage the tension-lever E and lift the bearing end of the said lever from the thread, and thus relax the tension, the shuttle being thereby furnished within itself with an automatic or intermittingly-acting tension device. To prevent the shuttle-thread from running entirely loose when its tension is thus relaxed, a light check-spring e^3 , which bears constantly on the thread, is preferably provided. This check-spring, as herein shown, is soldered or otherwise attached at its inner end to the lever E.

By the employment of a stationary barrel bobbin-case to contain a cylindrical bobbin a bobbin with a greater thread capacity relative to the size of needle-loops required to encompass the same may be used; also, by providing the stationary bobbin-case with a support which is at one side of the bobbin-chamber thereof a long or extended bobbin-case-supporting surface or pin may be employed, while the location of the bobbin-case eccentric to the shuttle enables the latter as it advances into and expands a loop of needle-thread to more and more closely approach the bobbin-case as said shuttle moves from the position shown in Fig. 1 to that shown in Fig. 2, so that in the last-named or cast-over position of the shuttle the bobbin-case is comparatively close up to the periphery of the shuttle, thus requiring but a relatively small loop of needle-thread to go around the bobbin-case and enabling the shuttle to carry this loop to the cast-over position by a relatively small circular movement which need be but little, if any, more than one hundred and fifty degrees. This will permit the use of smooth and easy movements of the shuttle-operating rock-shafts when the improved shuttles are applied to oscillating-shuttle machines, and when they are used in rotary-shuttle machines the objectionable and jerky differential movements of the rotating-shuttle shafts will not be necessary, and still plenty of time in the rotation of the driving-shaft for the proper and easy action of the feed and take-up will be allowed. The automatic tension on the shuttle-thread afforded by the improved shuttle is also a desirable feature, as will be understood by those skilled in the art to which the invention relates.

The bobbin-case B is "self-threading," in that it is provided with a thread slot or passage b^4 , running from the heel of the said bobbin-case to the thread-egress hole b^5 , and from said egress-hole the thread runs between the bearing end of the tension and locking lever E and the outer surface of the bobbin-case to the delivery eye or hole b^6 , whence it

passes to the work, slots b^7 being cut between the lugs b^8 and the body of the bobbin-case to enable the thread to be drawn beneath the tension-lever E and the check-spring e^3 in threading. The free end of the said check-spring is preferably loosely connected with the said tension-lever, so that when the latter is lifted by pressing on the projection e^4 said check-spring will also be raised for convenience in threading the loose or slotted connection of the free end of said check-spring with the lip e^2 of said lever, permitting said check-spring to rest on the thread when the pressure of the said lever is relieved from the thread by the slight lifting movements of said lever produced by the cam or eccentric a^3 , with which the pin a' is provided.

The terms "automatic" and "intermittingly acting" as hereinbefore employed in connection with the tension device are intended to be synonymous, in that the term "automatic" as applied to a tension device is now well known in the art as referring to an "intermittingly-acting" tension device or a tension device the frictional action of which is automatically varied during the formation of each stitch while the machine is in operation.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination with a segmental sewing-machine shuttle, of a bobbin-case having a pivotal connection with said shuttle at a point which is concentric with the curved periphery of the latter, or approximately so, but which is located out of line, in the direction of the axis of the shuttle, with the bobbin-chamber of the said bobbin-case.

2. The combination with a circularly-movable segmental sewing-machine shuttle having a centrally-placed bobbin-case-supporting pin, of a stationary bobbin-case sustained by said pin and having a bobbin-chamber the longitudinal axis of which is transverse to the axis of said shuttle, to contain a transversely-placed long or cylindrical bobbin.

3. A sewing-machine shuttle provided with an intermittingly-acting tension device for the shuttle-thread, all of the parts of said tension device necessary to secure the intermittent action being parts of said shuttle.

4. A sewing-machine shuttle provided with an intermittingly-acting tension device for the shuttle-thread, all the parts of which tension device, necessary to secure the intermittent action, are parts of said shuttle, combined with a check-spring which serves to exert a light drag or tension on the thread when the normal tension thereon is relaxed.

5. The combination with a circularly-movable sewing-machine shuttle provided with a bobbin-case-supporting pin having a cam or eccentric, of a stationary bobbin-case having a tension lever or device to be operated by said cam or eccentric to relax the tension on the shuttle-thread at intervals when the machine is in operation.

6. The combination with a circularly-moving sewing-machine shuttle provided with a bobbin-case-supporting pin having a cam or eccentric, of a stationary bobbin-case having a tension lever or device to be operated by said cam or eccentric to relax the tension on the shuttle-thread at intervals when the machine is in operation, and a check-spring which serves to exert a constant light tension or drag

on the said thread when the normal tension is relaxed.

In testimony whereof we affix our signatures in presence of two witnesses.

PHILIP DIEHL.

MARTIN HEMLEB.

Witnesses:

J. G. GREENE,
HENRY CALVER.