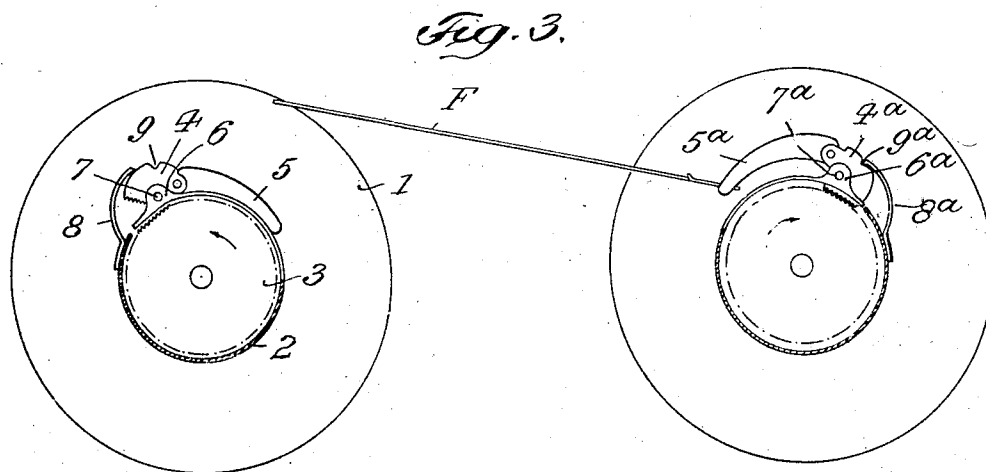
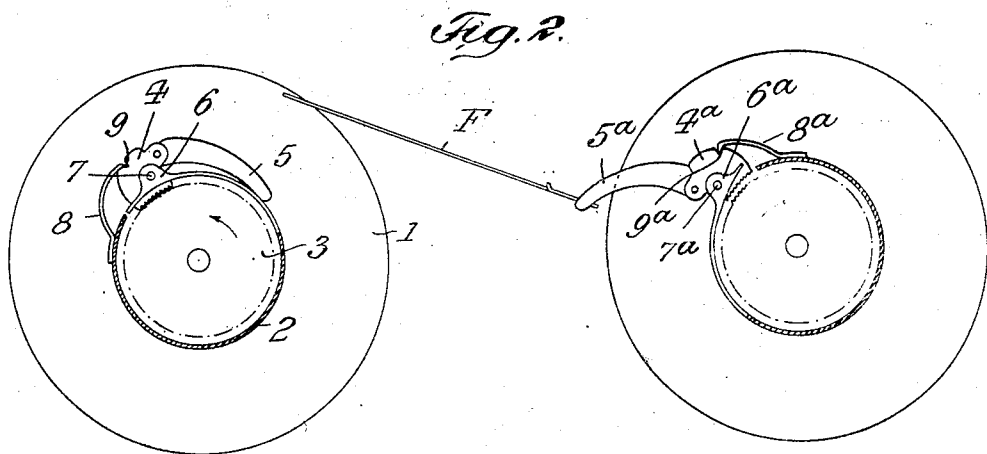
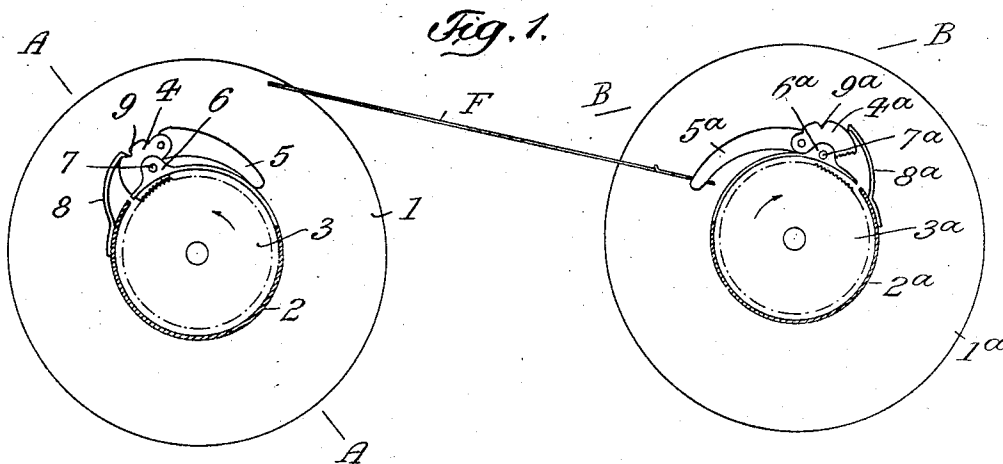


J. W. SCHÄFER.
AUTOMATICALLY REVERSING RIBBON SPOOL.
APPLICATION FILED JULY 6, 1912.

1,049,154.

Patented Dec. 31, 1912.

2 SHEETS-SHEET 1.



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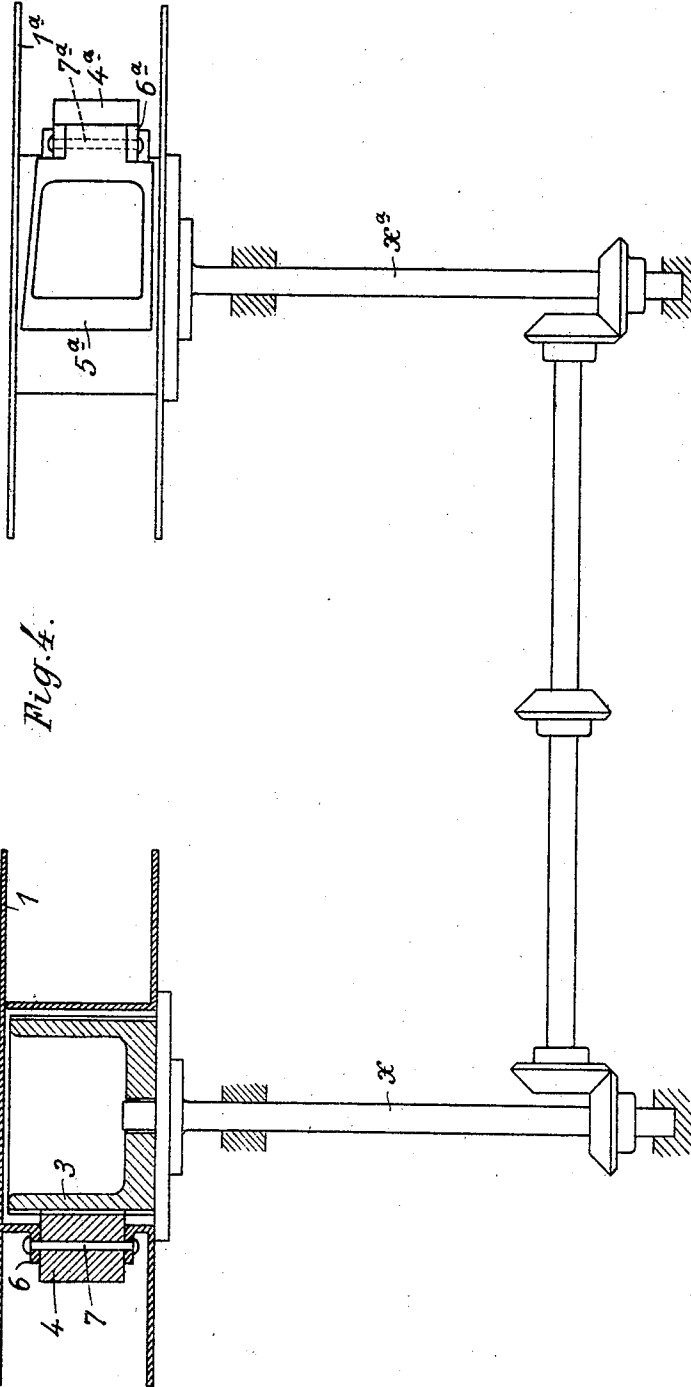


Fig. 4.

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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-REVERSING RIBBON-SPOOL.

1,049,154.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed July 6, 1912. Serial No. 707,982.

To all whom it may concern:

Be it known that I, JOHANN WILHELM SCHÄFER, a subject of the King of Prussia, and a resident of Hanover, in the Kingdom of Prussia, Germany, have invented an Improvement in Automatically-Reversing Ribbon-Spools, of which the following is a specification.

Devices are known for automatically reversing the direction of travel of the ink ribbon in typewriters wherein the tension of the ribbon after the latter has been completely unwound from one spool is used to produce the reversal of the direction of travel of the ribbon. These devices comprise, however, parts belonging to the machine itself, namely levers, rods and the like, which in some cases are driven by mechanical means contained in the spools so that the particular device is only of use on machines which contain these additional parts.

The present invention also relates to a device for automatically reversing the direction of the travel of the ink ribbon by using the tension produced by the ribbon after it has been completely unwound from one spool. The novelty of the invention consists in a construction whereby the parts which reverse the direction of travel are not parts of the machine, but are carried by the spool itself, so that the spools together with the reversing devices, may be mounted directly in any typewriter or the like containing spindles rotated in opposite directions by the strokes of the keys in known manner.

In the preferred construction each ribbon spool contains an independent rotary core and each of them is provided with a coupling device such that when the ink ribbon is run off one spool the coupling device of the full spool is first disconnected and thereupon the coupling device of the empty spool is connected.

The invention is illustrated by way of example in the accompanying drawings.

Figure 1 shows in end view the ribbon spools provided with couplings in the position in which one spool is nearly full and the empty spool is about to be coupled to its core. Fig. 2 is a like view of the two spools at the moment when the empty spool is ready to be coupled to its core and the tension on the ink ribbon is about to uncouple from its core the full spool. Fig. 3 shows a like view of the two spools running in the

reverse direction from that shown in Fig. 1. Fig. 4 is a part sectional plan showing the left hand spool in section on the line A—A of Fig. 1, and the right hand spool in plan on the line B—B of Fig. 1.

The spools 1 and 1^a contain each a coupling device. This comprises a core 3, 3^a keyed to a spindle α , α^a , and having teeth on its periphery; on this core the drum 2, 2^a of the spool is mounted to rotate freely. There is a gap in the periphery of the drum 2, 2^a through which extends a pawl 4, 4^a pivoted on pin 7, 7^a in brackets carried by the drum 2 or in any other suitable manner; teeth on the end of this pawl are adapted to engage in the teeth of the core 3, 3^a. To the other end of the pawl is pivoted a lever 5, 5^a which is formed as a stirrup at its free end (Fig. 4) for attachment of the ink ribbon. The spring 8, 8^a is adapted to engage in a notch 9, 9^a in the pawl 4, 4^a and tends to keep the pawl engaged with the core 3, 3^a. The bearings of the pin 7, 7^a are mounted on springs, for instance in brackets 6, 6^a carried by a forked portion of the periphery of the drum 2, 2^a which is split axially to allow of the necessary elasticity of the said forked portion.

The automatic reversal of the direction of travel of the ink ribbon is as follows:— In the position of the coupling devices of the two spools shown in Fig. 1, the teeth of pawl 4^a are out of engagement with the teeth on the core 3^a, which is mounted on the spindle α^a so as to turn with it in the direction of the arrow. On the other hand the pawl 4 is in engagement with the teeth on core 3 so that it is rotating with the core in the direction of the arrow and is turning by means of the ink ribbon F the freely movable right hand spool 1^a in the direction opposite to that of the rotation of the core 3^a. The right hand spool 1^a therefore is quite free to turn in Fig. 1. When spool 1 is turned farther by its core 3 through a certain angle the lever 5^a is raised somewhat, as shown in Fig. 1, by the tension of the ink ribbon and then turns the pawl 4^a against the action of the spring 8^a and at the same time extends the spring 8^a so that the position of the parts is that shown in Fig. 2. From this moment further rotation of the spool 1 is prevented by the tension of the ribbon F and, since the core 3 continues to be rotated in the direction of

the arrow at each stroke of a key, the coupling of spool 1 is disconnected owing to the fact that the pawl 4 is forced out of engagement with the teeth of the core 3; the position of the pawl then being that shown in Fig. 3. Spool 1 is now free to turn on its core and under action of the spring fork 6^a and of the spring 8^a is turned slightly backward by the tension in the ribbon F until the teeth of pawl 4^a engage in the teeth of the core 3^a. Spool 1^a now rotates with its core 3^a and the reversal is completed, the ribbon being wound up on the right hand spool and unwound from the left hand spool.

By suitable arrangement of bridges over the parts of the coupling the ink ribbon which has to lie above these parts does not interfere with them. The hooked end of spring 8, 8^a and the notch 9, 9^a in the pawls insure that under all conditions the coupling device is held ready in the position shown for the right hand spool in Fig. 2 before the disconnection of the coupling occurs in the left hand spool, this disconnection being made difficult by the engagement of the hook of spring 8 in the notch 9.

I claim:

1. In a device of the character described, a pair of key-actuated oppositely rotatable spindles, ribbon spools detachably mounted thereon, couplings intermediate said spindles and spools, and means carried by the spools and actuated by the ribbon for operating said couplings, whereby the direction of travel of the ribbon is automatically reversed.

2. In a device of the character described, a pair of key-actuated oppositely rotatable

spindles, cores fast on said spindles, ribbon spools loosely encompassing the cores, couplings intermediate said cores and spools, and ribbon-actuated means carried by the spools for operating the couplings, whereby the coupling of the filled spool is first opened and the coupling of the emptied spool is then closed.

3. In a device of the character described, a pair of key-actuated oppositely rotatable spindles, cores fast on said spindles, ribbon spools loosely encompassing the cores, spring-influenced pawls pivoted to the spools and adapted to engage the cores, and ribbon-actuated means carried by the spools for operating the pawls.

4. In a device of the character described, a pair of key-actuated oppositely rotatable spindles, cores fast on said spindles, ribbon spools loosely encompassing the cores, spring-influenced pawls pivoted to the spools and adapted to engage the cores, and ribbon-actuated levers pivoted to the pawls and adapted to actuate the same.

5. In a device of the character described, a pair of key-actuated oppositely rotatable spindles, cores fast on said spindles, ribbon spools having drums that loosely encompass the cores and are provided with resilient sections, spring-influenced pawls pivoted to said sections and adapted to engage the cores, and ribbon-actuated levers pivoted to the pawls and adapted to actuate the same.

JOHANN WILHELM SCHÄFER.

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