

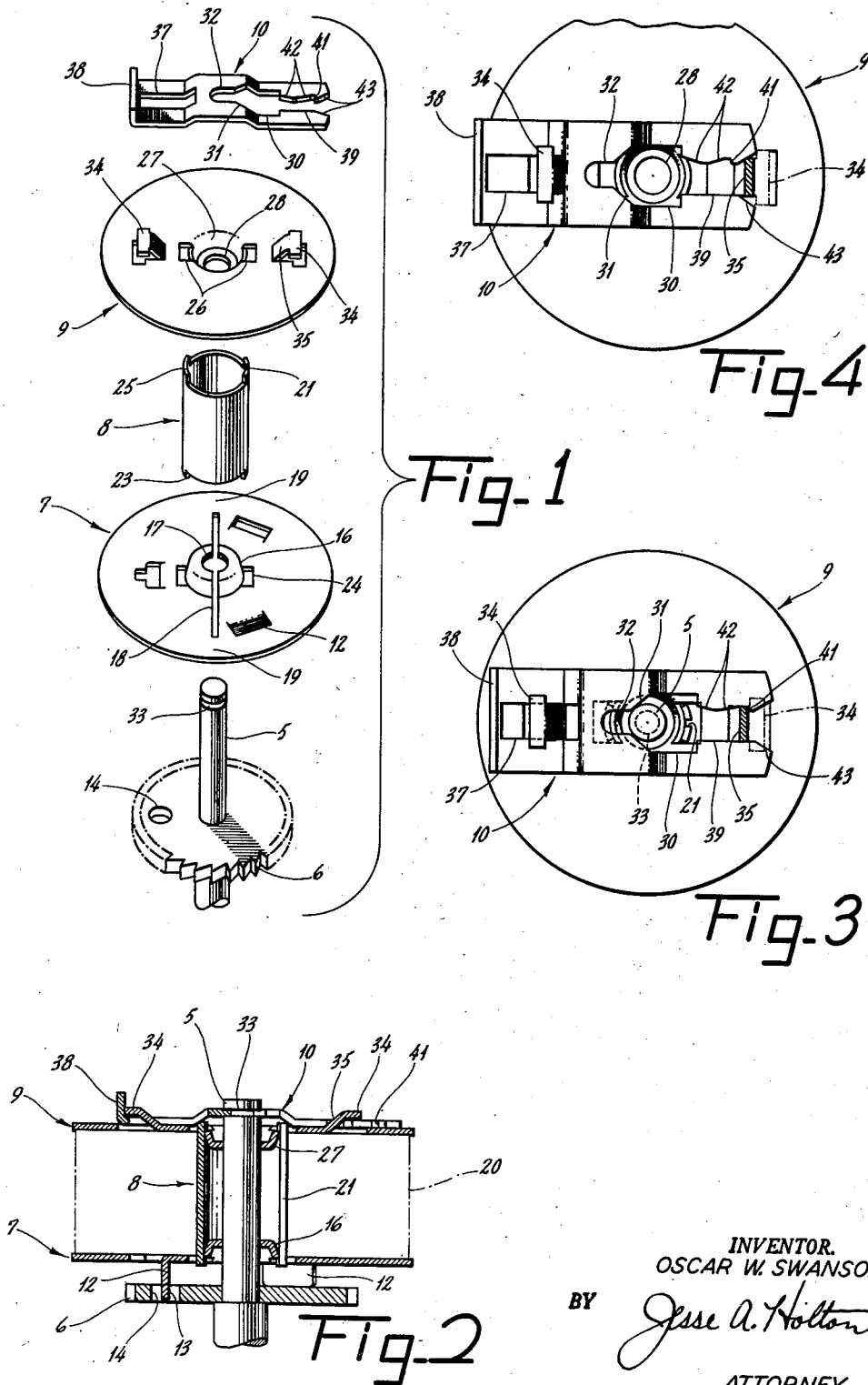
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O. W. SWANSON

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RIBBON SPOOL

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INVENTOR.
OSCAR W. SWANSON
BY *Jesse A. Holton*
ATTORNEY

UNITED STATES PATENT OFFICE

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RIBBON SPOOL

Oscar W. Swanson, West Hartford, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware

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This invention relates to ribbon spools in association with means for removably mounting and driving the spools to feed a ribbon to the type-impression area, in typewriters, adding machines and the like.

In machines of this kind it is customary to provide two ribbon spools, one at each side of the printing or typing area, between which the ribbon travels as it passes over said area. Each spool is removably held to a rotatable spindle, one of which is automatically rotated to feed the ribbon past the typing area. By a reversing-drive mechanism either spool may be driven, so that the entire length of ribbon may be used and re-used until its ink material is exhausted. At such time the used ribbon, then fully wound on one of the spools, is removed and discarded with its spool, the same being replaced with a fresh ribbon wound on a new spool, after which the free end of the new ribbon is attached to the remaining spool.

Such ribbon spools, being durably constructed of metal, involve an appreciable cost to make in that they may include a hub with integral flanges, an element on the lower flange to key the spool to the driving means, and a device on the upper flange to releasably retain the spool on the driving spindle.

One of the objects of the present invention is to provide an improved ribbon spool assembly, the construction of which and association of same with the mounting and driving means of the machine being such that the replacement of a used-up ribbon involves discarding only a very minor part of the ribbon spool namely the core or hub, and the replacement hub supplied with the new spool may be quickly and easily installed in operative relation with the old spool flanges and with the mounting and driving means.

Another object is to provide a disjointable ribbon spool construction, the component parts of which, although of simple and inexpensive design, may be quickly and accurately assembled and securely held in operative relation.

A further object resides in the provision of an improved means for removably retaining the ribbon spool on its drive shaft or spindle, embodying a lock slide and its slidable mounting on the spool flange, the construction being such as to enable manufacture of these parts by economic stamping and die-forming methods, and enable assembling the lock slide and spool without the use of tools.

With the above and other objects in view, the invention will now be described with reference to

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the accompanying drawings wherein one embodiment which the invention may assume in practice is shown for the purposes of illustration.

In the drawings:

5 Figure 1 is an exploded perspective view of the improved ribbon spool assembly including the driving spindle of a typewriter, adding or like machine,

10 Figure 2 is a central, vertical sectional view of the assembled ribbon spool installed on the drive spindle,

15 Figure 3 is a top view of the ribbon spool in place on the drive spindle, the lock slide of the spool, however, being in released position in readiness to remove the spool, and

Figure 4 is a view similar to Figure 3 but showing the lock slide in a temporary position assumed incidental to assembling the slide to the spool flange.

20 Referring to Figure 1, a drive spindle 5 with a disk 6 secured thereto and serving herein as a ratchet wheel, is rotatably supported by means not shown, and is rotated by suitable means such as a reciprocating pawl cooperating with the ratchet wheel 6. Said spindle and a suitable drive therefor, such as represented by the ratchet wheel 6, are intended to illustrate the pertinent portions of a typical ribbon-feed mechanism having provision for reversing the direction of ribbon feed by causing the drive to be effective on one or the other of the two ribbon spool spindles of the machine. The manner of driving the spindle 5, by a pawl-and-ratchet mechanism of which the wheel 6 on each spindle is a part, is like that shown and described in the patent to Sundstrand et al., No. 2,349,769, and is intended to typify any ribbon-feed and reversing mechanism of machines of the general character indicated.

25 The component parts of the improved ribbon spool are: a bottom flange 7, a sleeve-like metallic core or hub 8, a top flange 9 and a lock slide 10 slidably mounted on the flange 9 and engaging a part of the spindle 5 to retain the spool parts in assembled arrangement and in operative driving relation to the ratchet wheel 6 and the spindle, as later described. In that the spindle 5 and wheel 6 function in holding the spool parts 7, 8, 9 together, they too may be regarded as part of the composite ribbon spool structure.

30 The lower flange 7 is supported on the wheel 6, in spaced relation thereto, by a set of three lugs 12 which are struck out from the body of the flange to protrude downwardly therefrom and rest on the wheel 6, as shown in Figure 2.

In this respect the wheel 6 constitutes a shoulder of spindle 5, against which the flange 7 rests. To afford a secure driving connection between the ratchet wheel 6 and the ribbon spool in general, at least one of the lugs 12 has a reduced end portion forming stepped shoulders and a tongue 13. The tongue extends into and snugly fits an aperture 14 in the wheel 6, and the shoulders at each side rest on the top of the wheel adjacent the aperture.

The center of the lower flange 7 is shaped as by die-forming to provide a conical projection 16 of such diameter at its base as to snugly fit the interior of the sleeve-like core 8, as shown clearly in Figure 2. The top of the projection 16 has a hole or bore 17 of a diameter slightly smaller than the portion of spindle 5 above the wheel 6. The flange 7 has a slit 18 or saw cut along a diametrical line and extending for a substantial length across the flange, leaving at the ends thereof two weakened portions 19 at which the flange may flex. In view of the fact that the hole 17 is slightly smaller than the spindle 5, on installing the flange 7 on the spindle, the two semi-circular edges defining the hole 17 at the opposite sides of the slit 18 are forced apart by the wedging action of the spindle 5, the necessary yield of the flange 7 occurring at the two portions 19. The inherent resilience of the flange 7, which may be constructed of resilient sheet metal, causes the edges of the hole 17 to press against the spindle and thus frictionally lock same in its position on the spindle, shown in Figure 2. The effect of this locking engagement is such that any force exerted on the two flange halves defined by the slit 18, tending to remove the flange 7 from the spindle, will tend to flex the flange at the portions 19 and thus press the walls of hole 17 harder against the spindle 5. In this way, the structure of the flange 7, as described, acts to securely retain said flange against any unintentional displacement such as might occur by withdrawing the core 8 therefrom incidental to replacing the used-up ribbon, as later described. Should it be desired, however, to remove the lower flange 7, the described locking effect may be nullified by applying the lifting force directly at the two portions 19, and the locking effect may be completely removed by simultaneously pressing the two flange halves downwardly while lifting at the portions 19.

The ribbon, indicated at 20 in Figure 2, is supplied to the consumer wound only on the core or hub 8. Each end of the ribbon is provided with an enlarged portion formed as by folding the ribbon end over or by attaching a metal clip thereto. The hub 8 has a continuous slot 21 extending lengthwise thereof into which the end portion of the ribbon is inserted edge-wise, with the enlarged end inside the hub. In this way the end of the ribbon is retained on the hub although the ribbon may be completely unwound therefrom. At its lower end the core 8 has two prongs 23 for engagement in openings 24 in the lower flange 7 and at its upper end has two prongs 25 for engagement in openings 26 in the top flange 9. It will be noted that the lengthwise slot 21 in the hub bisects the upper prong 23 and the lower prong 25 at the one side of the hub. The snug fit of these upper and lower prongs in the respective openings 24, 26 prevents the hub slot 21 from widening, although the unwound ribbon may be subjected to appreciable tension such as may occur in ribbon-

reversing mechanisms operating in response to an increased tension of the ribbon when the ribbon end is reached.

The upper flange 9 at its central portion is formed to provide a conical projection 27 like the projection 16 on the lower flange and which is likewise adapted to snugly fit the interior of the hub 8. The bottom of the projection 27 has a hole or bore 28 fitting the spindle 5.

The lock slide 10 is slidable on the upper flange 9 to two positions, in the rightward one of which, Figure 2, the slide locks the flange on the spindle 5, and in the leftward position, Figure 3, the flange is released for removal to permit replacement of the ribbon. Near the middle of lock slide 10 a wide opening 30 is provided to freely admit the upper end portion of spindle 5. At its leftward end said opening is constricted at 31 and connects with a narrow slot 32 adapted to fit around the neck of a grooved or reduced portion 33 of the spindle 5, the upper face of the slide at said slot engaging under the annular shoulder thus formed. As shown best in Figure 2, the medial portion of slide 10, at which the slot 32 is located, is arched or offset upwardly from the end portions of the slide so as to be spaced from the face of flange 9. The slide is thus capable of flexing downwardly and therefore, the locking engagement of the slide with the spindle 5 can be made under a slight tension. That is, the parts may be so proportioned that when the slide is in locking position, it exerts a slight upward pressure against the annular shoulder formed by groove 33. This allows a greater tolerance in making the spool parts, and prevents the spool from rattling during operation of the machine.

To slidably mount the lock slide 10 on the upper flange 9, the latter has struck out therefrom two T-shaped studs or ears 34. Each ear is formed, as shown best in Figure 1, so that the shank 35 reached upwardly from the face of flange 9 and the cross of the T is in spaced parallelism with said face, being spaced therefrom a distance about equal to the thickness of the lock slide.

A closed-ended slot 37 at the leftward portion of lock slide 10 slidably fits the shank 35 of the leftward ear 34, the crosspiece or head of the ear straddling the slot and engaging the bordering areas of the slide. An upturned lip 38 provides a finger piece for the slide and determines the limit of its rightward movement by engaging the ear 34, see Figure 2. The rightward ear 34 is received in a slot 39 in the slide, the lower edge of which, as viewed in Figure 3, is straight and the upper edge of which is shaped to afford a detenting and limiting effect in cooperation with the rightward shank 35. Said upper edge provides an abrupt shoulder 41 by which the limit of leftward movement of the slide is determined by said shoulder engaging shank 35. Between shoulder 41 and the opening 30, the upper edge of slot 39 provides a cam 42 of shallow V contour coacting with the edge of shank 35 so as to yieldably resist movement of the slide 10 from either its released or locking positions. It will be noted, in view of the narrowness of the strips at the sides of opening 30, and because the slot 39 is open-ended, that the two times thus formed will yield laterally of the slide. That is, when the slide is pushed rightwardly from its position in Figure 3, the rightward incline of the V cam 42 will wedge against the shank 35, causing the two times to yield, spreading

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slightly as the cam ridge is moved past the shank. As the slide 10 approaches its rightward limit, the leftward incline of said cam, in pressure engagement with said shank, urges the slide to the full rightward position and detents it at said position. The rightward cam incline has a similar detenting action tending to hold the slide in its leftward position.

A feature of the invention resides in the construction of the lock slide 10 and its slidable mounting, as embodied in the ears 34 of flange 9, which enables installing and removing the lock slide without the use of tools. The first step of installing the slide is to hold same in a position at a right angle to its normal position on the flange 9, with the slot 37 straddling the leftward ear 34, allowing the slide to lie flat against the face of flange 9. To allow the left ear 34 to be inserted through the slot 37, the width of the ear, as measured from its leftward edge to the far side of its shank 35, should of course not exceed the width of the slot. The slide 10 is then rotated a quarter-turn about the leftward ear, that is, until the slide assumes the position shown in Figure 4, with the slot 39 at the rightward end straddling the other ear 34. It may be here noted that the edges of slot 39 at the open end diverge as indicated at 43. With the slide 10 positioned as described, the divergent edges 43 are adjacent the opposite edges of the rightward shank 35. A rightward force now applied to the finger piece 38 will cause the edges 43 to cam against the shank 35 and thus spread the two times, allowing the slide to move rightward until the shoulder 41 snaps into position to the right of said shank. Slide 10 is now fully installed on the flange 9, taking the position shown in Figure 3, the spindle-releasing position.

If removal of the slide 10 from the flange 9 should be required for reasons such as for repair or replacement, removal can be effected by a procedure opposite that for installing the slide. The first step in removing the slide is to cause it to assume the position shown in Figure 4 by urging same leftwardly beyond the normal leftward position determined by the shoulder 41. To enable this, the shoulder 41 is slightly rounded so that it may be caused to cam itself leftwardly past shank 35, to the position shown in Figure 4, by applying an extra forceful effort on the slide. With the slide in the Figure 4 position, its rightward portion can be raised slightly to clear the rightward ear 34, after which the slide is rotated about the leftward ear until it is about at right angles to its normal position. In said position the ear 34 will pass through the slot 37, so that the slide may then be lifted free of the flange 9.

The construction of the disjointable ribbon spool and its association with the mounting and driving means 5, 6, in addition to effecting economy when replacing a ribbon by discarding only the core 8 and not the entire spool, embodies features which materially expedite removal of the used-up ribbon and reassembly of the spool parts incidental to installing the new ribbon. The lock slide 10 is readily shifted with a snap action to fully release its locking engagement with the spindle 5, after which the upper flange 9 is entirely free for instant removal from the spindle. This affords complete access to the wound-up ribbon which, with its core 8, is easily lifted from the lower flange 7. During removal of the ribbon and core, the locking of the lower flange to the spindle by the means 16-18 assures that

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this flange remains on the spindle, in driving engagement with the wheel 6. In installing a new ribbon its core 8 becomes instantly aligned centrally with the lower flange 7 by the guiding effect of the conical projection 16, as the core prongs 23 move into the openings 24. Similarly the conical projection 27 on the upper flange quickly aligns the upper end of the core 8 with the flange center, so that the flange may be rapidly lowered into place. With the spool parts 7, 8 and 9 thus assembled, the shifting of the lock slide 10 to its locking position instantly secures the assembly.

Having thus described the invention, what is claimed is:

1. A disjointable ribbon spool adapted for placement on a rotatable spindle and comprising, a first flange including a central conical projection having at its top interior edges defining a bore adapted to fit the spindle, said flange having a diametrical slit bisecting said projection and terminating intermediate the periphery of the flange, said conical projection and the flange portions between its periphery and the ends of said slit jointly effecting a frictional locking of the bore-defining edges to the spindle, a second flange having a central conical projection and a bore adapted to fit the spindle, a sleeve-like hub interposed between said flanges, the interior of said hub at each end snugly receiving the respective conical projections to centralize the hub with the respective flanges, and a device on the second flange adapted to engage the spindle and in cooperation therewith to hold said flanges and hub in assembled relation.

2. In a ribbon spool adapted to be removably locked to a spindle having a shoulder, in combination, a spool flange having a central bore to receive the spindle, two T-shaped studs diametrically aligned on said flange with their cross-pieces parallel with each other, and a lock slide having a constricted opening defining edges adapted to embrace the spindle so as to engage the lock slide under the spindle shoulder in one position of the slide and adapted to clear the spindle in another position of the slide to free the ribbon spool for removal, said lock slide also having two aligned slots lengthwise thereof, at least one of said slots being open at an end of said slide, said slots having a width such that their side edges slidably fit the shanks of the respective T-shaped studs, the width of the studs across the narrow of part of the crosspiece being not more than the width of the slots so that one of said studs will pass through one slot and by a quarter turn of the lock slide the open end of the other slot is aligned to receive the other stud, the edges of the open slot engaging the shank of the other stud upon shifting the lock slide longitudinally toward said stud.

3. In a ribbon spool adapted to be removably locked to a spindle having a shoulder, in combination, a spool flange having a central bore to receive the spindle, two T-shaped studs diametrically aligned on said flange with their cross-pieces parallel with each other, and a lock slide having a constricted opening defining edges adapted to embrace the spindle so as to engage the lock slide under the spindle shoulder in one position of the slide and adapted to release said engagement upon shifting said slide to a second position, said lock slide also having a closed-ended slot and an open-ended slot aligned longitudinally thereon, the edges of said slots slidably fitting the shanks of the respective T-shaped

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studs, the closed-ended slot being adapted to admit one of said studs when the lock slide is positioned so that said slot is co-extensive with the crosspiece of the stud and by a quarter turn of the lock slide the open end of said open-ended slot is aligned to receive the other stud, the edges of the open slot being brought into engagement with the shank of the corresponding stud upon shifting the lock slide longitudinally towards said stud, the tines bordering the open-ended slot being resiliently yieldable transversely of the lock slide and at least one of the edges of the open-ended slot presenting a cam contour for detenting the lock slide in the two positions.

4. In a ribbon spool assembly, the combination 15 with a spindle having a shoulder, of a first spool flange resting against said shoulder, a second spool flange spaced from said first flange, each of said flanges having interior edges defining a central bore fitting said spindle, a hollow core 20 spacing said first and second flanges to form a hub therewith, each of said flanges having a cen-

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tral conical projection extending into and fitting at its base the interior of the hollow core to centralize the core ends with the respective flanges, said first flange having a plurality of slits extending radially from the bore-defining edges outwardly beyond the base of its conical projection, the portions of said first flange beyond the radial slits and its conical projection acting to press the bore-defining edges into frictional grip with said spindle, and a device on said second flange adapted to engage the spindle to hold said flange and core in assembled relation.

OSCAR W. SWANSON.

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