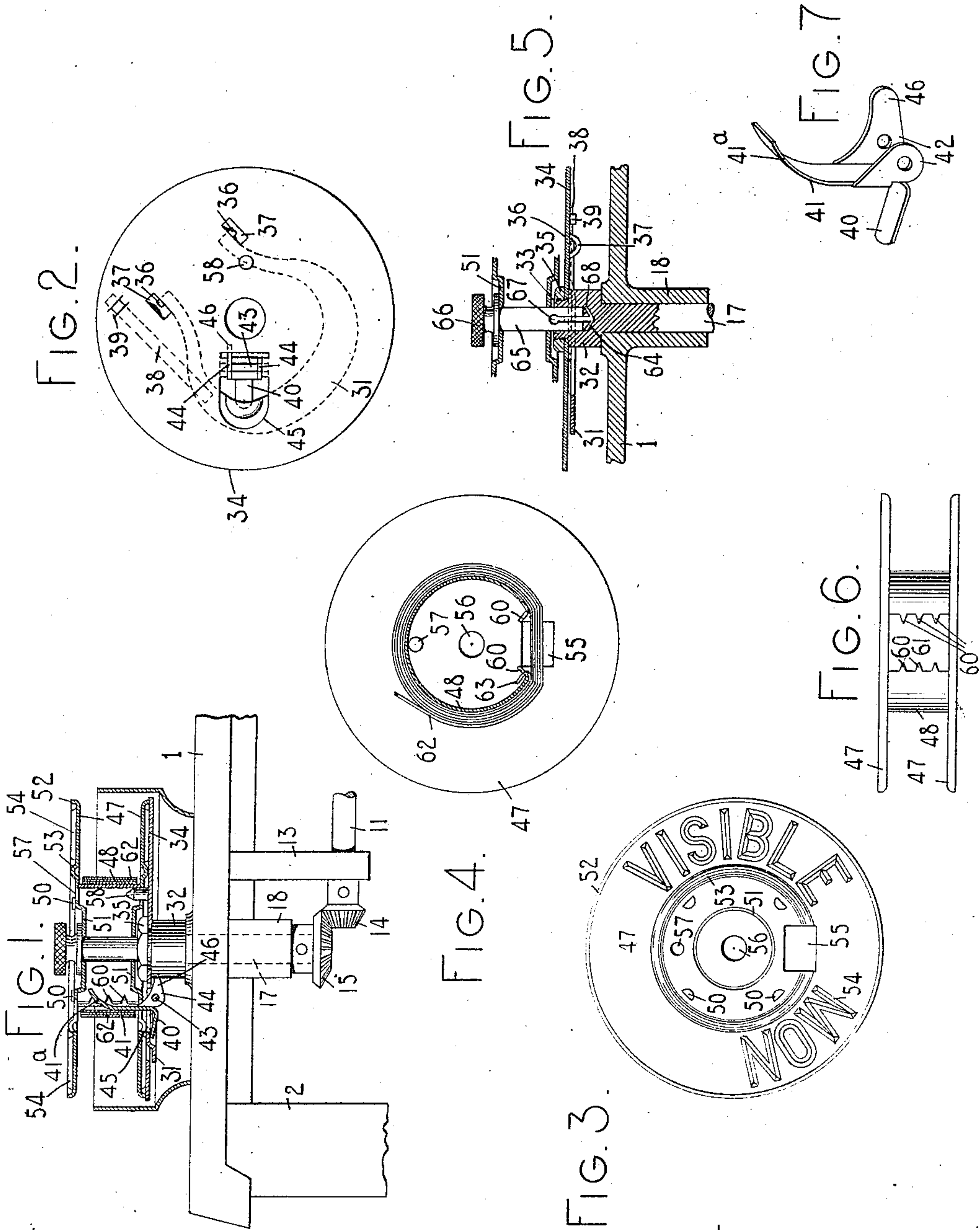


953,494.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

J. B. Reeves.  
R. H. Strother.

FIG. 3.

INVENTOR.

Herbert H. Steele  
By Jacob Felbel

HIS ATTORNEY

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2 SHEETS—SHEET 2.

FIG. 8.

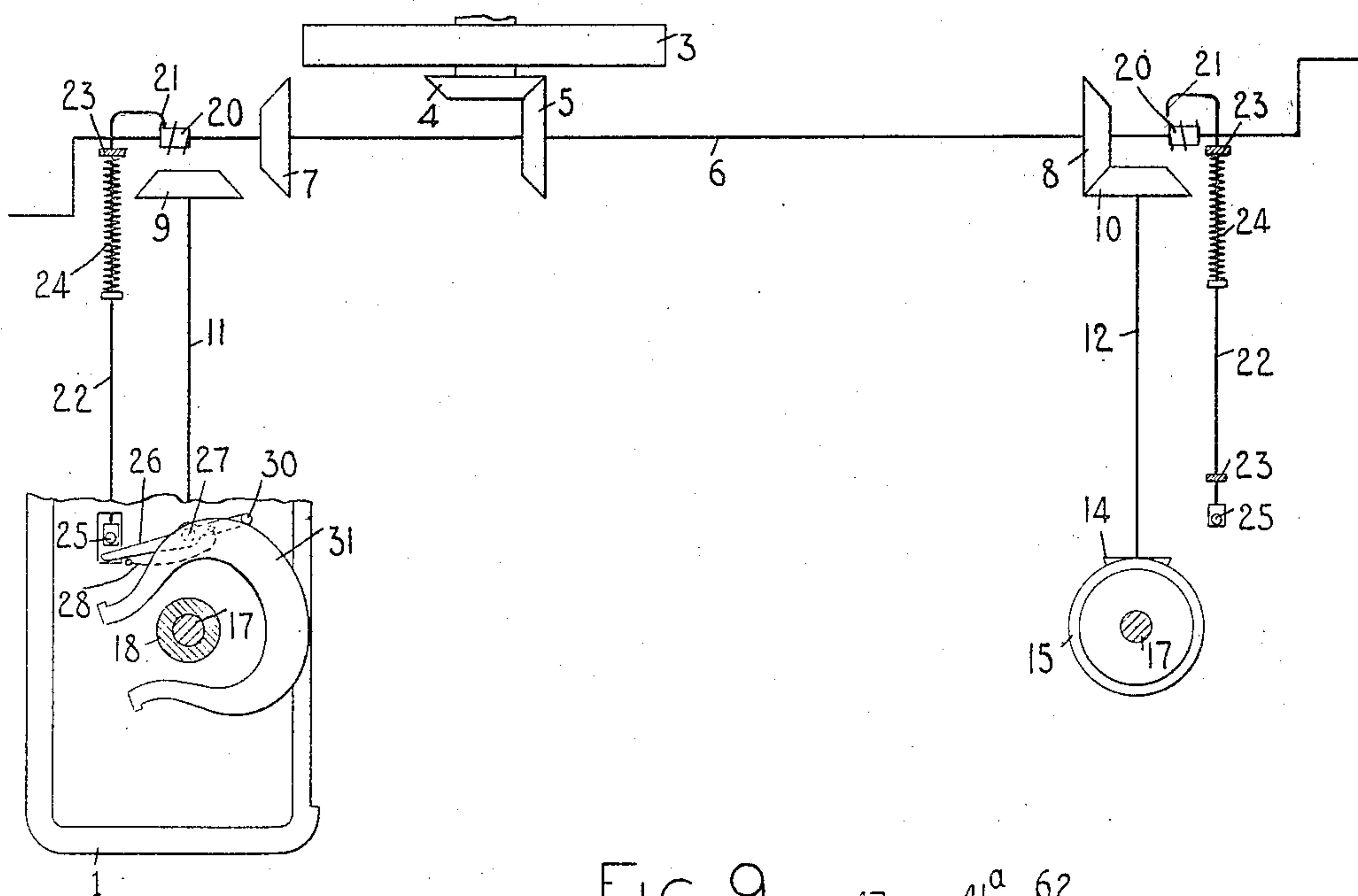
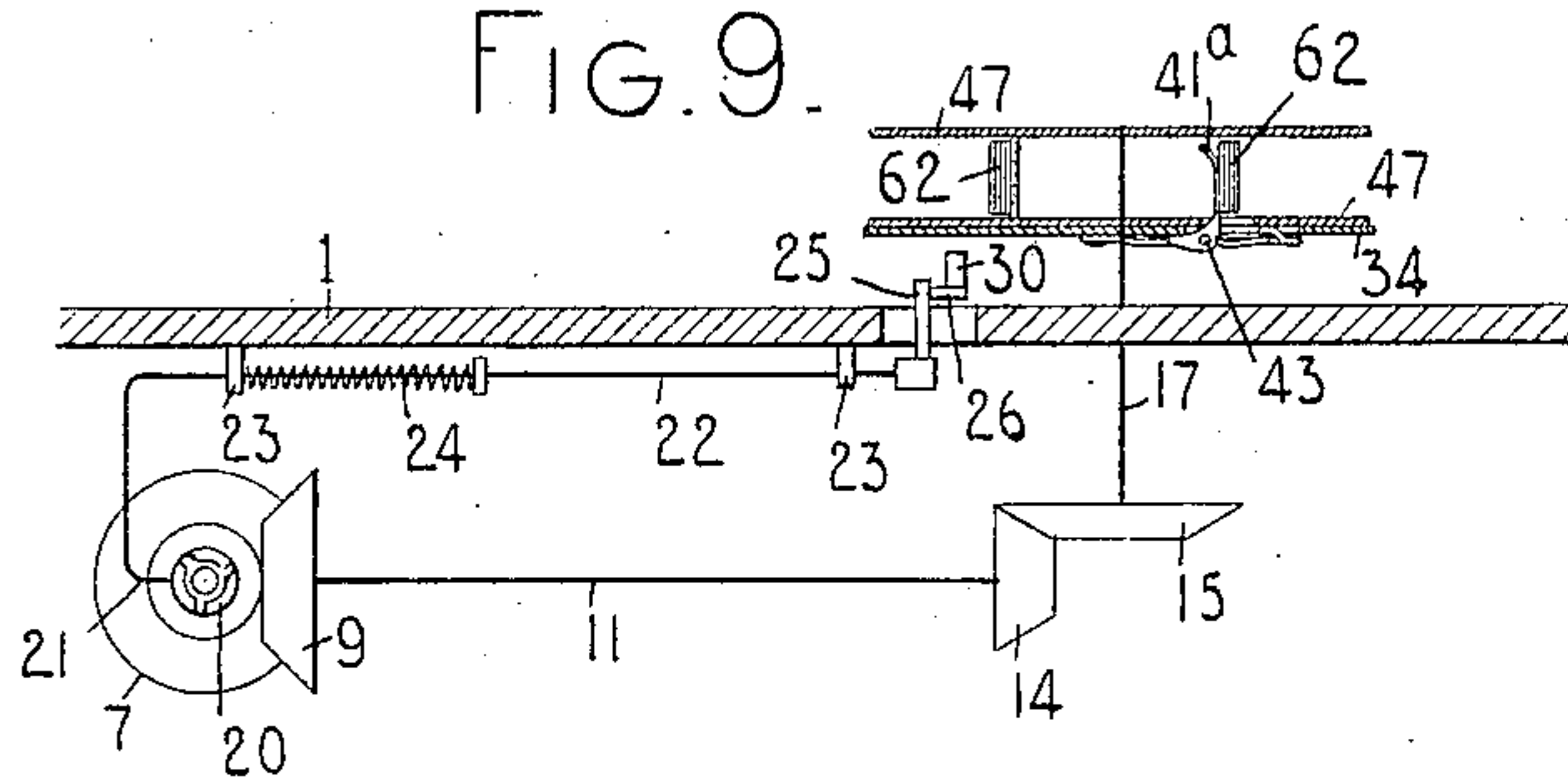


FIG. 9.



WITNESSES:

*J. B. Reeves*  
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INVENTOR:

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# UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

953,494.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed December 16, 1908. Serial No. 467,784.

*To all whom it may concern:*

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to ink ribbon mechanism and particularly to such mechanism for typewriting machines.

In the Monarch typewriter as heretofore constructed the ribbon spools have been made detachable and each of said spools has had mounted thereon a part of the automatic reversing mechanism for changing the direction of longitudinal feed of the ribbon.

One of the objects of the present invention is to place this part of the ribbon reversing mechanism on a part of the machine where it remains permanently in place when the spools are detached, thus cheapening the construction of the spools. It would be convenient for the user of a machine to have several pairs of spools with different sorts of ribbon thereon and these extra spools can be more cheaply produced by obviating the necessity for any movable mechanical parts being mounted on the spool itself. In the Monarch machine as heretofore constructed these spools have not been reversible but have had to be placed on the machine in a definite way; and it is one of the objects of the present invention to make these spools reversible in every sense, that is to say, so that the spool will go into the machine with either side up, either spool may be placed on either side of the machine, and the ribbon may be wound in either direction on any individual spool so far as the construction of the spool itself is concerned.

A ribbon spool having the above characteristics and made in accordance with my invention can be produced with so little expense as to make it practicable to sell the ribbon on the spool if desired; and in winding the ribbon on the spool at the factory no care need be exercised as to the direction in which the ribbon is wound.

To the above and other ends which will appear hereinafter, my invention consists in certain features of construction and combinations and arrangements of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a fragmentary elevation, partly in section, as seen from the middle of the machine, of part of the top plate of a Monarch typewriter and one of the ribbon spools and associated mechanism made in accordance with my invention. Fig. 2 is a detail top plan view of a part of the ribbon driving and reversible mechanism. Fig. 3 is a top view of one of the ribbon spools. Fig. 4 is a view of the spool in horizontal section through the core thereof. Fig. 5 is a fragmentary sectional view through the center of one of the spools and its driving shaft. Fig. 6 is a side or edge view of one of the ribbon spools. Fig. 7 is an enlarged detail perspective view of a ribbon controlled lever forming part of the automatic reverse. Fig. 8 is a diagrammatic plan view of the ribbon driving and reversing mechanism. Fig. 9 is a diagrammatic side view of the same, parts being shown in section.

For the purpose of illustration I have shown my invention embodied in the Monarch typewriter, although it should be understood that the invention is applicable or adaptable to other styles of typewriters and to other writing or printing machines.

In the Monarch machine the top plate 1 is supported by corner posts 2 and on said top plate is mounted a paper carriage which is driven in letter space direction by a spring drum 3. Said spring drum, when the carriage is moving toward the left, turns a bevel gear 4 which meshes with a bevel gear 5 mounted on a transverse driving shaft 6 which carries two bevel gears 7 and 8 adapted to mesh respectively with bevel gears 9 and 10 on the rear ends of horizontal fore and aft extending shafts 11 and 12 respectively, these shafts 6, 11 and 12 being journaled in brackets 13 (Fig. 1) depending from the top plate 1. The shaft 6 is adapted to be moved endwise to connect it with one or the other of the shafts 11 and 12 by moving the gear 7 or 8 into mesh with its cooperating gear. At their forward ends the shafts 11 and 12 have bevel pinions 14 that mesh with bevel gears 15 mounted on the lower ends of vertical ribbon spool shafts 17, each of which is journaled in a boss 18 of the top plate.

The automatic ribbon reverse comprises a pair of worms 20 rigidly mounted on the shaft 6, one near each end thereof, and these



worms are adapted to be engaged by pins 21 consisting of forwardly bent ends of rods 22 that are slidably mounted in brackets 23 beneath the top plate 1, each of the rods 22 being pressed toward the front of the machine by a coiled spring 24. Each of the rods 22 has at its forward end a pin 25 that projects upward through a suitable slot in the top plate into the path of a horizontal swinging lever 26 which is pivoted at 27 to the top plate 1 and is moved in one direction by a spring 28 which tends to turn the lever 26 in such a way as to force the rod 22 toward the rear of the machine into the position shown at the right-hand side of Fig. 8, which is the normal position of this rod, the spring 28 being strong enough to overcome the spring 24. The inner end of the lever 26 is bent upward, forming a lug 30 which, when the ribbon is exhausted from the spool, is adapted to be struck by a cam 31 and forced by said cam into the position shown at the left-hand side of Fig. 8. The cam 31 rocks the lever 26 on its pivot against the tension of its spring 28, thus relieving the pressure on the pin 25 and permitting the spring 24 to move the rod 22 toward the front of the machine, thus drawing the pin 21 into the worm 20 and shifting the shaft 6 toward the empty spool and reversing the feed.

Most of the parts thus far described are shown only diagrammatically as these parts are old and well-known and they are or may be similar to the parts shown in the patent to Felbel and Gabrielson No. 703,339, dated June 24th, 1902. As heretofore constructed, however, the shaft 17 has extended clear up through the ribbon spool and the cam 31 has been mounted on the lower flange of said spool. By the present construction the shaft 17 terminates a little above the top plate 1 and beneath the ribbon spool in an enlargement or head 32 forming a shoulder that rests on the top of the top plate and the extreme upper end 33 of said shaft is reduced and threaded. This reduction of the upper end of the shaft forms an annular shoulder on which rests a disk 34 which is secured in place by a nut 35 screwed on to the threaded part 33, thus rigidly mounting the disk 34 on the upper end of the shaft 17. The cam 31 is pivoted to the under side of the disk 34 by means of trunnions 36 projecting from the arms of the cam and extending into loops 37 struck down from the sheet metal of which the disk is made. A light flat spring 38 is secured to the under side of the disk 34 by being forced through a loop 39 struck down from the sheet metal plate and this spring bears lightly on the top of the cam 31 and assists gravity in depressing said cam when it is released for the purpose of reversing the feed. The cam 31 is normally held up against the under side of the disk

34 by means of a bell crank lever having the form shown in Fig. 7. This lever is made of sheet metal and comprises a horizontal arm 40 that lies beneath the cam 31, a curved upright arm or tongue 41 that extends into the ribbon spool about flush with the core thereof and is normally in contact with the ribbon, and two ears 42 perforated to receive a pivot rod 43 which passes through ears 44 struck down from the disk 34. This bell crank lever is thus pivoted in an opening 45 in the disk 34, the ears 44 consisting of a part of the metal forced out of said opening. One of the ears 42 has a heel, extension or stop 46 which, by contact with the under side of the disk 34, limits the downward motion of the bell crank and consequently the downward motion of the cam 31 when said bell crank and cam are released by the exhaustion of the ribbon on the spool.

The ribbon spool consists of three pieces of sheet metal, namely, two flanges or heads 47 and a cylindrical core piece 48. This core piece has ears 50 projecting from its edges through suitable openings in the heads and bent over as shown in Figs. 1 and 2 to secure the heads to the core piece. Each of the heads is dished in or cupped as shown at 51 inside of the core and this cupped part is adapted to make room for the nut 35 when the spool is in place on its carrier, as shown at Fig. 1. The spool heads are also stiffened by this cupping and also by peripheral outwardly turned rims 52 and by a bead 53. The webbed part may be formed with raised letters as shown at 54 and these letters also serve to stiffen the spool heads. Each of said heads has a rectangular opening 55 for the reception of the arm 41 of the reversing bell crank, a central opening 56 and a hole 57 adapted, when the spool is in place on the machine, to receive a pin 58 that projects upward from the disk 34 to connect the spool to turn with the disk 34 when the latter is turned by the driving mechanism. The core 48 consists of a strip of sheet metal having the ears 50 projecting from its edges, as heretofore described, and having its ends formed into points 60, this strip of metal being bent into cylindrical form and the points 60 being bent in at an inclination as shown in Fig. 4 to serve as means for securing the end of the ribbon to the spool. The core piece does not constitute a complete cylinder but the points 60 terminate at the edges of the openings 55 in the head pieces, thus leaving in the core an opening 61 (Fig. 6) in which the bell crank arm 41 is adapted to play.

Fig. 4 shows the manner in which the ribbon 62 is wound on the spool, one of the spool heads being sectioned away in this figure. The end 63 of the ribbon is caught over one of the sets of hooks or points 60



and the ribbon is wound around the spool, leaving, of course, a flat part across the opening 55. When the spool is placed in the machine the lower opening 55 is slipped  
 5 down over the arm or tongue 41 of the bell crank. It will be seen that the upper end portion of the arm 41 is curved as at 41<sup>a</sup> so as to form a cam. The purpose of this cam is to cause the bell crank 40—41 to be  
 10 forced to the normal position shown in Fig. 1 as a spool is placed in position. Thus when a spool is removed the arm 41 is pressed outwardly by the spring 38 and as a spool is placed in position the ribbon will  
 15 contact with the cam 41<sup>a</sup>, forcing the arm 41 inwardly within the coil of ribbon against the pressure of the spring 38. The arm 41 being in the middle of the spool as indicated in Fig. 1, and under pressure of the  
 20 spring 38, bears lightly against the inside of the coil of ribbon.

The enlarged upper end of each shaft 17 is formed with an axial hole 64 to receive a detachable spindle 65 having a milled head  
 25 66. This spindle may be secured to the shaft in any suitable manner but as here shown it is formed with a split 67 to provide two arms with slight inherent resiliency sufficient to hold the spindle in  
 30 place by friction, the two arms or branches of the lower end of the spindle extending into the hole 64. The lower end 68 of the spindle is made conical as shown in Fig. 5. When the spool is placed in the machine  
 35 with the arm 41 in the spool, this spindle 65 is thrust through the openings 56 in the heads of the spool and is forced into the opening 64 in the shaft 17. The conical end 68 of the spindle forces the spool to central  
 40 position, pressing the ribbon against the arm 41 and forcing said arm to the position shown in Fig. 1, and holding the cam 31 up where it will not act on the lug 30. The spool is slightly turned if necessary to bring  
 45 the pin 58 into the hole 57 and the spindle is pushed down to such an extent as to hold the spool in place on the disk 34. It will be seen that the spool is thus secured sufficiently rigidly to said disk 34 and the shaft  
 50 17, partly through the spindle 65 and partly through the pin 58, said spindle and pin centering the spool so that no part of the spool rubs against the bell crank 40 to interfere with the motion of said bell crank.  
 55 When the ribbon is exhausted from a spool the arm 41 of the bell crank is released and the cam 31 drops down and effects the reverse in the feed in the manner hereinbefore described.

60 Each of the holes 57 is on the same diameter of the spool as the companion hole 55.

It will be noted that both sides of the spool are exactly alike and that both sides of the opening 61 are equipped with the  
 65 points 60 for securing the ribbon. If these

spools are filled at the factory there is no necessity for exercising any care as to which way the ribbon is wound on the spool. Either spool will go on either side of the machine and either spool will fit into the  
 70 machine with either side up. In placing any spool in the machine with the ribbon already wound on it, it is, of course, necessary for the operator to take care to mount said spool in the machine with due regard  
 75 to the direction in which the ribbon is wound.

Various changes may be made without departing from my invention.

What I claim as new and desire to secure  
 by Letters Patent, is:—

1. An ink ribbon spool built up of two heads and a core, said core being of a sheet metal strip the ends of which do not meet whereby a slot is left in the core, and an end  
 85 of said strip being formed into points for attaching the end of the ribbon to the spool.

2. An ink ribbon spool comprising two heads and a core, said core being formed with a longitudinal slot and having points  
 90 projecting inward from an edge of said slot for attaching the end of the ribbon to the spool.

3. In a writing machine, the combination of a ribbon spool, a rotary carrier for said  
 95 spool, and a headed spindle thrust axially through said spool and secured to the end of said carrier.

4. In a writing machine, the combination of a detachable ribbon spool having an open-  
 100 ing in a head thereof, a carrier for said spool, a reversing device adapted to enter said opening when the spool is placed on its carrier, and a spindle with a tapered end, arranged to be thrust axially through said  
 105 spool and into an opening in said carrier, said tapered end of the spindle acting as a cam to center the spool on the carrier.

5. In a writing machine, the combination of a vertical shaft for a ribbon spool, a disk  
 110 mounted on the upper end of said shaft, a cam mounted on the under side of said disk, a lever for controlling said cam, a detachable ribbon spool having in a head thereof an opening to receive an arm of said lever  
 115 inside the coil of ribbon, a spindle adapted to be thrust axially through said spool and into a hole in the upper end of said shaft, and ribbon driving and reversing mechanism controlled by said cam.

6. In a writing machine, the combination of a detachable ribbon spool, means on said  
 120 spool for attaching the end of the ribbon for winding on the spool in either direction, driving mechanism for said spool, and means  
 125 on both heads of the spool for connecting said spool with said driving mechanism, whereby said spool is reversible.

7. A detachable ribbon spool comprising two heads and a core, said core having a slot  
 130



therein armed on both sides with points for attaching the end of the ribbon so that the ribbon can be attached for winding in either direction, and both heads formed with means  
5 for cooperating with driving mechanism for said spool.

8. In a writing machine and in ink ribbon mechanism, the combination of two spool carriers, means for driving said carriers, two  
10 ribbon spools each comprising two heads, means on each head of each spool for connecting either head of either spool with either of said carriers, and means in each  
15 spool for attaching an end of the ribbon for winding in either direction.

9. The combination of a rotary ribbon spool carrier, a driving pin on said carrier, means for driving said carrier, an automatic  
20 reverse device a part of which is mounted on said carrier, a detachable ribbon spool adapted to be mounted on said carrier and comprising two heads, each of said heads having an opening for the reception of a  
25 part of said automatic reverse device, and an opening for said driving pin and both of said openings in each head being on the same diameter of the spool.

10. A ribbon spool comprising a core formed of a strip bent into substantially cylindrical shape with an open space between  
30 the ends of the strip, said ends being provided with tines, the tines on one strip projecting toward the tines on the other strip; and heads or flanges connected to the edges  
35 of the strip.

11. In a writing machine, the combination of a ribbon spool comprising a core formed of a strip bent into substantially cylindrical shape with an open space between the ends  
40 of the strip, said ends being provided with tines, the tines on one end projecting toward the tines on the other end; heads or flanges

connected to the edges of the strip; and a reversing device received within the space between the ends of the strip which constitutes the core of the spool. 45

12. In a writing machine, the combination of a detachable and reversible ribbon spool having openings in both heads or flanges thereof; a carrier for said ribbon spool; 50 ribbon reversing mechanism including a device carried by said carrier, said device being adapted to be received within the opening in either of the heads of the ribbon spool and to be brought into cooperative relation  
55 with the ribbon on the spool irrespective of the opening through which said device extends; and a detachable spindle that passes axially through the ribbon spool to position  
60 a ribbon spool in its carrier.

13. In a writing machine, the combination of a detachable and reversible ribbon spool, each head of which is provided with a reversing-device-receiving-opening and a locking  
65 opening; a ribbon spool carrier provided with a locking pin that is adapted to be received in either of the locking openings in the heads of the ribbon spool; ribbon reversing mechanism including an actuating device controlled by the ribbon and carried by said  
70 carrier, said ribbon reversing device being adapted to be received in either of the receiving-openings in the heads of the ribbon spool; and a detachable spindle which passes  
75 axially through the ribbon spool and which is detachably connected to the ribbon spool carrier.

Signed at Syracuse, in the county of Onondaga and State of New York this 11th day of December A. D. 1908.

HERBERT H. STEELE.

Witnesses:

GEORGE L. COLING,

MARIE K. UNDERDOWN.