

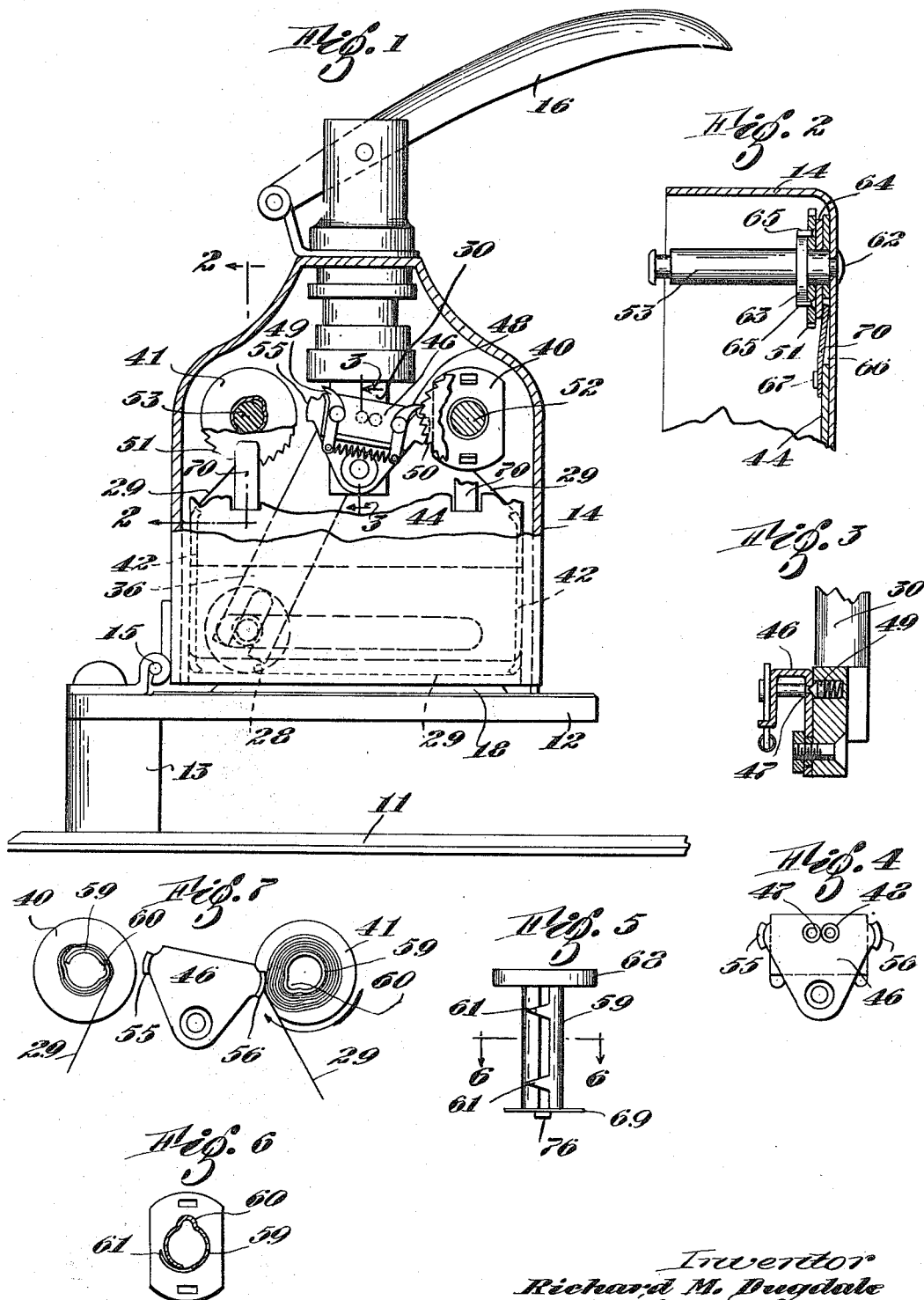
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PRINTING DEVICE

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PRINTING DEVICE

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10 Claims. (Cl. 101—336)

This invention is in part disclosed in my co-
pending Patent No. 1,801,592 granted April 21,
1931, for improvements in printing devices, and
relates to printing devices wherein an ink ribbon
is moved relative to the impression mechanism.
One of the objects of the invention is to provide
improved and simplified mechanism for reversing
the direction of movement of the ribbon, to per-
mit the ribbon to be used a number of times.

Other objects are to provide means for moving
the ribbon reversing mechanism quickly and posi-
tively from one position to the other and to avoid
any tendency on the part of the ribbon reversing
mechanism to cause a failure of ribbon feed or a
breakage of the ribbon.

Another object of my invention is to provide
an improved ribbon reel. Further objects of my
invention relate to features of construction which
are explained in the accompanying specification
and drawing.

My invention is of general applicability in the
printing art but for the purpose of illustration
will be described as I have applied it to a printing
machine for printing sales slips shown in the
accompanying drawing, in which:

Fig. 1 is a side elevation, partially broken away,
of a machine for printing sales slips embodying
my invention;

Fig. 2 is a section on the line 2—2 of Fig. 1; with
one of the ribbon reels removed;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is an elevation of the tumbler shown in
Fig. 1;

Fig. 5 illustrates one of the ribbon reels;

Fig. 6 is a section on the line 6—6 of Fig. 5; and

Fig. 7 is a diagrammatic view of the ribbon
reels and the ribbon actuating and reversing
tumbler.

The apparatus for printing sales slips includes
a base 11, a plate holder 12 rigid with the base
and spaced therefrom by block 13, a casing 14
hinged to the plate holder at 15 and containing
impression mechanism and ribbon feeding and
reversing mechanism, and an operating handle 16
for swinging the casing and contained mechanism
toward and from the plate holder 12 and for oper-
ating the impression mechanism and ribbon feed-
ing and reversing mechanism. A suitable typo-
graphical plate 18 is adapted to be retained by
the plate holder 12, one or more sheets of paper,
such as sales slips, placed thereupon, and the
casing 14 swung to the position shown in Fig. 1
wherein inking ribbon 29 is superposed upon the
sheet or sheets of paper. In this position an
impression may be made upon the sheets of paper

by depressing the operating handle 16 and thereby
causing a vertical plunger 30 to swing a pivotally
mounted roller yoke 36 to the right in Fig. 1 and
move an impression roller 28 in a horizontal direc-
tion over the inking ribbon 29. Plunger 30 is
normally retained in its uppermost position by a
suitable spring. This apparatus is claimed and
more fully described and illustrated in my co-
pending application Serial No. 391,788, filed Sep-
tember 11, 1929, and no further description
thereof is believed necessary.

The inking ribbon 29 is wound upon reels 40 and
41 and is directed to and from the lower portion
of the casing by vertical ribbon guides 42 which
constitute flanges of an inner casing 44 and are
located adjacent opposite side walls of the main
or outer casing 14.

A preferred mechanism for supporting the
ribbon reels is illustrated in Figs. 1 and 2. This
mechanism comprises two cylindrical stud shafts
52 and 53 rigidly mounted on the casing 14, by
means of screws 62, and each having enlarge-
ments in the form of flanges 63 spaced from the
back of the inner casing 44, and adapted loosely
to receive a ratchet wheel 50 or 51 and a spacing
washer 64. Each ratchet wheel has pins 65 pro-
jecting forwardly therefrom immediately outside
the periphery of the flange 63 on the shafts 52
and 53. As shown in Fig. 2 the inner casing 44 is
provided with a recess 66 immediately below each
of the reel supports and a spring 70 is mounted
on the inner casing 44, by means of struck-up ears
67, to extend into the recess 66 and bear against
the spacing washer 64.

The ribbon reels are preferably constructed as
shown in Fig. 5, comprising a central tubular
portion 59 having radial flanges 68 and 69 at the
opposite ends, the rear flanges 69 having teeth
76 struck up rearwardly therefrom to inter-
engage with the pins 65 on the ratchet wheels.
As shown in Fig. 1 the ratchet wheels have their
teeth reversed with respect to each other so that
the ribbon 29 is fed in one direction across the
bottom of the casing 14 when one ratchet wheel
is actuated and in the reverse direction when the
other ratchet wheel is actuated.

I have provided a mechanism cooperating with
these ratchet wheels for actuating the ribbon
reels at each operation of the device in order to
advance the inking ribbon in a step by step man-
ner to present fresh inking surfaces to the im-
pression roller. This means preferably comprises
a pawl device operable with the impression mech-
anism to engage one of the two ratchet wheels
connected respectively to the ribbon reels. Re-

ferring to Figs. 1, 3, 4, and 7, a tumbler 46 is pivotally mounted on the lower end of the plunger 30 between the two ribbon reels to swing toward either of these ribbon reels. Tumbler 46 is provided on one face with a pair of countersunk holes 47 and 48 on the opposite sides of its center, and plunger 30 carries a spring-pressed pin 49 adapted to project into either of these holes and thereby yieldingly position the tumbler adjacent one or the other of the rolls of ink ribbon. Tumbler 46 is provided with two pivotally mounted pawls 48 and 49 for engaging respectively ratchet wheels 50 and 51 connected to reel retaining shafts 52 and 53. As the plunger 30 returns to its uppermost position at the end of the printing impression, one of the pawls 48 or 49, depending upon the position of the tumbler, engages its adjacent ratchet wheel and winds a portion of the ribbon upon a corresponding reel. In this manner the ribbon is advanced in a step by step manner. The ratchet wheels are prevented from moving freely by the frictional engagement of springs 70 with spacing washers 64.

As the tumbler successively engages a ratchet wheel and causes the ribbon to wind up on the corresponding reel, continued operation of the device will transfer most of the ribbon to this reel. I prefer to reverse the direction of movement of the ribbon automatically by causing the increased thickness of ribbon on the reel upon which ribbon is being wound to bring about a reversal of position of the tumbler and thereby disconnect the tumbler from the reel which has been wound up and cause the other ratchet wheel and reel to be actuated in the opposite direction. Tumbler 46 is provided at its opposite sides, adjacent the respective rolls of ribbon, with ribbon contacting members 55 and 56. When a roll of ribbon on a reel attains a certain thickness, it contacts with one of the ribbon contacting members 55 or 56, and a sufficient thickness of ribbon on either of the reels moves the tumbler to its opposite position, and thereby causes a reversal of the ribbon.

In order to prevent the ribbon reversing tumbler from moving slowly from one position to the other in proportion to the necessarily slow change of thickness of the rolls of ribbon on the reels, and a consequent danger of the ribbon reversing tumbler becoming stuck in an intermediate position between the ratchet wheels, I cause the ribbon to move the tumbler from one ratchet wheel to the other both positively and rapidly. In order to accomplish this I prefer to cause the mass of wound ribbon on a reel to operate in the manner of a cam or eccentric having an eccentricity greater than the thickness of one layer of ribbon, whereby the ribbon reversing tumbler is moved into its opposite position during a portion of one revolution of the eccentric mass of ribbon.

A preferable manner of causing the ribbon to act in this manner is to utilize a ribbon reel having a central portion provided with an eccentric part having an eccentricity greater than the thickness of one layer of ribbon. This construction is illustrated in Figs. 6 and 7 wherein the central tubular portion 59 of the reel is shown as provided with an integral protuberance 60. The central tubular portion of the reel is preferably of sheet metal and the protuberance 60 thereon may be formed by suitably deforming the sheet metal before forming it into tubular shape. I prefer to provide one edge of this tubular sheet with prongs 61 which overlap the other end of the sheet, as shown in Fig. 6, and are adapted to

engage the inner end of the inking ribbon to secure it to the reel.

As the device is used, successive operations of the plunger 30 cause one of the pawls of the tumbler to wind the greater portion of the inking ribbon upon its associated reel. Referring to the diagrammatic showing of Fig. 6, the protuberance 60 on the central portion of the reel causes the ribbon roll to function as an eccentric, and after the ribbon reaches a certain thickness, for example that shown in Fig. 6, the eccentricity and camming action of the roll will cause a rapid and positive movement of the tumbler to its opposite position, and a consequent reversal of direction of the inking ribbon.

I claim:

1. In a printing machine, the combination of an ink ribbon, a pair of ribbon reels upon which said ribbon is wound and unwound, means for rotatably supporting each of said ribbon reels, a pair of ratchet wheels each operatively associated with one of said reels, a movable member, pawl means movable with said member and adapted to actuate either ratchet wheel to rotate the corresponding reel to wind ribbon thereon, said member being engageable with the roll of ribbon which is being wound and being adapted to be moved toward the opposite reel by said roll when the latter attains a predetermined thickness.
2. In a printing machine, the combination of an ink ribbon, a pair of ribbon reels upon which said ribbon is wound and unwound, means for rotatably supporting each of said ribbon reels, a pair of ratchet wheels each operatively associated with one of said reels, a movable member, pawl means movable with said member and adapted to actuate either ratchet wheel to rotate the corresponding reel to wind ribbon thereon, means for yieldingly positioning said member to retain the pawl means in a position for engagement with a ratchet wheel, said member being engageable with the roll of ribbon which is being wound and being adapted to be moved toward the opposite reel by said roll when the latter attains a predetermined thickness.
3. A printing machine comprising a pair of rotary ribbon reels, an ink ribbon carried by said reels, said reels each being adapted to wind up and unwind said ribbon, impression mechanism cooperating with said ribbon, a tumbler movable with said impression mechanism and adapted in one position to cause rotation of said reels and in another position to cause reversed rotation of said reels, whereby the ribbon may be moved back and forth from one reel to the other, said tumbler being adapted to be moved from one position to the other by the roll of ribbon which is being wound up when the latter attains a predetermined thickness.
4. In a printing machine, the combination of a ribbon reel, means for rotatably supporting said reel, a ratchet wheel operatively associated with said reel, pawl means for engaging said ratchet wheel to rotate said reel, and shift means associated with said pawl means for engaging the periphery of a wound roll of ribbon on said reel and adapted to remove said pawl means from said ratchet wheel when the ribbon roll attains a predetermined thickness, said shift means including a tumbler which moves past the reel at each stroke of the pawl means and, when said roll attains a predetermined maximum thickness, impacts the periphery of the roll sufficiently to kick the tumbler away from the reel.
5. In a printing machine the combination of

rotary means for winding an ink ribbon into a roll having an eccentricity greater than the thickness of a layer of ribbon, said means comprising an eccentric reel, and ribbon reversing mechanism responsive to the eccentricity of said roll after it has attained a predetermined thickness.

6. In a printing machine the combination of an eccentric reel for winding an ink ribbon into a roll having an eccentricity greater than the thickness of a layer of ribbon and ribbon reversing mechanism responsive to the thickness of said roll.

7. In a printing machine the combination of an eccentric reel for winding an ink ribbon into a roll having an eccentricity greater than the thickness of a layer of ribbon, means for rotating said reel in a winding direction, and means responsive to the eccentricity of said roll for disengaging said last-named means from said reel.

8. In a printing machine the combination of an eccentric reel for winding an ink ribbon into a roll having an eccentricity greater than the thickness of a layer of ribbon, means for rotating said reel in a winding direction, and ribbon reversing mechanism adapted to engage the periphery of the wound ribbon roll and adapted to be actuated by the camming action of said ribbon roll when the ribbon roll has attained a given thickness.

9. A printing machine comprising a pair of rotary ribbon reels, an ink ribbon carried by

said reels, said reels each being adapted to wind up and unwind said ribbon, impression mechanism cooperating with said ribbon, a tumbler movable with said impression mechanism and adapted in one position to cause rotation of said reels, whereby the ribbon may be moved back and forth from one reel to the other, said tumbler being adapted to be moved from one position to the other by the roll of ribbon which is being wound up when the latter attains a predetermined thickness, the winding surfaces of said reels having an eccentricity greater than the thickness of a layer of ribbon.

10. A printing machine comprising a pair of rotary ribbon reels, a ribbon carried by said reels, said reels each being adapted to wind up and unwind said ribbon, an impression roller movable over said ribbon, a plunger for moving said roller, a tumbler movable with said plunger and adapted in one position to cause rotation of said reels and in another position to cause reversed rotation of said reels, whereby the ribbon may be moved back and forth from one reel to the other, said tumbler being adapted to be moved from one position to the other by the roll of ribbon which is being wound up when the latter attains a predetermined thickness, the winding surfaces of said reels having an eccentricity greater than the thickness of a layer of ribbon.

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