

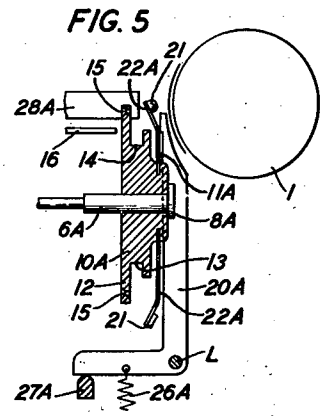
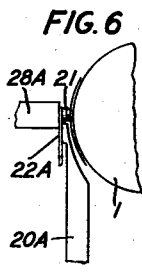
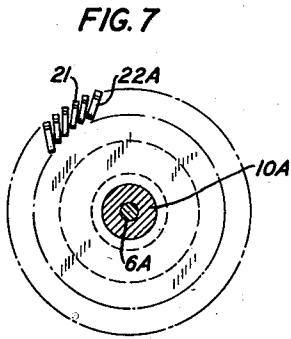
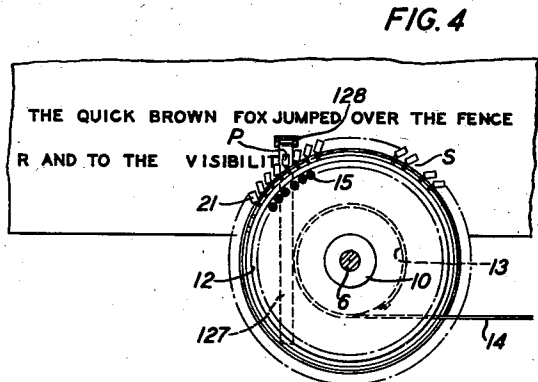
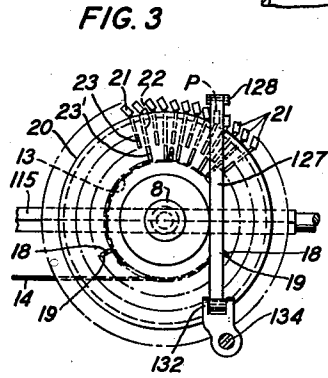
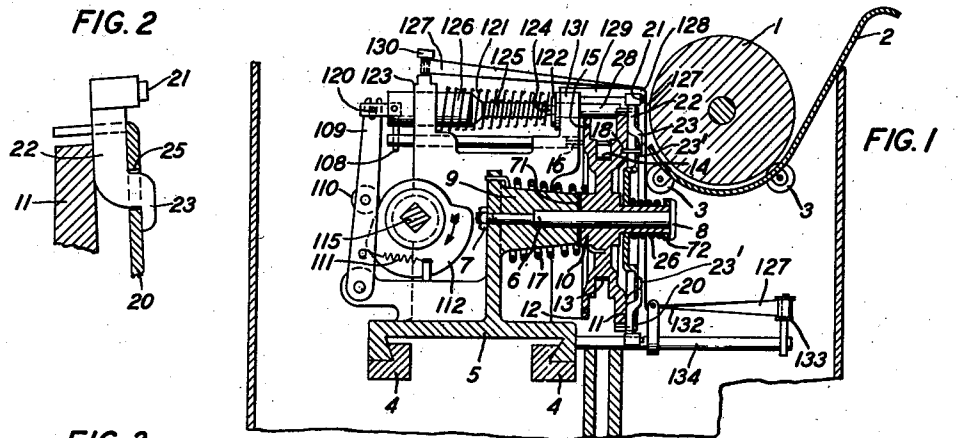
April 1, 1941.

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2,236,663

TYPE WHEEL TELETYPEWRITER

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2,236,663

TYPE WHEEL TELETYPEWRITER

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Original application February 18, 1936, Serial No.
64,467. Divided and this application June 15,
1938, Serial No. 213,745

10 Claims. (Cl. 197—53)

This invention relates to improvements in typ-
ing means for automatic typing machines, es-
pecially for that class of typing machines which
are electrically operated, commonly called print-
ing telegraphs and tickers, and more particu-
larly, but not exclusively, for that variety called
page printers as distinguished from tape printers.

The present application is a division of my
application Serial No. 64,467, filed February 18,
1936, now patent No. 2,161,840, issued June 13,
1939, the disclosure of which is incorporated
herein by reference as a part of this specifica-
tion, and relates particularly to a typewheel
with its associated ribbon guides and actuating
hammer for use in electrically operated typing
machines in which the type faces are selectively
changed before a common typebar or hammer.
One feature of the invention is the provision of
a light disc form of type carrying member for
use preferably with a type setting or guiding
member having either a parallel motion or a
long radius rocking motion to which the selected
type only is locked by the printing bar whereby
very short stemmed pivoted types may indi-
vidually be advanced with little or no angular
change. This is important in relation to the
selective type member positioning feature of my
invention, particularly described in my appli-
cation Serial No. 64,467 mentioned above, be-
cause a more massive type member with the
simple and stopless selective displacement means
that is preferred would require more force to
accelerate and would consume time in oscillation,
possibly even requiring the addition of special
sections or even of stops for attaining high
speeds. However, the typewheel is not restricted
to use with this type of machine as it is capable
of wide application to other forms of printing
machines.

A further real advantage of the preferred form
of my page printer with disc-shaped type mem-
ber is that it practically overcomes the advantage
the typebar printer has heretofore had over the
type wheel printer in greater visibility of matter
being typed. The printing point on my preferred
disc-shaped type member is so chosen below and
to the left of the top center of the type wheel
that both the line and the character last printed
are legibly visible.

An object of the invention, therefore, is the
provision in an electrically operated typing ma-
chine of an unusually lightweight member carry-
ing the type for use with lightweight moving
means, thereby making high-speed printing op-
erations readily obtainable.

Another object is to provide a printing tele-
graph machine with types, in a disc form of
carrier, orientated at such an angle and thrust
against the paper when at a point so much to
the left and below the top center of the type
wheel as to leave legibly visible the line and the
character last printed.

A further object is the provision in a mani-
folding printer of an exceptionally light and
compact wheel or disc of types, each type being
individually movable to printing position in a
path of longer radius than its own hinge radius
in order to avoid top or bottom shading with
various manifold copies.

Still another object is the provision of a page
printer yielding regularly spaced typing by ac-
curately registering the selectively positioned
type carrier just before striking each type.

Other objects and advantages of the invention
will be described in connection with the follow-
ing detailed description with reference to the
drawing in which:

Fig. 1 is a sectional elevation of the type wheel
and platen showing the typing bar and center-
ing pin;

Fig. 2 is an enlarged detail view of the type
hinge shown in Fig. 1;

Fig. 3 is a sectional elevation from the rear of
the machine showing that side of the type wheel
which faces the platen;

Fig. 4 is a sectional elevation from the front
of the machine showing that side of the type
wheel which faces the operator of the machine
and showing the relation of the type to the line
of printing on the paper around the platen;

Fig. 5 is a sectional view of an alternative form
of type wheel with a non-rotating type guide;

Fig. 6 is a detailed view showing the cooper-
ation of the type hammer and the type wheel and
guide of Fig. 5; and

Fig. 7 is a sectional elevation from the front
of the machine showing the arrangement of type
on the typewheel shown in Fig. 5.

1 designates a platen or paper roller, 2 a paper
guide, 3, 3 pressure rollers to cause a paper or
papers to hug platen 1. These paper handling
parts are not shown or described in detail, being
well known in the typewriter and printer arts.
Platen 1 and associated paper handling parts
do not move axially in this machine. This is
advantageous for several reasons. It is harder
to cause paper to "track" properly on a moving
platen, especially if fed continuously from rolls.
It is less fatiguing to read messages coming in
on paper that is stationary. Reciprocation of

the long and massive paper and platen also takes considerable space and consumes more energy and time than the reciprocation of the light type wheel carriage to be described. 4, 4 are carriage rails extending from side to side of the machine. 5 is a carriage frame riding on rails 4, 4. This may be of metal or, in the interest of lightness, of molded Bakelite or the like.

6 is a shouldered metal stud held in boss 9 by nut 7. Stud 6 has an enlarged head 8. Type wheel body 10, preferably of molded Bakelite or of light metal, runs on stud 6 and is confined axially between stud head 8 and washer 71 against the end of boss 9. Type wheel body 10 integrally carries two circular flanges, 11 and 12, separated by a cylindrical neck portion or drum 13. A tape 14 which is preferably of very thin spring steel, but may be of woven linen rubberized, or of any flexible and relatively non-extensible and non-hygroscopic construction, is attached at one end on drum 13 and wraps about it at least a full turn when not extended. In rear flange 12 are a suitable number of accurately spaced bell-mouthed centering holes 15, one for each selectable position of the type wheel. A pointed centering pin 16 is arranged to enter holes 15 with very small clearance for accurately positioning type wheel body 10. This pin 16 is moved by coupling pin 108 integral with typing hammer 28. Thus, centering pin 16 is withdrawn and shot forward together with typing hammer 28.

The preferred type wheel is so light for one having independent manifolding types, due to the construction described, that high speeds may be obtained with relatively weak springs, i. e., with low energy. The overthrow is opposed by spring 17 which has been increasing more in tension the farther and faster the tape 14 has spun the type wheel. There is provided an incidental damping friction due to spring 26 pressing the type wheel body against fibre washer 71 on the face of boss 9. A stopping of the type wheel is thus obtained in which the stored energy is dissipated fully as quickly as is needed for high speed typing yet without shock. The centering pin 16 next darts into one of the holes 15—this accompanies and very slightly precedes the blow of the typing hammer 28—and the bell mouth of hole 15 with the pointed end of pin 16 enforces correct centering if the amplitude of the type wheel oscillation at that instant is only less than one type space.

Lever 109 bearing cam roller 110 is pivoted on carriage frame 5 and is raised against spring 111 and hammer spring 121 by a traveling cam 112 mounted on shaft 115. As the carriage moves, cam 112 slides axially along the square portion of shaft 115, which is driven from the main power shaft by spiral gears not shown. The end of lever 109 lies in a fork at the rear end of hammer 28 and there engages cross pin 120 in its slotted end, withdrawing hammer 28 from advanced position and compressing spring 121 between horseshoe collar 122 and guide lug 123 of frame 5. Horseshoe collar 122 is slipped over neck 124 of hammer 28 and is kept in place by spring 121. Cushion spring 125, footing against enlarged portion 126 of hammer 28, holds collar 122 to the far end of neck 124. When roller 110 reaches the sharp drop of cam 112, spring 121 drives forward hammer 28, made massive by portion 126, with such energy as to compress spring 125 and strike type 21 a sharp blow with a quick but limited rebound. Thus, roller 110 may stay on the low part of cam 112 for some time, keeping

pin 16 in hole 15 without the hammer 28 touching type 21 against the paper.

A helical torsion spring 17 surrounds boss 9 and engages a hole in frame 5 at the base of boss 9 with its left end and type wheel body 10 with its right end. A number of like holes for engaging the left end of spring 17 may be distributed about boss 9 in frame 5 to permit of adjusting the spring torque. Three pins 18, of which only one is fully visible in the section of Fig. 1, are molded or driven into type wheel body 10 and engage radially elongated but laterally close fitting holes 19 (seen best in Fig. 3) in type guide disc 20, thus angularly locating guide disc 20 relative to type wheel body 10.

21—21 are type having stems or bodies 22. These bodies, which are preferably proportioned thin and flat, end in offset or Z-shaped ends 23 which are hinged or hooked in radial slots 25 in type guide disc 20. In order that disc 20 shall not be weakened by having slots 25 all along one circle, the type bodies 22 of alternate types 21 are made slightly longer thereby causing alternate slots 25 in disc 20 to be along different circles, as can be understood from Fig. 3. The offset or Z-shaped end of one of the longer bodied types is shown at 23' in Fig. 1.

A relatively stiff spring 26 footing against washer 72 which is held by the enlarged head 8 of stud 6 presses guide disc 20 against flange 11, the bodies 20 of the type being interposed between disc 20 and flange 11. The outer rim of guide disc 20 is formed back to surround flange 11 as shown, and this formed back portion is slotted to receive the bodies 22 of all the types 21. It will be seen that the types 21 are well located both radially and angularly in guide disc 20, and that they are also normally held against the back of disc 20 by the face of flange 11. It will also be seen that if disc 20 is tilted or moved away from flange 11 the types can freely swing on their hinges but only away from disc 20.

The position of hammer 28 and of the type 21 struck by it, looking from the rear or platen side of the type wheel as in Fig. 3, is well to the right and below the top center of the typewheel, or to the left and below if looking from the front of the machine as in Fig. 4. As is seen in Fig. 4, this provides for legibility of the last letter printed. Because of this off-center printing, the particular type 21 in front of hammer 28 is not visible in the strictly central section view of Fig. 1. However, it will readily be understood from that view that, when hammer 28, which is very heavy relative to guide disc 20 which may be of duralumin or of a light embossed sheet metal construction, falls on the back of any type 21, the whole guide disc 20 is tilted about its diametrically opposite point and the type 21 so struck is gripped firmly between the hammer pressure and the spring 26 acting through disc 20 and is swung against the paper on the platen exactly as though it were an integral part of guide disc 20.

No other type but the one struck is impelled toward the paper. In fact, due in inertia, when the Z or hinge ends 23, 23' of adjacent types 21—21 are suddenly accelerated by disc 20 toward the paper, their heads momentarily react all the harder against flange 11. Hammer 28, as described, instantly rebounds, due to spring 125, from its printing position far enough to permit disc 20, under pressure of spring 26, to press all the types 21—21 against flange 11. This occurs before any but the struck type 21 can have been shaken against the paper. The long radius of action for the struck type provided by the com-

mon tilting guide disc 20 is a desirable feature as it produces an action comparable to that of type-bar type in that the type faces strike evenly whether on single papers or on thick manifold copies.

Fig. 4 shows the type wheel, of which the various numbered parts have been identified, in its relation to the matter being typed. The type 21 at position P is the one about to be printed. The last character printed, T, is legible although its lowest part is not visible. It is desirable to maintain legibility of the last character printed, while avoiding a ribbon shifting device, to present a narrow typewriter ribbon 127 vertically before the type in position P. Ribbon 127 comes from a supply spool (not shown) at the left of the machine to left main guide 130 (Fig. 1) carried on top of hammer guide lug 123. It makes a right angle bend around guide 130 toward the paper, also a 90-degree twist, and comes to the top ribbon guide 128, which is supported on rod 129 carried on top of the other hammer guide lug 131, from which point it passes downward over guide 128 and between the type faces and the platen 1. Ribbon 127 angles slightly away from the type wheel in this downward stretch, the more easily to clear the type faces, makes a right angle bend around the lower ribbon guide 132 toward the back of the machine, also a 90-degree twist, coming to right main guide 133. Guides 132 and 133 are carried on rod 134 extending from carriage frame 5.

The ribbon 127 rounds right main guide 133 to extend either to another supply spool (not shown) at the right-hand side of the machine, or else to run over a pulley and back to a supply spool at the left side of the machine. Well-known arrangements for taking up and letting off typewriter ribbons and for reversing them are numerous and one of them may be used here. The only requirements to be observed in choosing a ribbon feeding device are that the ribbon feeding movements of the supply spools in this machine should preferably be caused only by the carriage return function, rather than by carriage steps or spaces, that the ribbon feeding movements preferably should not be an integral multiple of the letter spaces, and that the ribbon should not be slack. The reason for this is that, as the carriage 5 spaces along rails 4, 4 during typing, with the ribbon supply spools stationary, the stationary ribbon 127 will be drawn through the moving carriage 5, over the guides just described, and will present a fresh spot for each new letter. If, when the carriage returns, the ribbon 127 is shifted thereby, but not a multiple of the letter space, fresh spots will again be presented for the whole next line. This ribbon feed per line arrangement as described is a convenient one for this machine, but may be replaced by any well-known feeding arrangement. The vertical or nearly vertical position of the ribbon at the printing point is, however, to be preferred for visibility in cooperation with the non-central typing point and non-radial type relationship of this invention.

In this machine, the type wheel is displaced on all so-called "stunt" codes exactly as if they represented characters. This offers no objections and avoids the construction of a device to prevent the raising of the typing hammer and centering pin on the "stunt" codes. Such a device might be a latch on the rear end of type hammer 28, in place of cross pin 120, and a ball to lift it operated by the falling of any one of the "stunt" code bars.

Spacing is accomplished by transmitting a spacing signal, for which any desired code combination may be assigned, to select a blank or typeless position on the type wheel, such as the position S in Fig. 4. No fixed code and order of letters has been assumed for this machine since its adaptability to cooperation with existing arrangements is paramount. The typing hammer 28 falls on position S, or on any other blank position, in the usual way. Its stroke is, however, checked by the horseshoe collar 122 striking the back shoulder of neck 124, so that, without the thickness of a type 21 interposed before the paper, hammer 28 makes no mark. The blow of the hammer 28 is cushioned by spring 125, as described. Lacking a type to strike, the compression of this spring is slightly greater, so that the impact on collar 122 is not sharp.

In Fig. 5, 10A is the type wheel body, 12 the rear flange with centering holes 15, 14 the tape, and 13 the tape drum. Molded into the type body 10A is a thin steel fingered disc 11A carrying type 21 brazed or riveted on the fingers 22A in the angular arrangement shown in Fig. 7. The fingers 22A are bent away from the paper as shown. A non-rotating type clamping guide 20A is pivoted at L on a suitable lug of carriage 5 and is provided with a strong spring 26A and a stop 27A.

As best seen in Fig. 6, when the flat end of typing hammer 28A strikes a finger 22A, the latter is gripped between the upper end of type clamping guide 20A and the lower part of the end of the hammer 28A, and is thus advanced against the paper substantially in a parallel manner, the type 21 being itself supported by the upper part of hammer 28A. An advantage of this form of construction is the still lower mass of the revolving type wheel due to the fact that the type clamping guide 20A, equivalent in type guiding function to disc 20 of Fig. 1, is not a part of the rotating mass, and also due to the type stems or bodies 22 not being used and to the fact that disc 11A is lighter than flange 11.

Many other variations and practical embodiments of the above principles will occur to those skilled in the art and may be practised without departing from the spirit of the invention as set forth in the appended claims.

What is claimed is:

1. In a printing telegraph machine, a type wheel comprising a back disc and a spring-pressed rocking front disc selectively rotatable together, a peripherally positioned set of types normally held between said discs, hinge means for pivotally securing each type to one of said discs, each type having a body and a face secured to the body at an angle to the radius through its respective position, and a printing hammer adapted to strike said types individually.

2. In a printing telegraph machine, a platen adapted to bear a paper, a wheel bearing types that are to be advanced for printing and rotating in a plane substantially parallel to the paper at the printing point, and means for obtaining legible visibility of the last character printed, said means including instrumentalities for printing a type to the left and below the top center of said wheel looking toward said platen.

3. In a printing telegraph machine having a cylindrical platen adapted to bear a paper, a type carrier comprising a selectively rotatable disc and a set of individually mounted types rotating therewith, a non-rotating yielding type guide having a concave upper surface adapted to bear against the cylindrical surface of the platen,

means for pivotally mounting said type guide in the printing telegraph machine, and a type presser bar for pressing said types one at a time against said type guide and for advancing a pressed type and said type guide against a paper borne by the platen to effect printing by said types.

4. In a printing telegraph machine, a platen adapted to bear a paper, a wheel bearing types that are to be advanced for printing upon said paper, means for rotating said wheel in a plane substantially parallel to the paper at the printing point, and means for obtaining legible visibility of the last character printed, said means including an ink ribbon and guides for causing the ink ribbon to pass substantially vertically between the type to be printed and the platen.

5. A front-strike printing machine comprising in combination a platen adapted to bear a paper, a type wheel body having a flange, a plurality of movable types, a guide member for guiding movement of said types, means for pivotally attaching each of said types to the guide member and between the flange of the typewheel body and the guide member for movement toward and from the platen, a spring for normally biasing said guide member toward the type wheel body, a printing hammer for moving a type and the guide member against a paper borne by the platen, operating means for operating said printing hammer, and actuating means for mechanically actuating said operating means.

6. A front-strike printing machine comprising in combination a platen, a plurality of types, a disc, supporting means for supporting the disc for rotation and for tilting, a printing hammer adapted to strike said types individually against the platen, and hinge means for individually mounting the types on the disc and for causing a struck type to effect the tilting of the disc toward the platen for advancing the struck type toward the platen in a path of longer radius than its own hinge radius.

7. A front-strike printing machine comprising in combination a front disc, a back disc, a shaft, means for mounting said back disc upon said shaft for rotation, means for mounting said front disc upon said shaft for rotation and for tilting toward the platen, selecting means for rotating the back disc, instrumentalities for causing the front disc to rotate integrally with the back disc, a plurality of individual types each having a body member, hinge means for pivotally mounting said type bodies individually on said front disc with the type bodies sandwiched between the front disc and the back disc, a spring for pressing the front disc against the back disc for retaining the type bodies in an unoperated position, means for causing an individual type to be moved toward the platen in a path of longer radius than its own hinge radius, said means including a printing hammer for rocking a type member and the front disc away from the back disc and toward the platen, and operating means for operating said printing hammer.

8. A front-strike printing machine comprising in combination a cylindrical platen having an axis and adapted to bear a paper, a typewheel having an axis for supporting the type wheel for rotation in a plane substantially parallel to the paper at the printing point, a plurality of individual types, instrumentalities for mounting the types individually on the type wheel, supporting means for supporting the type wheel axis in a position other than parallel to the platen axis, driving means for causing the type wheel to travel the length of the platen, and means for obtaining legible visibility of the last character printed, said means including actuating means for causing the types to strike individually along the length of the platen near the trailing edge of the type wheel as it advances along the length of the platen.

9. A front-strike printing machine comprising in combination a cylindrical platen having an axis and adapted to bear a paper, a type wheel having an axis for supporting the type wheel for rotation in a plane substantially parallel to the paper at the printing point, supporting means for supporting the type wheel axis in a position other than parallel to the platen axis, a plurality of individual types, a printing hammer for striking the types individually toward a paper borne by the platen, hinge means for pivotally mounting said types individually on the type wheel, each of said types having a body and a face secured to the body at an angle to the radius through its respective position, and means for obtaining legible visibility of the last character printed, said means for obtaining legible visibility including supporting means for supporting the printing hammer in a position for causing it to strike only a type which is mounted on the type wheel at a point to the left and below the top center of the type wheel looking toward the platen.

10. A front-strike printing machine comprising in combination a cylindrical platen having an axis and adapted to bear a paper, a type wheel having an axis for supporting the type wheel for rotation in a plane substantially parallel to the paper at the printing point, supporting means for supporting the type wheel axis in a position other than parallel to the platen axis, a plurality of individual types, a printing hammer for striking the types individually toward a paper borne by the platen, an ink ribbon, hinge means for pivotally mounting said types individually on the type wheel, each of said types having a body and a face secured to the body at an angle to the radius through its respective position, supporting means for supporting the printing hammer in a position for causing it to strike only a type which is mounted on the type wheel at a point to the left and below the top center of the type wheel looking toward the platen, and a plurality of guides for causing said ink ribbon to pass vertically across the middle left portion of the type wheel looking toward the platen.

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