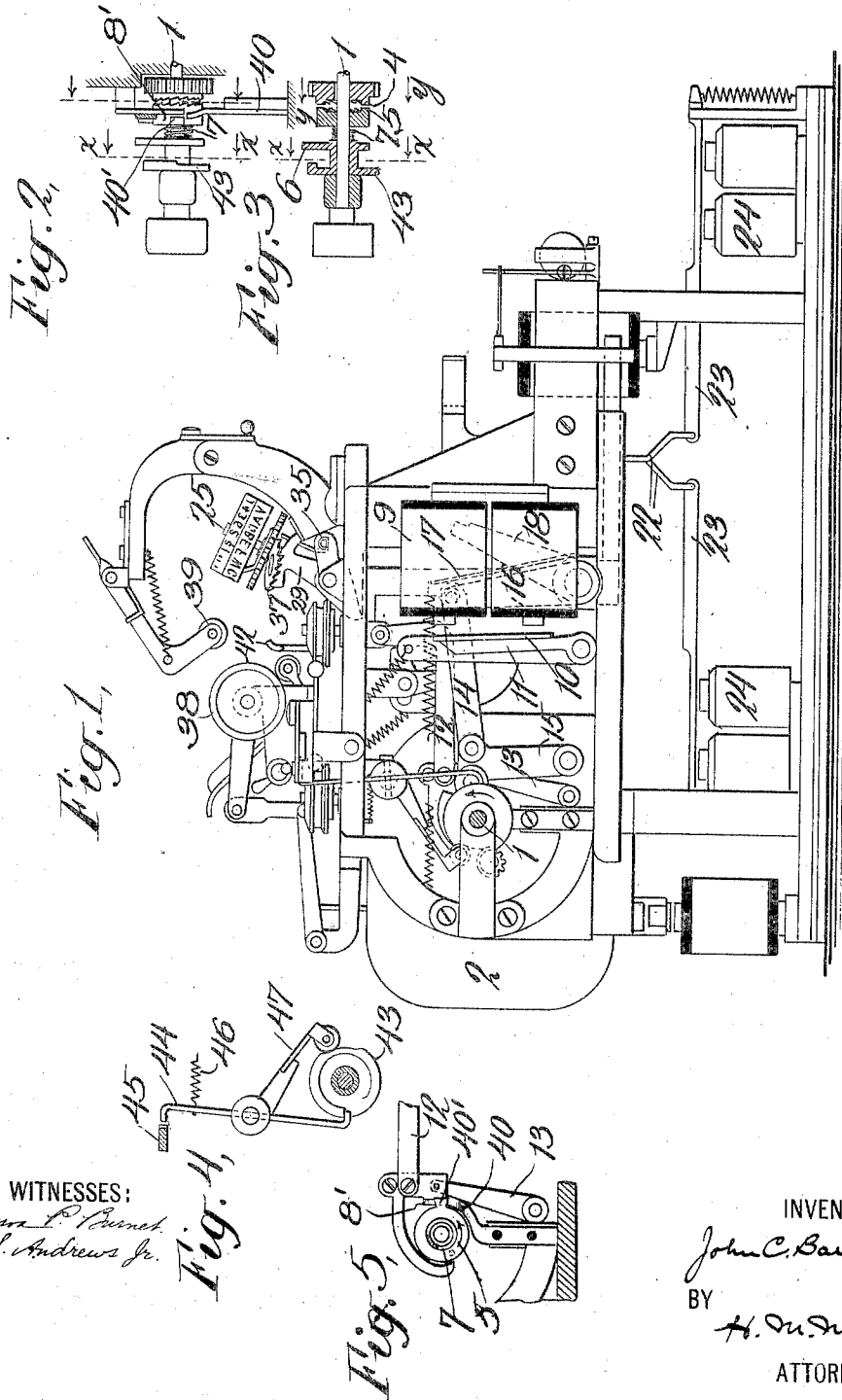


No. 811,995.

PATENTED FEB. 6, 1906.

J. C. BARCLAY.
PRINTING MECHANISM.
APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 1.



WITNESSES:
Emerson P. Burnett
L. S. Andrews Jr.

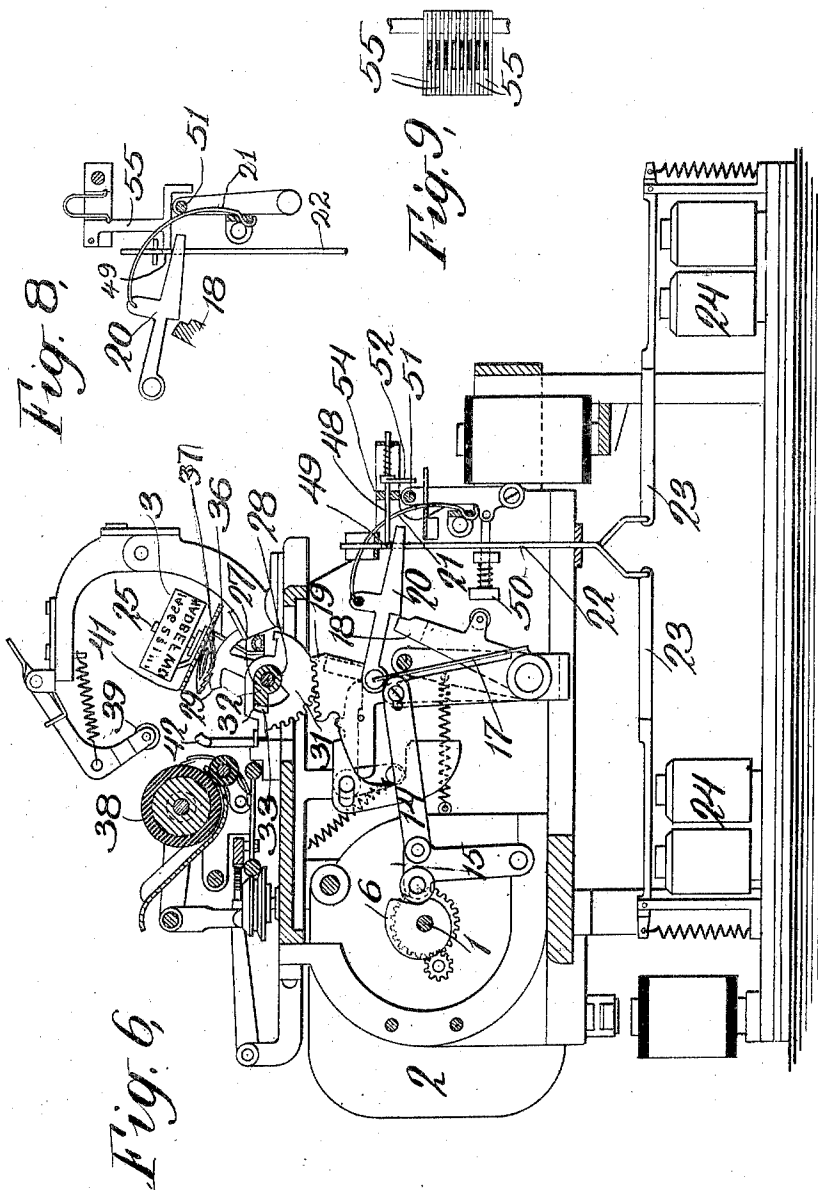
INVENTOR
John C. Barclay
BY
H. DuMarble
ATTORNEY

No. 811,995.

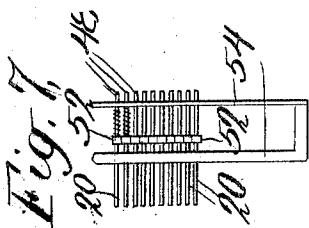
PATENTED FEB. 6, 1906.

J. C. BARCLAY.
PRINTING MECHANISM.
APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 2.



WITNESSES:
James T. Barnett
L. L. Andrews Jr.



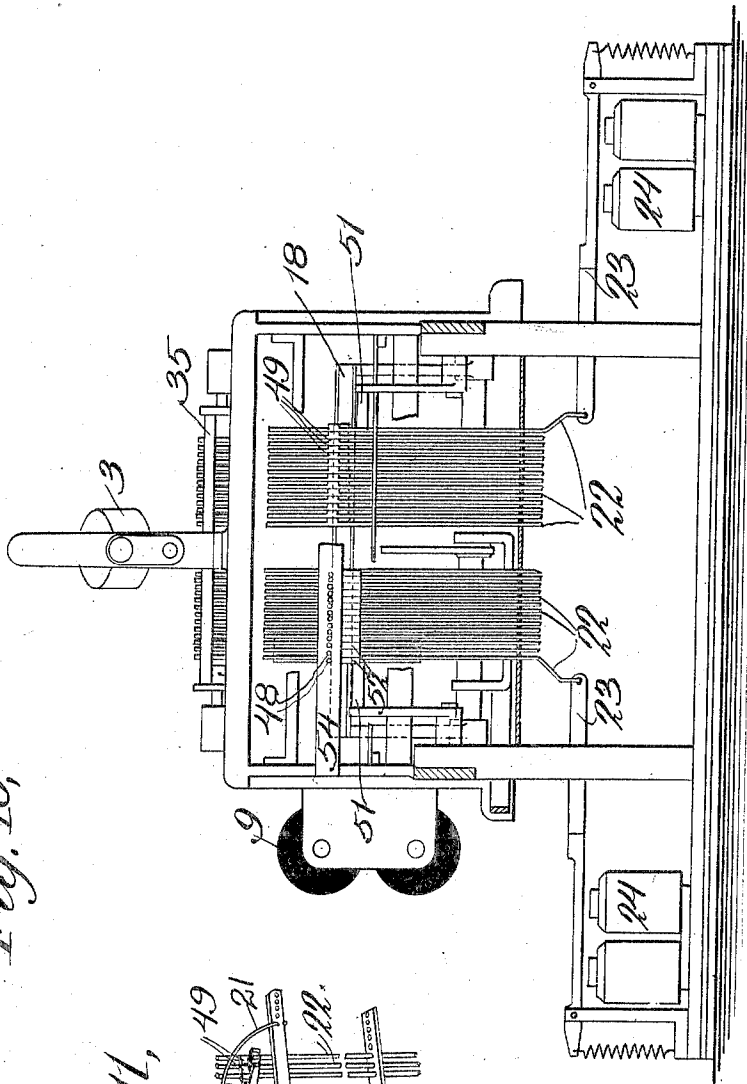
INVENTOR
John C. Barclay
BY
H. M. Marble
ATTORNEY

No. 811,995.

PATENTED FEB. 6, 1906.

J. C. BARCLAY.
PRINTING MECHANISM.
APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 3.



WITNESSES:

WITNESSES,
James P. Burnet
G. S. Andrews Jr.

INVENTOR

John C. Barclay

BY

H. M. Marble

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN C. BARCLAY, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN UNION TELEGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PRINTING MECHANISM.

No. 811,995.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed March 24, 1905. Serial No. 251,804.

To all whom it may concern:

Be it known that I, JOHN C. BARCLAY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Printing Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in printing mechanism, and particularly to that class thereof wherein selecting devices each corresponding to one or more of the characters to be printed and normally out of operative connection with a relatively movable driving member are arranged each to be engaged operatively with the said driving member when the corresponding character is to be printed.

The object of my invention is to prevent the missing of characters by such printing mechanism when operated at high speed.

In the accompanying drawings I illustrate my invention as embodied in a telegraph-printer described and claimed in my Patent No. 787,608, dated April 18, 1905, the printing mechanism proper of which telegraph-printer is substantially the printing mechanism of what is known as the "Blickensderfer Electric Type-Writer;" but my invention is applicable also to type-writers, and particularly to the "Blickensderfer Electric Type-Writer."

In said drawings, Figure 1 shows an elevation of the left-hand side of the printing-telegraph receiver, the selecting-relays and associated parts being omitted. Figs. 2 to 5, inclusive, are detail views of the clutch employed for transmitting motion from a power or driving shaft to the printing mechanism and of the associated parts, Fig. 2 showing a front view of the clutch and associated parts, Fig. 3 a longitudinal section thereof, Fig. 4 a transverse section on the line X X of Figs. 2 and 3, showing the cam mechanism for operating the carriage-feed, and Fig. 5 a transverse section on the line Y Y of Figs. 2 and 3 through the center of the clutch, showing the device for opening and closing the clutch. Fig. 6 shows a sectional elevation of the machine, the section being taken on planes parallel to Fig. 1 and in such manner as to dis-

close the operation of the printing mechanism. Fig. 7 shows a detail top view of the form of device for locking down the pawls 20 illustrated in Fig. 6. Fig. 8 is a detail side elevation of an alternative device which may be employed, and Fig. 9 is a detail top view thereof. Fig. 10 shows a detail front view of the printing mechanism, the carriage return and shift magnets, all but two of the printing-magnets being omitted and a portion of the locking device being broken away. The particular locking device illustrated in this figure is of the type shown in Figs. 6 and 7. Fig. 11 is a detail view showing three of the type-wheel-actuating pawls and the rods for actuating the same.

The printing mechanism of the machine herein illustrated and described comprises a normally open clutch interposed between a power-shaft and a cam, a driver mounted to be reciprocated by said cam when the latter rotates, mechanical selecting mechanism comprising a plurality of tumblers and coacting gear-sectors corresponding to the different characters to be printed, and pawls carried by the gear-sectors normally out of engagement with the reciprocating driver, but each adapted to be drawn into engagement therewith to effect the printing of a character corresponding to that gear-sector and its tumbler, said tumblers and their corresponding gear-sectors being of various different gear ratios, so that the same movement of the reciprocating driver will cause different tumblers to move different distances. The said mechanism also comprises a type-wheel having on its periphery the various characters to be printed, said type-wheel mounted on a spindle adapted to be rotated to different positions to bring different characters of the type-wheel into position for printing and then to be locked against further rotation and then swing bodily with the type-wheel toward the platen, whereby the character of said wheel then in position for printing is caused to strike the surface to be printed upon, and said printing mechanism further comprises means whereby said tumblers, though normally disengaged from said type-wheel, are each brought into driving connection therewith when operated by said reciprocating driver and then are caused to rotate the type-wheel until the latter is locked after

the desired character reaches the printing position and to move said type-wheel toward the platen. In the operation of such printing mechanism when any character on the type-wheel is to be printed the corresponding pawl of the selecting mechanism is drawn down into position to be engaged by the said driver and simultaneously the said clutch is closed and the driver thereby caused to move forward to engage said pawl. Much trouble has been experienced, however, when such printing mechanism is operated rapidly, owing to the pawl rising under the influence of its spring before said pawl is engaged by the said driver. This, if it occurs, results in the missing of a character. My invention comprises means whereby said pawls when depressed are held down until after the reciprocating driver has engaged them. By this means missing of characters is obviated even when the machine operates at very high speeds.

The printing mechanism employed in my printing telegraph and as hereinbefore stated heretofore employed in a type-writer will be described only so far as is necessary to show how said mechanism is automatically operated and controlled by selecting mechanism according to my invention.

Referring first more particularly to Figs. 1 to 6, inclusive, numeral 1 designates the main driving or power shaft, and 2 an electric motor driving said shaft through suitable gearing. Numerals 4 and 5 designate a clutch on said driving-shaft, 4 being a stationary member and 5 being a sliding member of the clutch. 6 designates a cam on said shaft, which is driven through the clutch, and 7 a spring which tends to press clutch member 5 into engagement with clutch member 4. 8' designates a spacing-piece which normally engages a projection 40' of clutch member 5 and holds said clutch out of engagement with its coacting member 4. 9 designates a magnet for operating the clutch, 10 the armature of said magnet, 11 a rocker-arm connected to the armature, and 12 a link connected to said rocker-arm and to the spacing-piece 8'. Said spacing-piece is supported by a rocker-arm 13. Cam 6 when rotated through the closing of clutch 4 5 pushes to the right of Fig. 1 a bar 14, supported by links 15 and 16 and arranged to transmit motion through leaf-spring 17 (shown in dotted lines in Fig. 1) to the driver 18, which is a rocking member extending transversely across the front of the machine. In the rear of said driver are the gear-sectors 19, one for each division or character space of the type-wheel, and each of these sectors carries a corresponding pawl 20 normally above and out of engagement with the driver 18 and held out of such an engagement by the spring 21, but arranged to be drawn into such engagement at suitable times by a corresponding operating-rod 22,

mounted to slide up and down in suitable guides at the front of the machine and connected each to the armature-lever 23 of the corresponding printing-magnet 24. There are as many of these printing-magnets as there are gear-sectors. When one of said magnets 24 is energized, its corresponding pawl 20 will be drawn down into engagement with the driver 18, and since, as hereinafter explained, the spacing-magnet 9 is energized when any one of the magnets 24 is energized and the clutch 4 5 is thereby closed and the cam 6 caused to revolve and move the driver 18 forward it follows that as soon as any one of the pawls 20 engages the driver 18 said pawl and its gear-sector are drawn forward.

Numerals 3 designates the type-wheel. It is mounted upon a spindle 25, itself mounted in a carrier (not shown) mounted upon a transverse rocker-shaft 27, having its bearings in the frame of the machine. Upon the shaft 27 are mounted loosely two sleeves 28, one to the right and the other to the left of the spindle 25, of which sleeves only one is shown in Fig. 6. The said sleeves carry gear-sectors 29, intermeshing with a pinion (not shown) on the spindle 25. Upon the sleeves 28 are mounted a plurality of segmental gears or tumblers 31, each corresponding to and in mesh with one of the gear-sectors 19, above mentioned. These tumblers 31, though mounted on sleeves 28, are normally out of driving connection therewith, each tumbler being normally in an eccentric position with respect to its sleeve 28, but being mounted upon such sleeve, as shown, so that it is capable of sliding into the eccentric position and in so doing of engaging with a projection 32 of the sleeve as soon as its gear-sector 19 is drawn forward by the driver 18. As soon as the tumbler is so in engagement with the sleeve 28 it rotates said sleeve, and thereby rotates the corresponding gear-sector 29 and the spindle 25, and therefore the type-wheel 3.

In order that the different sectors 19 and tumblers 31 may rotate the type-wheel different distances from its normal position, said sectors and their corresponding tumblers are of graduated pitch diameters. By so constructing these parts the reciprocating driver 18 when it operates rotates the type-wheel different distances according to the pawl which is drawn down into engagement with said driver. Each tumbler when so rotated picks a bar 35 when the character on the type-wheel corresponding to the tumbler is approximately in printing position, and this bar 35 when so picked up causes a stop-pawl 36 to engage the teeth of a stopping-ratchet 37, carried by the spindle 25, thus arresting the rotative movement of the type-wheel. This locking of the type-wheel occurs before the forward movement of the driver 18 is completed, and such movement of said driver continuing and the type-wheel

being no longer able to rotate the spindle 25 of said type-wheel is caused to swing on shaft 27 as an axis toward the platen 38, carrying the type-wheel with it, causing said type-wheel to strike a blow against the platen 38 or upon a piece of paper carried thereby. In its movement toward the platen the character opposite the platen wipes past an inking-roller 39. The cam 6 on the driving-shaft 1, by which motion is imparted to the driver 18 and thence to the type-wheel, is of such shape that in the first instance it gives a gradually-accelerated motion to said driver and then before the type-wheel reaches the platen permits the said driver to move forward by inertia in advance of the motion of the cam, so that the blow is struck by momentum. A stationary cam 40, Figs. 2 and 5, engages a projection 40' on clutch member 5 when said member 18 has about completed its movement, and said projection riding upon cam 40 opens the clutch and then slips over the end of the cam 40 upon spacing-piece 8' and is arrested in such position by said spacing-piece. The opening of the clutch prevents a repetition of the blow of the type-wheel until one of the magnets 24 is again energized, and as soon as the blow is struck the various parts of the mechanism which are out of their normal positions are returned to normal position by the several retractile springs shown.

Upon the spindle 25 of the type-wheel there is a star-wheel 41, Figs. 6 and 7, which when the type-wheel begins to move toward the platen is engaged by a centering-pin 42, which serves to bring the character to be struck into the exact position required to give a good impression. Spacing between letters and words is accomplished by a cam 43, which is both a face and an edge cam, its face operating a claw-lever 44 from left to right against the tension of a spring 46 and its edge operating a follower 47, which presses said claw-lever 44 against a rack 45 on the rear of the carriage.

The printing-magnets 24 correspond to the keys of a type-writer and are in circuits controlled by selecting mechanism such as that described in my Patents No. 758,732, dated May 3, 1904, and No. 785,076, dated March 21, 1905. It is not necessary herein to describe such selecting mechanism. The clutch-magnet 9 is in a common return of the circuits of the several printing-magnets, and therefore said spacing-magnet is operated each time any one of the printing-magnets 24 is operated. These circuits and the inclusion of the spacing-magnet and common return are not illustrated, as the same will be understood readily by those skilled in the art. The circuits of the printing-magnets 24 are broken very soon after said circuits are closed, and when the machine is operated at high speed it has been found that occasionally the

circuit of a printing-magnet will be broken before the driver 18 has moved forward into engagement with the pawl depressed by the action of said printing-magnet. Such de-energization of the printing-magnet will result in the rise of the said pawl under the influence of the corresponding spring 21 unless means be provided to prevent this and so will result in missing the character corresponding to the printing-magnet energized. To avoid such missing of characters, I provide locking means such as illustrated in the drawings. Figs. 6 and 7 illustrate one type of locking means which may be employed, the same comprising a plurality of spring-pressed bolts 48, corresponding each to one of the pawls 20, each such bolt normally opposite and resting against a lug 49 of the corresponding rod 22, which lug projects over the corresponding pawl 20 and depresses said pawl when said rod 22 is pulled down. Said bolts 48 are each arranged to move in over the corresponding lug 49 when said lug is depressed under the influence of the actuating-spring, thereby preventing said rod 22 from rising even if the corresponding printing-magnet 24 is deenergized before the driver 18 has picked up the particular pawl 20 which was depressed. Missing of the character corresponding to the pawl depressed, therefore, becomes impossible. As the driver 18 moves forward near the end of its movement it encounters a head 50 of a transverse universal bar 51 and moves said bar 51 forward. Such bar 51 in such movement encounters a lug 52 of the locking-bolt 48, which has moved inward. The universal bar 51 therefore trips the bolt 48, which holds down the pawl which was depressed, permitting the pawl to rise. This tripping occurs at about the time when the driver 18 reaches the limit of its forward movement, and therefore at a time such that release of the pawl will not interfere with the printing of the corresponding character. The locking-bolts 48 and parts associated therewith are carried by a frame 54, secured to the frame of the machine. It will be seen that this is a very simple and relatively inexpensive locking device, whereby dropping out of characters is avoided, and that the use of such locking device permits a very considerable increase of speed of the machine without the possibility of dropping out of characters.

In Figs. 8 and 9 I illustrate an alternative locking device which may be employed, the same consisting of a plurality of pivoted and spring-actuated latches 55, suitably supported in proximity to the ends of the pawls 20 and corresponding each to one of said pawls. When any one of said pawls is depressed, the corresponding latch 55 is pressed in over the end of said pawl and holds the same depressed until the universal bar 51 in its forward movement sweeps aside said

latch and releases said pawl. It will be obvious that this device is a mere equivalent of the locking device first described.

It will be obvious that my invention as herein described is susceptible of many variations and modifications without departing from the spirit and scope of my invention and also that certain parts may be used in connection with other parts of different construction. I do not limit myself, therefore, to the particular details of construction, arrangement, and operation herein illustrated and described.

What I claim is—

1. The combination with printing mechanism comprising means for printing at will any one of a plurality of characters, operating means therefor comprising a driver, a plurality of engaging means, and means for moving any one of said engaging means into position for engagement with said driver, of locking means for said engaging means which holds any one of the latter which has been operated, in position for engagement until engaged with said driver.

2. The combination with printing mechanism comprising selecting means, a driver therefor, and engaging means for operatively connecting said selecting means and driver, of operating means for said engaging means, and locking means for holding said engaging means in position for engagement until such engagement is accomplished.

3. The combination with printing mechanism comprising selecting means, a driver therefor, and engaging means for operatively connecting said selecting means and driver, of operating means for said engaging means, locking means for holding said engaging means in position for engagement until such engagement is accomplished, and means for releasing the locking means.

4. The combination with printing mechanism comprising selecting means, a driver therefor, and engaging means connected to said selecting means and normally out of, but arranged to be drawn into, position for engagement with said driver, of operating means for said engaging means, and locking means for holding said engaging means in position for engagement with the driver until such engagement is accomplished.

5. The combination with printing mechanism comprising selecting means, a driver therefor, and engaging means connected to said selecting means and normally out of, but arranged to be drawn into, position for engagement with said driver, of operating means for said engaging means, locking means for holding said engaging means in position for engagement with the driver until such engagement is accomplished, and means for releasing the locking means.

6. The combination with printing mechanism comprising tumblers, gear-sectors for

rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, of operating means for said pawls, and locking means for holding each pawl, when the latter is moved into position for engagement with the driver, in such position until engaged by the driver.

7. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, of operating means for said pawls, locking means for holding each pawl, when the latter is moved into position for engagement with the driver, in such position until engaged by the driver, and means for releasing said locking means.

8. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, of operating means for said pawls, locking means for holding each pawl, when the latter is moved into position for engagement with the driver, in such position until engaged by the driver, and means operated by said driver for releasing said locking means.

9. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, operating means for said pawls, latches for the said pawls adapted to engage and hold each pawl when the latter is moved into position for engagement with the driver, and means for releasing said latches.

10. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, operating means for said pawls, latches for the said pawls adapted to engage and hold each pawl when the latter is moved into position for engagement with the driver, and means operated by the driver for releasing said latches.

11. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of engagement with said driver, but arranged to be drawn into position for such engagement, operating means for said pawls, latches for the said pawls adapted to engage and hold each pawl when the latter is moved into position

tion for engagement with the driver, and a universal release-bar operated by said driver as it moves forward, and arranged when operated to engage and release whichever of
5 said latches has been operated.

12. The combination with printing mechanism comprising tumblers, gear-sectors for rotating the same, a driver, and pawls carried by said gear-sectors and normally out of
10 engagement with said driver, but arranged to be drawn into position for such engagement,

of rods for operating said pawls, spring-pressed locking-bolts therefor each adapted to engage a lug on the corresponding rod when
said rod is depressed, and means operated by 15 the driver for releasing said rods.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN C. BARCLAY.

Witnesses:

B. STEIN,

H. M. MARBLE.