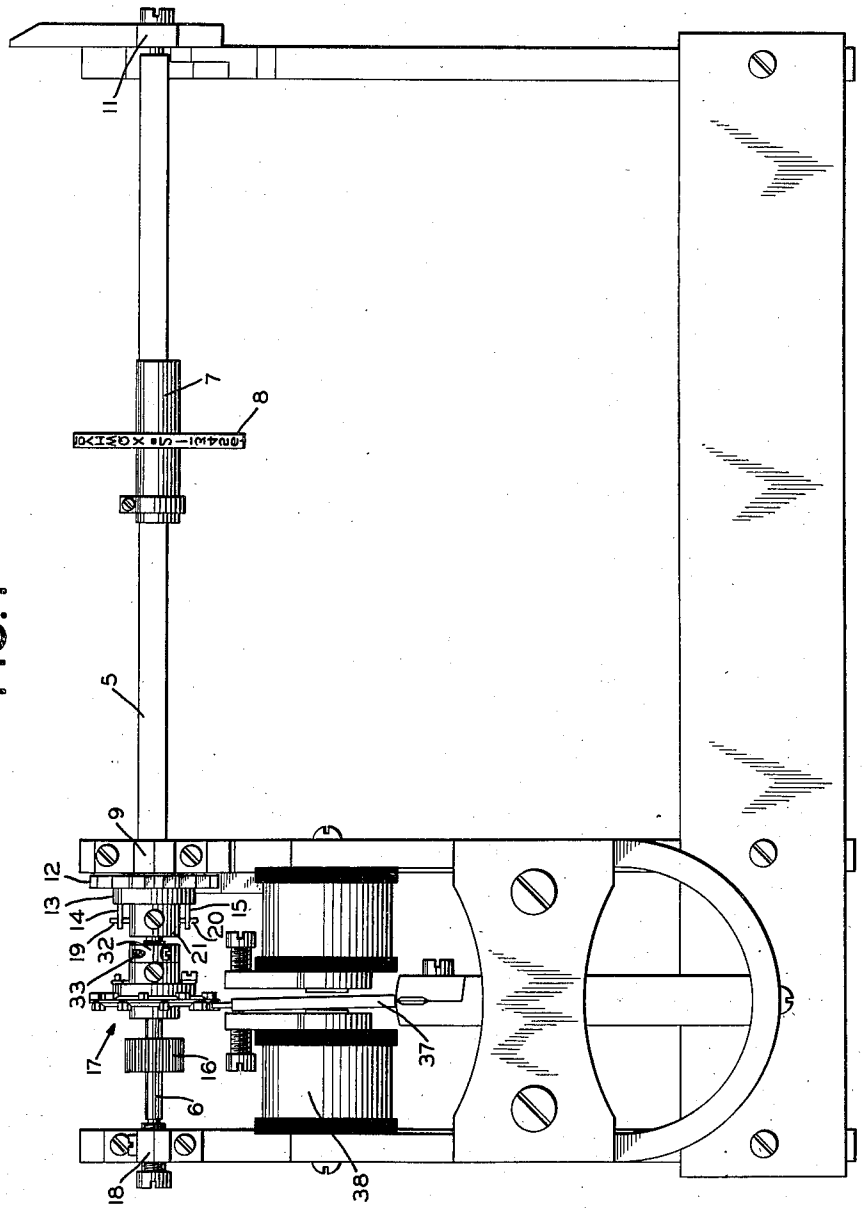
Aug. 17, 1937. G. S. HILTZ 2,090,203

TYPE WHEEL PRINTER

Filed April 11, 1935 2 Sheets-Sheet 1

FIG. 1



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FIG. 2

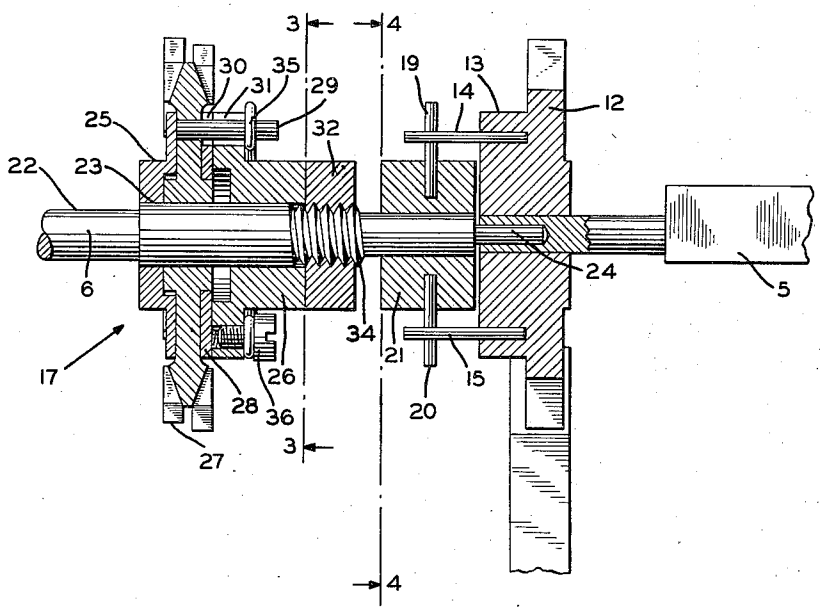


FIG. 3

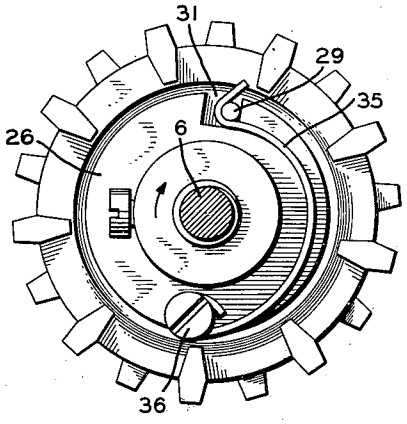
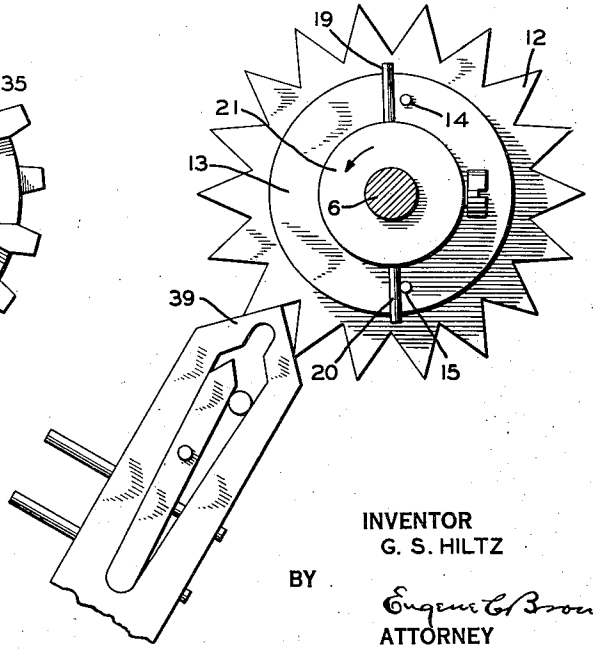


FIG. 4



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2,090,203

TYPE-WHEEL PRINTER

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Application April 11, 1935, Serial No. 15,869

5 Claims. (Cl. 178—36)

This invention relates, in general, to printing telegraph machines, and has particular reference to improvements in the driving mechanism of the type-wheel thereof.

One of the objects of this invention is to increase the speed of operation. Another object is to eliminate, or appreciably decrease, the fly-wheel action of the type wheel and its shaft. Still another object is to provide means for decreasing the rebounding action of the type-wheel and its shaft at the escapement mechanism.

A still further and more specific object is to effect a continuity of rotation of the escapement-wheel shaft and the type-wheel by decreasing the sudden jar or shock transmitted to the escapement-wheel shaft each time the escapement-wheel strikes the escapement armature.

In printing telegraph machines of the type to which this invention relates, it has heretofore been customary to have the type-wheel and escapement-wheel rigidly secured to a common shaft, the rotation of this shaft being controlled by the escapement magnet and its armature. The escapement-wheel is permitted to rotate one step for each movement of the armature.

While the type-wheel is rotating so as to bring the proper character into printing position, the rotary movement of the escapement-wheel shaft is practically continuous. When, however, a prolonged pulse is sent through the escapement magnet, the escapement-wheel strikes against the escapement anchor, or armature, and the escapement-wheel and its shaft comes to rest with a sudden jerk.

It will be obvious that in those printing selections where the type-wheel must make a substantial portion of a revolution to arrive at the selected character, inertia will be stored up in the rotating type-wheel. This fly-wheel effect of the type-wheel is transmitted through its shaft, and causes a rebounding action at the escapement mechanism.

This fly-wheel action imposes a limitation on the speed of the printer, and when operated at or near the maximum speed sometimes causes the type-wheel not to properly align the character to be printed. Another object of the invention is, therefore, to overcome this difficulty.

Other objects are effected by this invention, as will be apparent from the following description and claims taken in connection with the accompanying drawings forming a part of this application, in which:

Fig. 1 is an elevational view of a Burry printer with all parts, except the type-wheel shaft and its associated mechanism, and the escapement magnet, removed from the framework for convenience of illustration.

Fig. 2 is a sectional elevation of a portion of the type-wheel shaft.

Fig. 3 is a sectional elevation of the escapement-wheel shaft and escapement-wheel, taken along the line 3—3 of Fig. 1; and

Fig. 4 is a sectional elevation of the escapement-wheel shaft and indexing-wheel, taken along the line 4—4 of Fig. 1.

Referring first to Fig. 1, there is shown the framework of a standard page printer, such as that shown in the patent to Burry, No. 680,693, dated August 20, 1901. This machine is well known in the art and hence many of the parts, not essential to a clear description of this invention, have not been included, so that the improvements herein may be more easily shown.

The present invention employs two shafts, 5 and 6, as a driving mechanism for the type-wheel. Type-wheel shaft 5 is triangular in cross-section, and carries a longitudinally movable sleeve 7, to which is rigidly secured the type-wheel 8. This shaft has its ends suitably journaled at 9 and 11 in the framework of the printer. Mounted upon the left end of shaft 5 is a star-wheel 12 provided with an extended hub portion 13 on one side thereof, from the perpendicular face of which project two horizontal pins 14 and 15. The escapement-wheel shaft 6, carrying a gear 16 and the escapement-wheel mechanism 17, has its left end suitably journaled in the framework at 18, and its right end supported by, and loosely coupled to, the left end of shaft 5, as is more clearly illustrated in Fig. 2. The rotational movement of shaft 6 is transmitted to shaft 5 by means of two pins 19 and 20 diametrically opposite each other and projecting radially from a collar 21 secured to the shaft 6 by means of a set screw. The pins 19 and 20 engage the horizontal pins 14 and 15 respectively, so as to drive the type-wheel shaft.

Fig. 2 shows a sectional elevation view of the shafts 5 and 6, and their associated mechanism. It will be observed that shaft 6 is divided into stepped portions 22 and 23, and that the right end 24 is turned down so as to fit into the end of shaft 5, the latter being drilled out to provide a bearing support for shaft 6.

Securely mounted on portion 23 of the shaft 6 are two flanged collars 25 and 26, intermediate which is located the escapement-wheel 27, and a washer 28. The escapement-wheel is of a type in common use, and needs no description. How-

ever, this invention provides for an escapement-wheel loosely carried by the shaft, and limited in its free rotation by a pin 29, projecting horizontally from the face of the wheel 27 through a notched portion 30 of the washer 28, and a similarly notched portion 31 of the flanged collar 26. A locking collar 32, held by a set screw 33, shown in Fig. 1, is screwed on a threaded portion 34 of the shaft 6 and serves to prevent side movement of the escapement mechanism.

In Figs. 2, 3 and 4 the parts have been considerably enlarged for the sake of clarity. It will be noticed from Fig. 3 that the notched portion 31 of the collar 26 is substantially wider than the diameter of the pin 29 projecting therethrough. The excess space indicates the amount of free rotational movement the escapement-wheel may have. The pin 29 is normally held against the right side of the notch 31 by the action of a curved spring member 35. This spring member is secured at one end, by means of a set screw 36, to the flanged portion of the collar 26, its free end yieldingly engaging the pin 29.

The escapement-wheel shaft rotates in the direction indicated, and is stopped each time one of its teeth engages the escapement magnet armature 37. As hereinbefore mentioned, this rotation is substantially continuous until the escapement-wheel assumes its preselected position, whereupon it comes to a sudden stop. It is obvious that at high speeds there is a substantial fly-wheel effect due to the momentum of the rotating parts.

When the escapement-wheel comes to a sudden stop, the shaft and parts secured thereto, may continue to rotate, limited of course by the slot 31, until the energy of rotation or momentum built up in the revolving parts is dissipated through the spring member 35. In other words, the spring acts as a snubber to cushion the effect of the shocks and jars incident to the intermittent operation of the escapement mechanism.

In Fig. 4 is shown an enlarged view of the coupling arrangement between the shafts 5 and 6. As stated, this comprises a collar 21 having a pair of pins 19 and 20 projecting radially therefrom, and engaging the pins 14 and 15, projecting from the face of the star-wheel 12. It will be noticed that the pins 14 and 15 are not diametrically opposite each other, but are positioned so that they are slightly off the diameter a predetermined distance. The pins 14 and 15 are disposed on the same side of the pins 19 and 20 and are so positioned that there can be only slight play or movement in either direction.

The centering and indexing mechanism is also shown. This comprises a pointed finger 39 movable into engagement with the teeth on the star-wheel 12, and cooperating with the same in selecting a predetermined one of two adjacent characters on the type-wheel. This indexing mechanism is well known in the art and requires no further description.

With the loose coupling arrangement of pins 19, 20 and 14, 15 it is possible for the shaft 6 to revolve a slight amount before its movement is transferred to shaft 5, and also for shaft 5 to continue rotating a slight amount each time the escapement-wheel shaft 6 is brought to a stop. In other words, there may be a slight lag in starting, and a slight overthrow in stopping.

With the loose coupling, as shown, there is not a positive drive between the two shafts but instead, shaft 6 is urged around by a series of blows or thrusts delivered through the pins 19 and 20.

The operation of the type-wheel positioning mechanism is as follows:

As a series of stepping impulses are received to select a character for printing, the armature 37 of the escapement magnet 38 vibrates from one side to the other, permitting the escapement wheel 27 to rotate step-by-step under the driving force of a spring motor (not shown) geared to the pinion 16. The movement of the wheel 27 is intermittent, that is, it is arrested momentarily between each impulse by the armature of the escapement magnet. The shaft 6, however, is permitted to rotate to some extent during the momentary rest intervals of the escapement-wheel due to the flexure by spring 35. Upon release of the escapement-wheel by armature 37, on the reception of a succeeding impulse of the character group, the spring 35, by energy stored therein, quickly advances the escapement-wheel one step. The movement of the shaft 6 is substantially continuous, with a certain amount of deceleration and acceleration as the escapement-wheel is momentarily stopped and released. The shaft 6 drives the type-wheel shaft 5 through the pins 20 and 15, the former applying slight blows to the latter as the driving pin 20 accelerates up to the driven pin 15. On deceleration of the shaft 6, the type-wheel may rotate freely under the momentum imparted to it by the aforesaid blow, so that the pin 15 advances relatively to the pin 20, until restricted by engagement of the pin 14 with the pin 19. On the next escapement of the wheel 27, the pin 20 again accelerates to apply another driving blow to the shaft 5 through pins 20 and 15. The movement of the type-wheel is, therefore, substantially uniform as it moves from one printing position to the next.

Upon prolonged stopping of the escapement-wheel at the end of a character signal, the shaft 6 continues to rotate until the rear wall of the slot 31 engages the pin 29, whereupon the shaft 6 comes to rest. At about the same time pin 14 is advanced into engagement with the pin 19, thereby stopping the type-wheel shaft. Due to the momentum of the type-wheel shaft and the parts carried thereby, there is a certain amount of rebound of the type-wheel shaft, which throws the shaft and the wheel 12 carried thereby backward, or in a clockwise direction, as viewed in Fig. 4. Since the driven pin 15 is spaced from the driving pin 20 at this time the rebound has no effect on the escapement-wheel shaft, at least until pin 15 is carried backward sufficiently to engage the pin 20, at which time the force of the rebound will have been substantially, if not entirely, expended. However, even if a blow sufficient to rotate the shaft 6 in a backward direction should be given to the pin 20 by the rebound of the type-wheel shaft, this blow will not be transmitted to the escapement-wheel but will be absorbed by the spring 35 as the rear wall of the slot 31 is moved away from the pin 29 carried by the escapement wheel.

By the foregoing embodiment of my invention, it will be seen that a means has been provided for neutralizing the fly-wheel effect of the revolving type-wheel and escapement-wheel, and for minimizing the rebounding action of these parts when they are brought to a sudden stop, so that a greater efficiency and speed may be obtained, and a less erratic and jerky action of the revolving parts may be accomplished.

While this invention has been shown in but

one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible to various changes and modifications without departing from the spirit thereof, and it is desired, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

What I claim is:

1. In a printing telegraph machine, the combination of a type-wheel, a shaft carrying the same, a second shaft loosely coacting with said first mentioned shaft for effectuating the rotation of said type-wheel, an escapement-wheel loosely carried by said second shaft, yieldable means for restraining the rotary movement of said escapement-wheel relatively to said shaft, said means comprising a resilient member having one end secured to said shaft, and the other end engaging the escapement-wheel.

2. In a printing telegraph machine, the combination of a type-wheel shaft, an escapement-wheel shaft, a yieldably mounted escapement-wheel on said last mentioned shaft, and means for loosely coupling said shafts together, whereby one shaft may have a slight rotation in either direction relatively to the other.

3. In a printing telegraph machine, a type-wheel shaft carrying a type-wheel, a member fixedly mounted at one end of said type-wheel shaft, a second shaft in substantial alinement with said first shaft, an escapement-wheel yieldably mounted on said second shaft, coupling means for joining said shafts end-to-end, comprising a plurality of elements projecting radially from said second shaft and transversely intersecting the locus of said first mentioned elements so as to loosely engage the same, whereby said first shaft is rendered responsive to the rotation of said second shaft.

4. In a printing telegraph machine, a type-wheel shaft, a second shaft in substantial alinement with said first shaft, an escapement-wheel yieldably mounted on said second shaft, coupling means for joining said shafts end-to-end, comprising a plurality of angularly spaced members carried by said type-wheel shaft, a plurality of differently spaced members projecting from said second shaft, and transversely intersecting the locus of said first mentioned members so as to loosely engage the same, whereby said first shaft is rendered responsive to the rotation of said second shaft.

5. In a printing telegraph machine, a type-wheel shaft, a type-wheel, a star-wheel fixedly mounted at one end of said type-wheel shaft, a second shaft in substantial alinement with said first shaft, an escapement-wheel yieldably mounted on said second shaft, coupling means for joining said shafts end-to-end, comprising a pair of members projecting horizontally from the outer face of said star-wheel on non-diametric lines, a second pair of members projecting from said second shaft on a diametric line and transversely intersecting the locus of said first mentioned members so as to loosely engage the same, whereby said first shaft may have a slight rotary movement in either direction relatively to said second shaft, and whereby said first shaft is rendered operable through said second shaft.

GEORGE S. HILTZ.