Feb. 13, 1940. R. D. SALMON 2,189,927

PRINTING TELEGRAPH APPARATUS

Filed Dec. 2, 1936 4 Sheets-Sheet 1

Fig. 1.

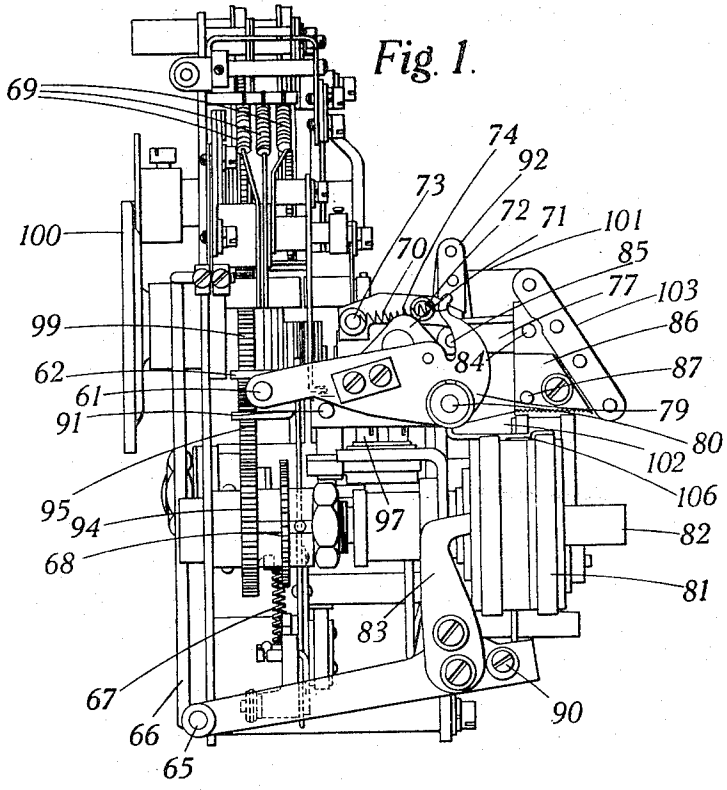
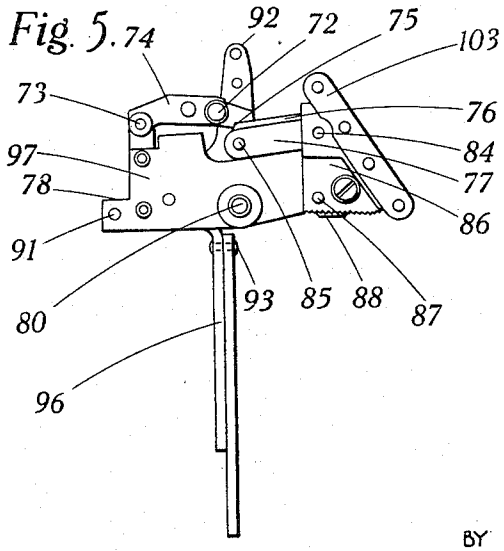


Fig. 5.



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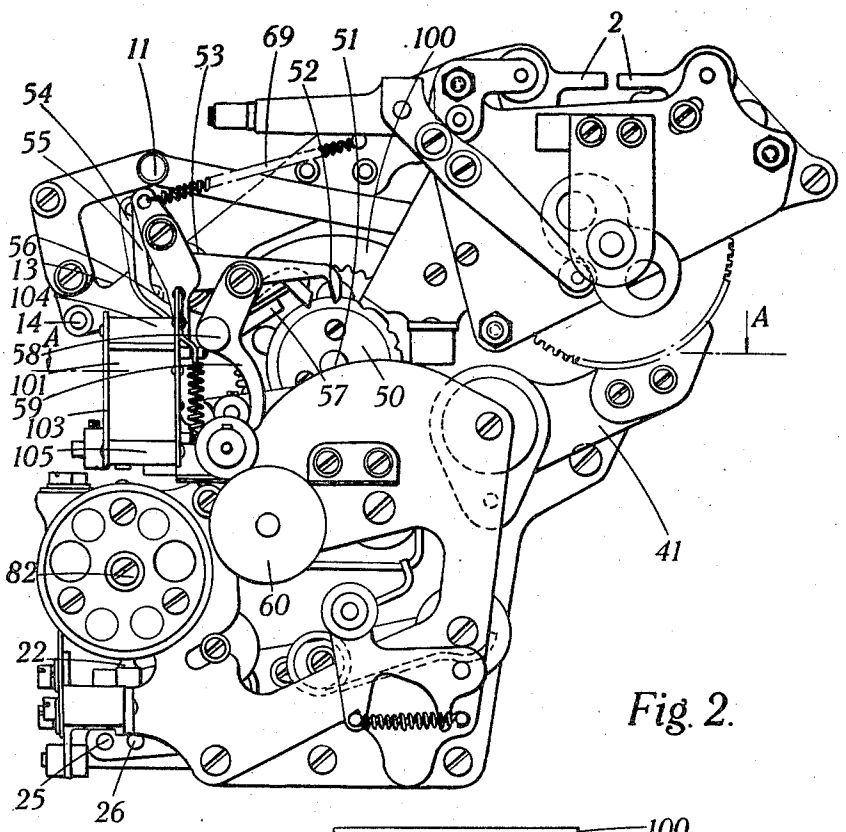


Fig. 2.

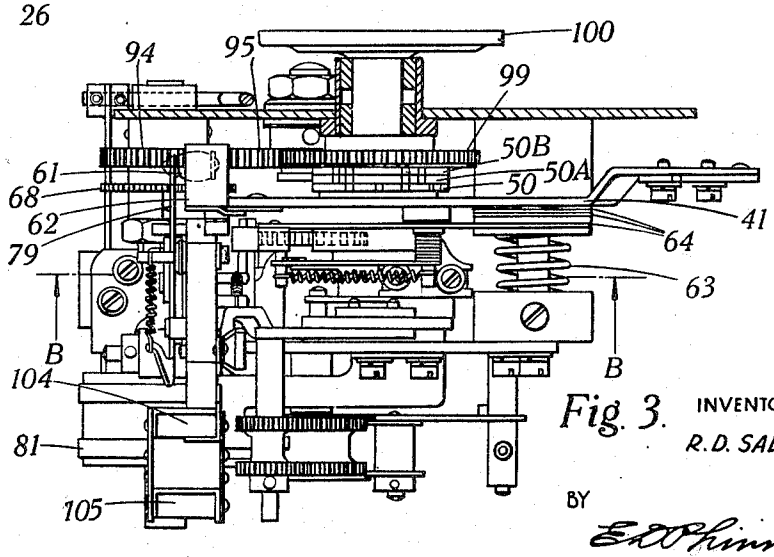


Fig. 3.

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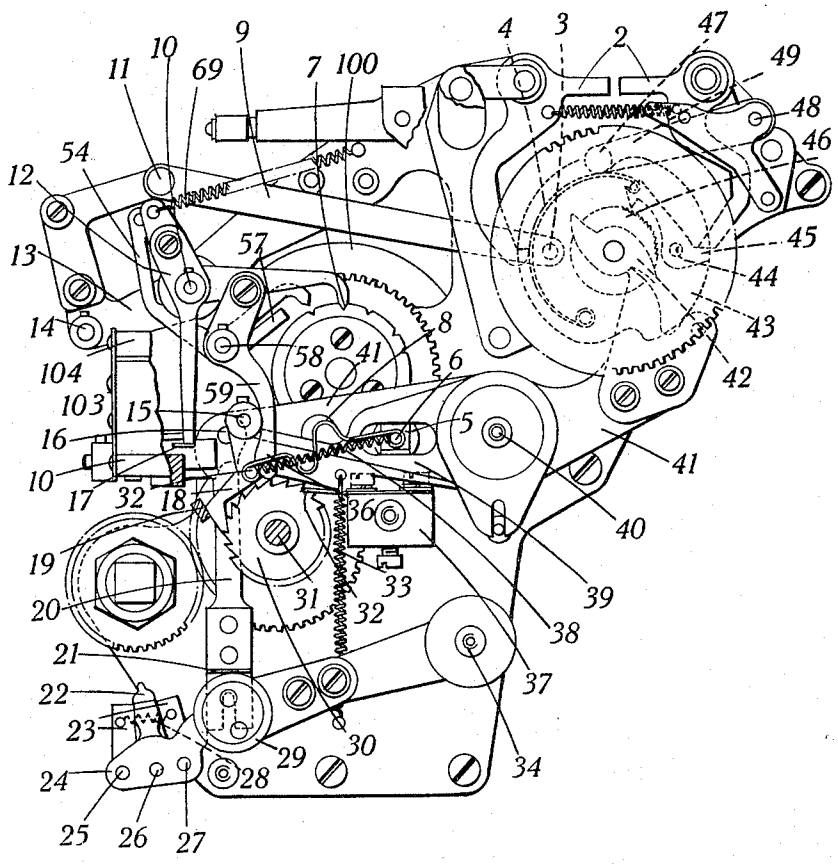
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Fig. 4.



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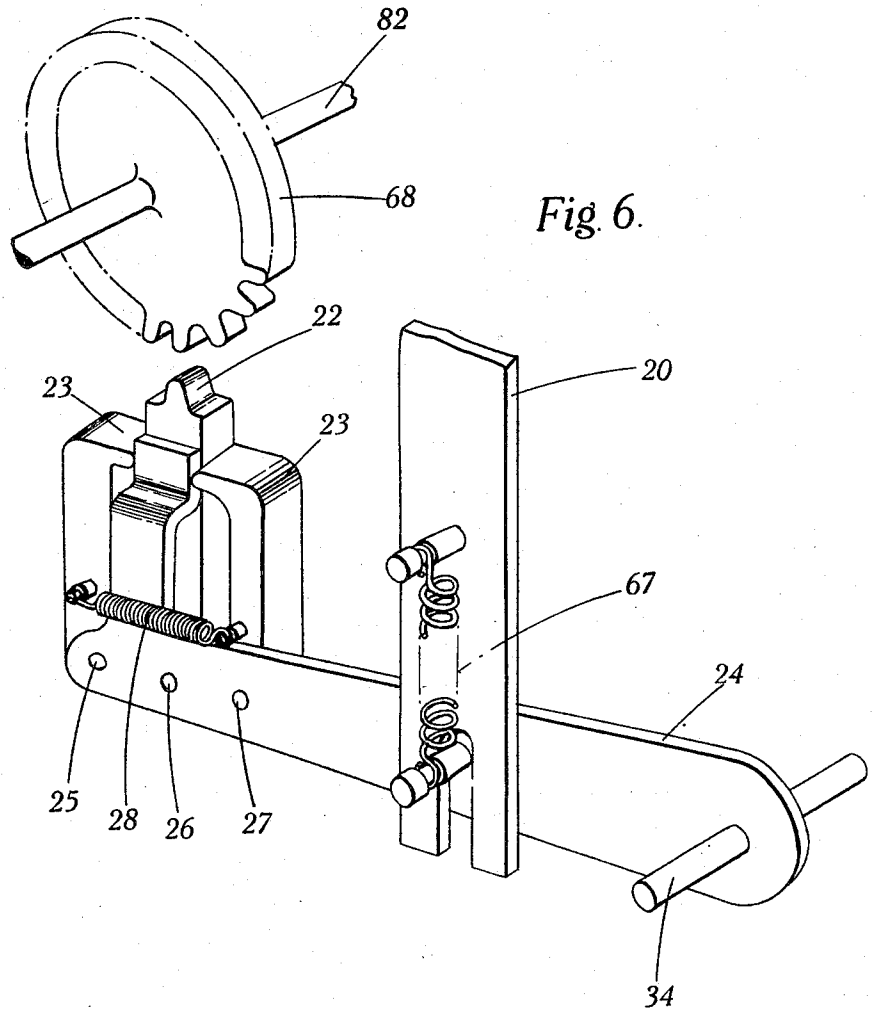


Fig. 6.

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UNITED STATES PATENT OFFICE

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PRINTING TELEGRAPH APPARATUS

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Application December 2, 1936, Serial No. 113,755
In Great Britain January 13, 1936

5 Claims. (Cl. 197—49)

This invention relates to type printing telegraph apparatus using type wheels or the like and has for its objects to provide maximum visibility of the printed matter, a clean impression, and accurate alignment of the letters and to reduce the noise produced and the power required to a minimum.

It has been found that considerable pressure upon the type face is necessary to produce an impression of the required density. In order that a printed letter should be visible immediately after printing, which is the maximum degree of visibility attainable, it is essential that the printing hammer should be above the type wheel.

According to one feature of this invention a printing hammer carried by a printing lever extending parallel to the axis of the type wheel and to the upright direction of the characters carried thereby is placed above the type wheel, an ink ribbon and paper being interposed between the hammer and the type with the paper next to the type and the ink ribbon and paper are moved at right angles to one another. In this arrangement it will be apparent that it is necessary to use a type wheel or segment the impression surface of which is hard, in order to get a clear printing. In order to allow for eccentricity in the mounting of the type wheel in relation to the printing lever, I therefore give a movement to the printing hammer which is parallel to the type face, and this is preferably accomplished by mounting the printing hammer upon a pivoted printing lever by a parallel motion linkage. In order to allow for errors in manufacture and assembly of the apparatus, I prefer to make the framework carrying the pivots of this linkage adjustable in a plane at right angles to the axis of the type wheel about an axis lying in the type face and to make the pivot of one link of the linkage adjustable in a direction parallel to the type face.

The invention will be better understood from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevation of type printing telegraph apparatus;

Fig. 2 is a front elevation;

Fig. 3 is a cross sectional view on the line A—A of Fig. 2;

Fig. 4 is a cross sectional view on the line B—B of Fig. 3;

Fig. 5 is a side elevation of the printing hammer with the lever 79 (Fig. 1) removed; and

Fig. 6 is a perspective view showing the corrector mechanism for the type wheel.

The type printing telegraph apparatus shown in the drawings employs a type wheel 81 which is mounted on a square portion of a shaft 82 so as to be capable of a certain amount of endways movement in response to shift signals. On the shaft 82 is also a gear wheel 94, which is rotated from a gear wheel 99 through an intermediate gear 95. The gear wheel 99 is rotated by selector mechanism which consists of a train of sun and planet gear units. Of this train of gear units only the final outer sun segment 100 is shown. The planet wheel of each gear unit is moved in accordance with an element of the received signal, by the operation of one or other of two detent levers, similar to the levers 2 in Fig. 4. In the manner described in my U. S. Patent No. 2,127,145, issued August 16, 1938, the operation of a detent lever selectively allows the rotation of a disc carrying an eccentric pin which is linked by a rod to its corresponding planet wheel. In the apparatus shown the operation of the detent levers for all the elements of a character occurs simultaneously, but as this forms no part of the present invention, the mechanism for effecting this is not shown.

Immediately after the operation of the detent levers above referred to both of the detent levers 2 shown in the drawings are operated momentarily and so allow a pawl 45 (Fig. 4) pivoted at 44 on a plate 43 to be pressed by a spring 4 into engagement with a continuously rotating ratchet wheel 46. The plate 43 is thus rotated for half a revolution until the pawl 45 is removed from engagement with the ratchet wheel 46 by the nose of one of the detent levers 2. At the same time a roller 47 carried on a lever 49, pivoted at 48 and spring pressed towards the plate 43, enters a recess in the circumference of plate 43 and holds it stationary.

A cam 42 is carried by the plate 43 and actuates the printing cam lever 41, against the action of a spring 33 (Fig. 4) which actuates the type hammer, a correcting lever, and a paper feeding mechanism in a manner to be described.

The printing cam lever 41 is pivoted at 40, is actuated at one end by the cam 42 and at the other end is formed as a fork 62 (Figs. 1 and 3) in which works a roller 61 on the end of a lever 79, pivoted at 80.

The printing hammer 86 itself is carried on a pivot 87 mounted on a lever 97 which is journalled on the pivot 80, and also on a pivot 84 mounted in a link 77 journalled on a pivot 85. The printing hammer 86 is positioned above the type wheel 81 and strikes downward upon it an anvil 88 thereon pressing an ink ribbon 101

against a paper strip 102 and both against the type on the type wheel. As the printing thus takes place upon the upper surface of the paper strip, the printed matter is visible immediately after printing. In order that the ink ribbon 101 shall not prevent the printing matter being viewed the ink ribbon 101 and paper strip 102 are traversed between the anvil 88 and type wheel 81 at right angles to one another. The anvil 88 is placed towards the side of the printing hammer 86 at which the paper emerges, so that a letter is visible immediately after being printed.

The ink ribbon 101 passes over rollers 104, 105 (Fig. 2), journalled in a framework 103 fixed to the inclined face of the printing hammer 86. The mechanism for moving the ink ribbon forms no part of this invention and is not therefore shown.

The paper strip 102 on leaving the type wheel passes over a thin metal member 106 (Fig. 1) which prevents it from sticking to the type wheel and is fed by passing over a feed roller 60 (Fig. 2) by means hereinafter described.

The movement of the printing hammer is made suddenly by means of energy previously stored in a spring. The printing cam lever 41 moves the lever 79 as previously described, and this lever is linked to lever 97 by means of a spring 70. Movement of lever 97 is, however, prevented by a pawl 74 pivoted thereon at 73 which at 75 abuts against a fixed stop 76 carried on a part 92 of the framework. Lever 79 also carries an adjustable cam portion 71 which after a certain movement of the lever 79 engages with a roller 72 on the pawl 74, and thereby disengages the pawl from the fixed stop. The lever 97 is thus allowed to rotate in a clockwise direction under the action of the spring 70. The lever 97 gathers momentum as it rotates, moving the printing hammer 86 and when the anvil 88 impacts against the type face on the type wheel 81 a hammer blow is delivered. As the lever 97 and the printing hammer 86 are of massive proportions the necessary pressure is developed without having to impart a high velocity to these two parts. The cam 42 commences to move the lever 41 to tension the spring 70 shortly after the printing of a character in order to store up energy for the next character.

As the printing hammer 86 is carried on two pivots, viz. 87, fixed to lever 97, and 84 fixed to link 77, the effect is that of a parallel motion linkage, and the printing hammer 86 moves in a direction perpendicular to the face of the type wheel 81. In order to enable the printing hammer to be accurately positioned in relation to the face of the type wheel, pivot 85 of the link 77 is adjustably mounted upon a portion 92 of the framework of the machine. The pivot 85 can be adjusted around the pivot 80 as a centre so that the hammer 86 may be adjusted in a plane at right angles to the pivot 80 to bring the anvil 88 exactly over the type face. The pivot 80 of the whole hammer assembly is, moreover, mounted on a bracket 96 screwed to the main frame of the machine and provided with a pivot 93, the axis of which lies in the plane of the type face, the whole hammer assembly being rotatable around the pivot 93 to adjust the anvil 88 in a plane at right angles to the axis of the type wheel so that it is exactly over the type face that is uppermost on the type wheel.

The printing cam lever 41 is moved by the cam 42 whilst the type wheel is still rotating and raises a corrector lever 24 pivoted at 34 through a link 20 (Fig. 4) mounted on a pivot 16 on the lever 41. The link 20 is connected to the corrector lever 24 by means of a slotted pin joint and a spring (not shown). The link 20 is also provided with an abutment 21 (Fig. 4) engaging a leather disc 29 mounted on the lever 24 and held thereagainst by the spring referred to. The lever 24 carries a corrector tooth 22 which is turned so that its tip engages with the required teeth on a corrector wheel 68 (fixed to the shaft 82 of the type wheel) immediately after the latter comes to rest. As the type wheel is positively driven through the sun and planet gear units, the corrector device must, as a precautionary measure, embody a yielding member; for should it enter the corrector wheel whilst the latter were still in motion the machine would jam, with the probable breakage of some part. Accordingly the corrector tooth 22 is pivoted at 26 to the corrector lever 24 and is prevented from rotating around this pivot by means of two small levers 23 pivoted at 25 and 27 and held together by means of a small spring 28 so as to abut against the tooth 22 and against small abutments on the lever 24.

The corrector tooth 22 enters between the teeth of the corrector wheel 68 before the printing hammer 86 descends on to the face of the type.

Whilst the printing cam lever 41 is moving in a clockwise direction a trunnion block 5 mounted thereon moves in a slot in a lever 39 and so moves that lever and a paper feeding pawl 18 mounted on a pivot 15 on the lever 39, and held in engagement with the teeth of a ratchet wheel 30 by a spring 38. The pawl 18 is thus retracted to engage with the next tooth in the wheel 30. The wheel 30 is prevented from moving by a retaining pawl 35 mounted in an adjustable manner on a block 37. Owing to the loose fit between the trunnion block 5 and the slot in the lever 39, and cam lever 41, when returning in an anticlockwise direction under the action of spring 38 rotates through a considerable distance before the lever 39 is caused to follow it. This gives times for the printing hammer 86 to be effectively disengaged from the paper before the lever 39 moves the pawl 18 to feed forward the ratchet wheel 30 by one tooth. Too great a movement of the feeding pawl 18 is prevented by a fixed stop 19. The ratchet wheel 30 is mounted on a spindle 31 that carries a paper feeding roller 60 (Fig. 2).

The lever 39 is journalled on the pivot 40 and is held between friction collars 64 (Fig. 3) under the action of a compression spring 63, so that the lever 39 remains stationary until positively moved by the trunnion block 5 engaging an edge of the slot therein.

It is sometimes required to prevent either the paper feeding operation or the operation of the printing hammer, and for this purpose cam discs 50, 50A and 50B (Fig. 3) are provided attached to the spindle of the final sun segment 100 of the aggregate gear train. These cam discs are provided with notches into which the pointed ends 7 or 52 of levers 12, 54 and 55 (Figs. 2 and 4) may fall.

The notches in the cam disc 50 are provided in positions in which it is desired to prevent the operation of the printing hammer. When the pointed end 7 of lever 12 falls into a notch in disc 50 an abutment 17 on a downwardly extending portion of lever 12 engages an abutment face 78 (Fig. 5) of the lever 97 and so arrests the move-

ment of this lever and of the printing hammer 86, before the anvil 88 strikes the paper.

In addition to the detent levers 2 shown in the drawings and the five similar pairs of such detent levers corresponding to elements of a character, a pair of similar detent levers is provided operated selectively in accordance with case shift signals. Operation of either of this pair of levers causes the rotation of an eccentric pin 3 (Fig. 4) mounted on a disc similar to disc 43 through a half revolution. This pin 3 is on a link 9 pivoted at 11 to a bell crank lever 13 secured to a boss 53 pivoted at 10. To the bell crank lever 13 is pivoted at 14 a link 66 (Fig. 1) which is also mounted on a pivot 65 on a shift lever 83 pivoted at 90. Movement of the link 9 thus causes movement of shift lever 83 to move the type wheel 81 on the square portion of its spindle, so that one or other of the sets of type thereon comes under the paper strip 102 and printing anvil 88.

The boss 53 is furnished with cams which engage with small lumps 56 on levers 54 and 55. When shifting from letters to figures selector lever 55 is prevented by these cams from engaging notches in disc 50A, but selector lever 54 is permitted to move so that if a notch allows its pointed end to fall therein it is rotated by its spring 69 in a clockwise direction. When shifting from figures to letters selector lever 54 is prevented from moving but selector lever 55 is allowed to be drawn by its spring 69 in a clockwise direction if a notch in disc 50B permits. Either of those levers when so moved engages and moves a lever 57 fixed in an adjustable manner to lever arm 59 and mounted on a pivot 58. As lever arm 59 moves, its lower end 36 engages a pin 32 on the paper feeding pawl 18 and moves it out of engagement with the ratchet teeth on the wheel 30. This action takes place before the feed pawl has commenced to move downwards to step the ratchet wheel 30.

It may happen that one or other of the selector levers 54 or 55 falls into a notch in the appropriate cam disc whilst the type wheel is still rotating, and the lever 59 will in consequence momentarily remove the pawl 18 from engagement with the ratchet wheel. In order to ensure that this will not cause the feed pawl to miss a tooth on the ratchet wheel when it is required to be re-engaged a bent link 8 is provided, attached to the pins 32 and 6. This link 8 prevents the spring 38 from being extended too far by the sudden movement given to the pawl 18 by the momentary movement of lever 59 and so ensures that the pawl 18 will re-engage the correct tooth of the ratchet wheel at the conclusion of the printing operation.

What is claimed is:

1. A typeprinting telegraph apparatus comprising, a type wheel, a printing lever, a printing hammer pivoted on said printing lever, means for guiding said printing hammer to provide the desired movement relative to the printing lever, said printing hammer being mounted above said type wheel for cooperation therewith, a printing anvil mounted on said printing hammer for striking against said type wheel, means for actuating said printing lever comprising a spring and a cam operated lever linked to said printing lever through said spring, means for holding said printing lever against movement until said spring is tensioned, a notched corrector wheel attached to said type wheel, a yieldingly mounted corrector tooth, and means controlled by said cam operated lever for bringing said corrector tooth into engagement with a notch in said corrector wheel for each printing position of said wheel.

2. A typeprinting telegraph apparatus comprising a type wheel, a printing lever, a printing hammer cooperating with said type wheel pivoted on said printing lever, means for guiding said printing hammer to provide the desired movement relative to said printing lever, a printing anvil mounted on said printing hammer for striking against said type wheel, means for actuating said printing lever, comprising a spring and a cam operated lever linked to said printing lever through said spring, means for holding said printing lever against movement until said spring is tensioned, a notched corrector wheel attached to said type wheel, a yieldingly mounted corrector tooth, and means controlled by said cam operated lever for bringing said corrector tooth into engagement with a notch in said corrector wheel for each printing position of said wheel.

3. Typeprinting telegraph apparatus comprising a type wheel, a printing anvil, a parallel motion pivoted linkage for moving said printing anvil, a framework carrying the pivots of said linkage, means for adjusting said framework in a plane at right angles to the axis of said type wheel and about an axis lying in the plane of the type face, and means for adjusting the pivot of one link of the parallel motion linkage in a direction parallel to the type face.

4. A typeprinting telegraph apparatus having a frame, comprising a type wheel, a printing lever, a printing hammer pivoted on said printing lever and cooperating with said type wheel, a printing anvil mounted on said printing hammer for striking against said type wheel, means for actuating said printing lever comprising a spring and a cam operated lever linked to said printing lever through said spring, means for holding said printing lever against movement until said spring is tensioned, and a link lying parallel to said lever pivoted to said hammer, the other end of said link being pivoted to the frame of the apparatus.

5. Typeprinting telegraph apparatus comprising a type wheel, a toothed corrector wheel mounted on said type wheel, a yieldably mounted corrector tooth, and means for mounting said corrector tooth for operative cooperation with the teeth of said corrector wheel, said last named means comprising a lever on which said tooth is pivoted, two members pivoted on said lever one on either side of said tooth, and spring means connected between said members for holding them against said corrector tooth.

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