Aug. 28, 1934. K. A. KNUTSEN ET AL 1,971,860

PRINTING DEVICE

Filed March 10, 1933 4 Sheets-Sheet 1

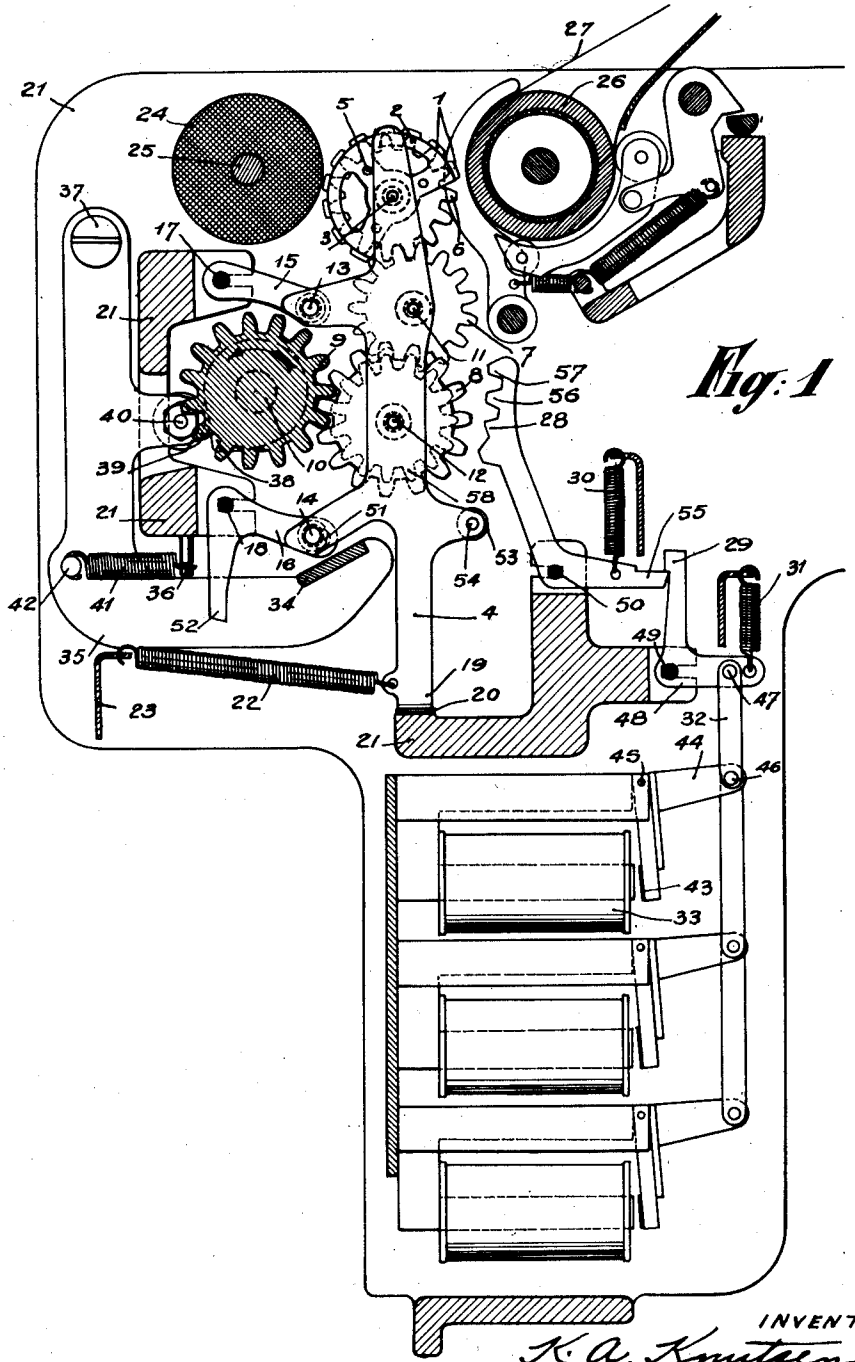


Fig: 1

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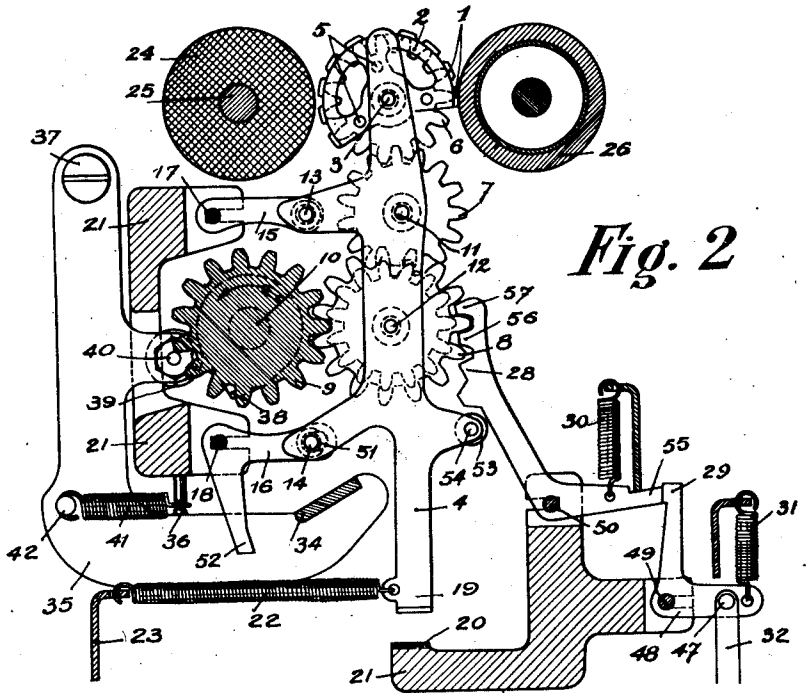


Fig. 2

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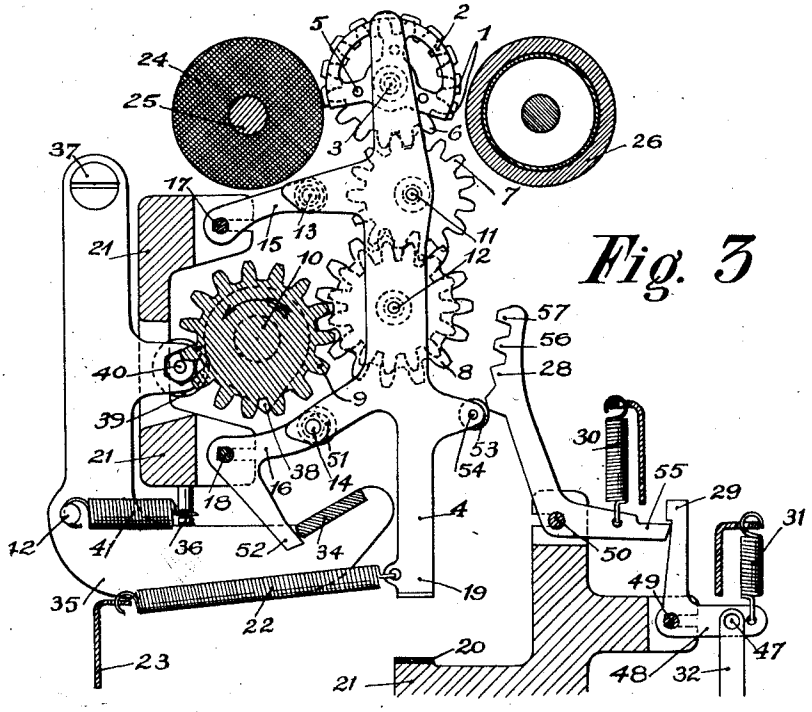


Fig. 3

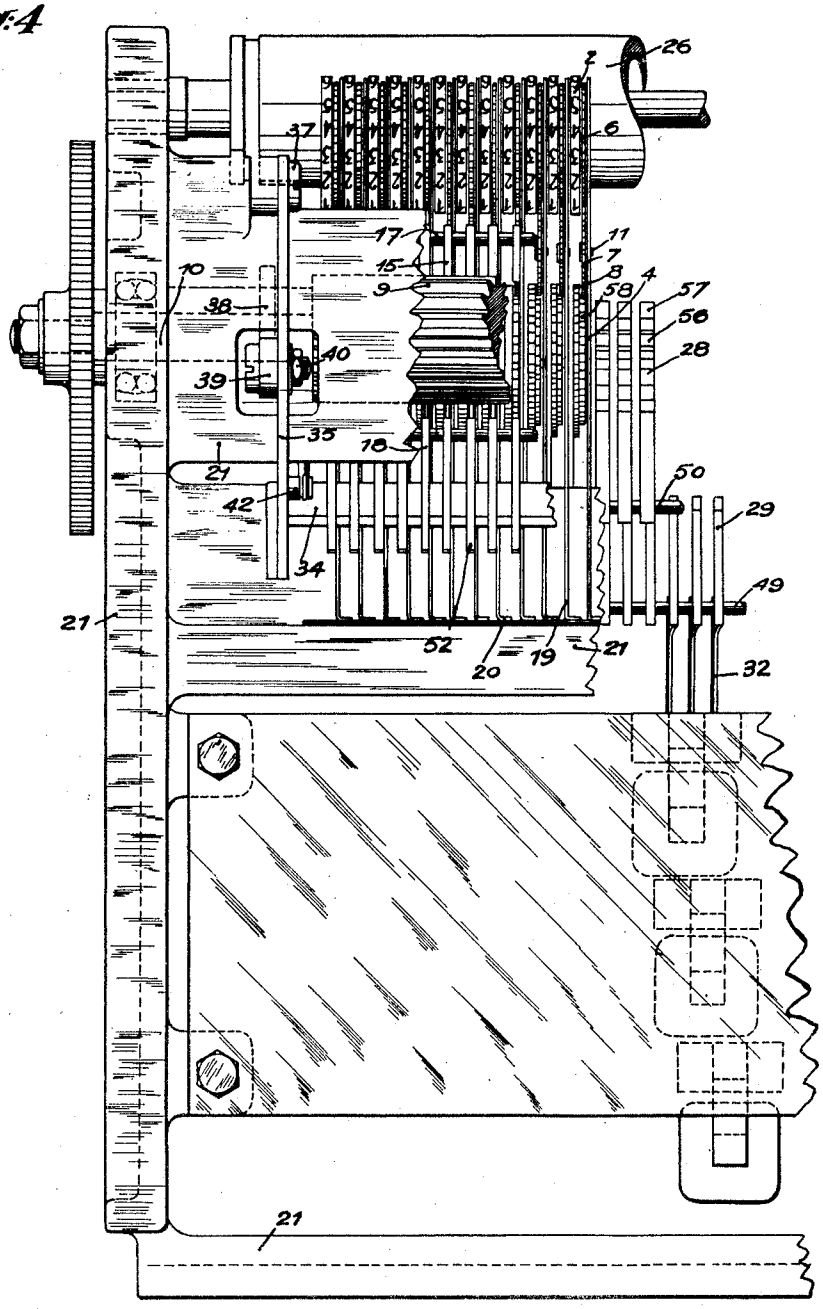
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PRINTING DEVICE

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Fig. 4



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UNITED STATES PATENT OFFICE

1,971,860

PRINTING DEVICE

Knut Andreas Knutsen and Anders Eirikson
Vethe, Paris, France

Application March 10, 1933, Serial No. 660,330
In France March 14, 1932

5 Claims. (Cl. 101—91)

Our invention relates to a printing device, and especially to printing devices adapted to be used in connection with tabulating machines for perforated register cards.

The object of our invention is to provide a printing device of that kind in which the types are caused to roll against the paper.

In the co-pending application, Serial No. 545,121, filed June 17, 1931, is described a printing device of that kind in which the rolling motion of the type wheel was obtained by the action of a lever meshing with a toothed wheel integral with said type wheel. The essential feature of our invention consists in using for that purpose, instead of a simple lever, a rack adapted to cooperate, either directly or indirectly, with said type wheel.

A preferred embodiment of our invention will be hereinafter described with reference to the accompanying drawings given merely by way of example, and in which:

Fig. 1 is a sectional view showing the position of the type-wheel before printing;

Fig. 2 is a sectional view showing the position of the type-wheel, as the type rolls on the paper;

Fig. 3 is a sectional view showing the position of the type-wheel, after the printing has been done;

Fig. 4 is a front view of the machine. Some parts have only been partially designated or have been removed to facilitate the understanding of the drawings.

Types 1 are mounted on type-wheel 2, which is journalled on support 4 above pivot 3. The type-wheel turns about its pivot 3 synchronously with the motion of the register cards past a contact device on the tabulating machine. There is a type-wheel 2 for each column of the card, or for each number-bearing wheel of the tabulating machine.

A toothed wheel 6 is secured by means of rivets 5 to type-wheel 2; this toothed wheel 6 meshes with a toothed wheel 7 itself in mesh with toothed wheel 8, which, in turn, meshes with gear 9 provided on main driving shaft 10. This main shaft 10 rotates in an anticlockwise direction. Toothed wheels 7 and 8 are pivoted to type-carrier 4 about pivots 11 and 12 respectively.

All toothed wheels have the same number of teeth as gear 9, and thus type-wheel 2 turns in a clockwise direction synchronously with main shaft 10. Typewheel carrier 4 is pivoted at 13 and 14 with two intermediate links 15 and 16 respectively, which links are pivoted to the frame about pins 18 and 17.

In the initial position, as shown in Fig. 1, type-wheel carrier 4 rests through its projecting part 19 upon a stop 20 on frame 21. In this position it is held by spring 22 which is attached to fixed support 23. The circumference of type-wheel 2 is in contact with colour drum 24 which turns about axle 25. Colour drum 24 is constantly slightly applied against the type-wheel.

To every column in the card there corresponds a type-wheel carrier 4 to which type-wheel 2 and two toothed wheels 7 and 8 are pivoted. With each type-wheel carrier 4 further correspond two intermediate links 15 and 16, the stopping lever 28 provided with rack 56, the lever release 29, springs 30 and 31, intermediate piece 32 and magnet 33. The type-wheel carriers can be moved independently from one another because they are mounted at a distance from each other which is smaller than the width of the magnets; some of the magnets 33 are mounted one below the other, as shown in Fig. 4; but with each type-wheel carrier 4, there corresponds only one magnet 33.

Return bar 34 extending over the whole width of the printing device acts on all type-wheel carriers, and when moved, returns all type-wheel carriers back into their initial position. Said bar 34 is secured to arm 35 which is attached to fixed frame 21 through pivot 37 about which it can turn. Arm 35 is moved by means of cam 38 mounted on main shaft 10 in such a way that cam 38 strikes against a roller 39 which is fixed through pivot 40 to arm 35. Return bar 34 tends always to be brought back into its initial position (see Fig. 1) by means of spring 41. This spring is attached to arm 35 by means of pin 42 and to the fixed frame by means of pin 36.

The printing of the various figures indicated on the register card takes place as follows: Shaft 10 of the printing device, and therefore also type-wheel 2, rotate synchronously with the main shaft of the tabulating machine, and also synchronously with the passage of the cards past a contact device.

When a hole in the card passes before the contact device, a contact is made, and a current is set up, which magnetizes magnet 33 of the printing device. This will move armature 43, and arm 44 which is integral with said armature, will turn about axis 45 and move intermediate piece 32 connected at one of its ends with arm 44 through pivot 46. Intermediate piece 32 is connected at its other end, through axis 47, with an arm 48 which is kept in position by means of spring 31 and keeps stopping lever 28 in an in-

operative position by means of its projecting hook 29. As it moves, intermediate piece 32 will turn arm 48 about fixed pivot 49 in such a way that projecting hook 29 releases stopping lever 28.

The latter is turned by spring 30 about a fixed axis 50 and rack 56 is brought into mesh with toothed wheel 8 thus stopping the movement of this toothed wheel. But, as toothed wheel 8 meshes with gear 9 on shaft 10 which rotates constantly, tooth wheel 8 and through it type-wheel carrier 4, will be displaced in the same direction as the teeth of gear 9. As type-wheel carrier 4 is connected with fixed frame 21 through intermediate links 15 and 16, the two fixed pivots 13 and 14 of type-wheel carrier 4 will turn about fixed axles 17 and 18. Type-wheel 2 thus receives such a movement that it approaches paper roller 27 and strikes against it, rotating simultaneously about pivot 3. All these movements cause type 1 to roll on paper 27, and printing takes place.

In order to give type-wheel 2 a springy strike against paper roll 26, intermediate link 16 is provided with an elongated slot 51 in which axle 14, which is secured to type-wheel carrier 4, can be moved. In the initial position spring 22 always presses the axle against the left hand side of slot 51. As type-wheel 2 strikes against paper 27, the type-wheel carrier will be able to swing slightly about axle 13, because axle 14 slides to the right in slot 51.

The tension of spring 22 regulates the power of the pressure of the type-wheel against the paper.

When a given type has been printed, the two intermediate links 15 and 16 will turn further about the two fixed shafts 17 and 18. This movement will move support 4 and consequently type-wheel 2 from paper 27, thus preventing another type on the type-wheel from touching the paper. This movement is continued until type-wheel carrier 4 is again at rest, and this is effected by a projection of arm 52 of link 16 knocking against bar 34 which is at rest.

Simultaneously, roller 53 which is mounted on type-wheel carrier 4 by means of axle 54, will push the rack 56 of stopping lever 28 away from toothed wheel 8, and it will push it so far that it is stopped in the initial position (see Fig. 1) because projecting part 55 of stopping lever 28 is engaged with hook 29. Cam 38 now moves back roller 39. This moves arm 35 (which was retained in the initial position by spring 41) and causes it to turn about axis 37, which brings all type-wheel carriers 4 back to their initial position. In the two positions of rest, each type-wheel carrier is retained by spring 22.

Type-wheel carriers 4 are not brought back to their initial position before type-wheel 2 will have turned so far that the part of the type-wheel facing the paper bears no types, and no type can therefore now touch the paper.

As already described, stopping lever 28 is released by magnet 33 becoming magnetized through a current which is established through a hole in the card. There is no objection to the release of stopping lever 28 being effected through mechanical means as the hole in the card is passing. The printing device would be the same otherwise.

It will be understood that the presence of rack 56 provides for an efficient stop for the teeth of wheel 8 and prevents any failure in the working.

Instead of a rack, we might also use another toothed structure carried by lever 28, or again a stationary toothed wheel etc., without departing from the principle of my invention.

While we have described what we deem to be practical and efficient embodiments of our invention, it should be well understood that we do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of our invention as comprehended within the scope of the appended claims.

What we claim is:

1. A printing device especially adapted to be used in connection with tabulating machines for perforated cards which comprises in combination, a fixed frame, a plurality of supporting members jointed to said frame so that they can be given a translatory motion with respect thereto, a set of toothed wheels in mesh with one another carried by each of said supporting members, a paper roll, a typewheel journalled on each of said supporting members opposite said paper roll and in mesh with one of said toothed wheels, a plurality of types carried by said typewheel on the periphery thereof, a driving toothed wheel meshing with one of the wheels of said set and journalled about a stationary axis with respect to said frame, a movable member provided with a plurality of teeth located opposite one of the first mentioned wheels, and means for bringing the last mentioned member in contact with the last mentioned wheel.

2. A printing device especially adapted to be used in connection with tabulating machines for perforated cards which comprises in combination, a fixed frame, a plurality of supporting members, a plurality of links jointed both to said frame and to said supporting members so that said members can be given a translatory motion with respect thereto, a set of toothed wheels in mesh with one another journalled in each of said supporting members, a paper roll, a typewheel journalled on each of said supporting members opposite said paper roll and in mesh with one of said toothed wheels, a plurality of types carried by said typewheel on the periphery thereof, a driving toothed wheel meshing with one of the wheels of said set and journalled about a stationary axis with respect to said frame, a pivoting lever provided with a plurality of teeth located opposite one of the wheels carried by each supporting member, means for keeping said lever in the inoperative position so that the last mentioned teeth are kept away from the wheel opposite which they are located, elastic means for actuating said lever so as to bring the last mentioned teeth into mesh with the last mentioned wheel, and means for releasing said lever.

3. A printing device especially adapted to be used in connection with tabulating machines for perforated cards which comprises in combination, a fixed frame, a plurality of supporting members, a plurality of links jointed both to said frame and to said supporting members so that said members can be given a translatory motion with respect thereto, a set of toothed wheels in mesh with one another journalled in each of said supporting members, a paper roll, a typewheel journalled on each of said supporting members opposite said paper roll and in mesh with one of said toothed wheels, a plurality of types carried by said typewheel on the periphery thereof, a driving toothed wheel meshing with one of the wheels of said set and journalled about a stationary axis with respect to said frame, a pivoting lever, a rack carried by said lever located oppo-

site one of the wheels carried by each supporting member, means for keeping said lever in the inoperative position so that the last mentioned rack is kept away from the wheel opposite which it is located, elastic means for actuating said lever so as to bring said rack into mesh with the last mentioned wheel, and means for releasing said lever.

4. In printing apparatus, the combination with a platen, of a type wheel having a plurality of type elements on the periphery thereof, a support on which said wheel is rotatably mounted adjacent the platen, means including a toothed gear for rotating said type wheel to present different type elements to the platen, and means for moving said support through a linear path such that a selected type element will roll on the platen during an intermediate part only of said movement to effect printing by the selected type element, said last named means comprising a rack having a plurality of teeth thereon, and mechanism for effecting meshing engagement of said rack and said gear.

5. In printing apparatus, the combination with a platen, of a type wheel having a plurality of type elements on the periphery thereof, a support on which said wheel is rotatably mounted adjacent the platen, means for rotating said type wheel to present different type elements to the platen, said means including a gear train of which at least one gear is carried by said support, and a rack having a plurality of teeth thereon, said rack being movable to engage the teeth of the gear carried by the support and to serve as a fulcrum therefor, whereby continued rotation of said gear train effects bodily displacement of said carrier and type wheel across said platen.

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