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PRINTING MECHANISMS

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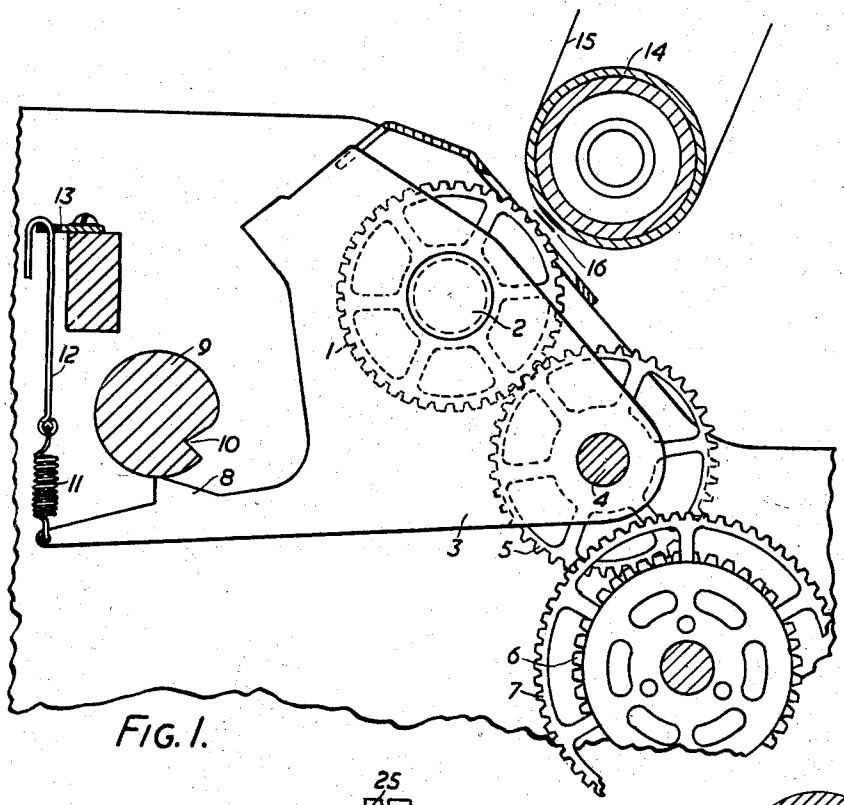


FIG. 1.

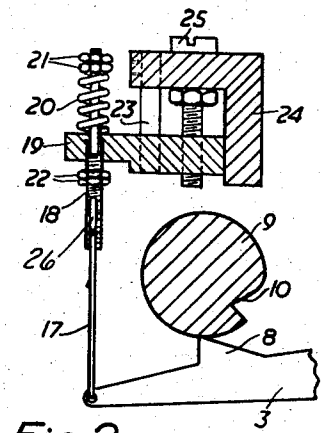


FIG. 2

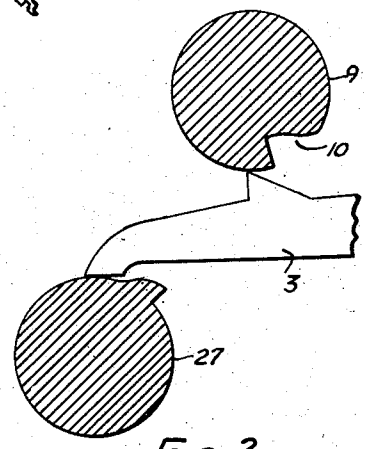


FIG. 3

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PRINTING MECHANISMS

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Claims priority, application Great Britain July 29, 1955

6 Claims. (Cl. 101—93)

This invention relates to printing mechanisms in which a type wheel is mounted in such a way that it may be moved towards a platen to effect printing.

A record card controlled printing mechanism is described in British patent specification No. 704,764. A type wheel is set, under control of data sensed from a column of a record card, to bring a selected character to a printing line. The wheel is impelled towards the platen at a fixed time in the printing cycle to effect printing from the selected character.

It is the object of the invention to provide an improved type wheel impelling mechanism.

According to the invention a printing mechanism has a type wheel mounted on a pivoted member, and means for releasing the pivoted member to allow the type wheel to be impelled against a platen, characterised by the provision of means which act on the pivoted member to impel the type wheel from rest toward the platen and which cease to act before the type wheel strikes the platen.

The invention will now be described, by way of example, with reference to the accompanying drawing in which:

Figure 1 is a partial sectional elevation of a printing mechanism;

Figure 2 is a detail showing a modified form of the invention;

Fig. 3 is a detail showing a further modification.

A type wheel **1** is mounted for rotation on a stud **2**. The stud **2** is secured to a plate **3**, which is freely pivoted on a shaft **4**. The shaft **4** also carries a gear **5**, engaging with gear gashes in the periphery of the type wheel. The gear **5** is driven, through gears **6** and **7**, by a character selecting mechanism (not shown), which is similar to that shown and described in British patent specification No. 704,764.

The plate **3** has an extension on which is a projection **8**. The plate **3** is normally held in the position shown by the projection **8** engaging with a cam **9**. This cam is driven in synchronism with the drive to the character selecting mechanism, through gearing (not shown). After a character has been selected, a notch **10** in the cam comes opposite the projection **8** and allows the plate **3** to move clockwise.

One end of a spring **11** is attached to the extension of the plate **3**, and the other end is attached to a wire **12**. The wire passes through a hole in a fixed plate **13**. The end of wire forms a U-shaped loop. The spring **11** is sufficiently stiff to produce a substantial tension for a small elongation.

When the notch **10** comes opposite to the projection **8**, the plate **3** starts to move clockwise under the tension of the spring **11**. A small angular movement of the plate **3** produces sufficient movement of the point of attachment of the spring to the plate to allow the spring **11** to contract to the normal unstressed length. The spring ceases to exert any force on the plate which continues to move due to its momentum until the type wheel strikes a platen **14**. A strip of paper **15** and an ink ribbon **16** are interposed between the type wheel and the platen, so that an imprint of the selected character is produced on the paper.

The wire **12** is free to slide upward in the plate **13**, so that the spring **11** exerts no restraint on the plate **3** after the spring has ceased to urge the plate towards the platen and the plate is moving due to its own momentum. Continued movement of the cam **9** brings the trailing edge of the notch **10** into engagement with the projection **8**, shortly after the type wheel has struck the platen, and returns the plate **3** to the initial position.

The use of a spring which is effective only to initiate movement of the plate **3** has two major advantages over the use of a spring which is continuously effective to urge the plate towards the platen. Firstly, the continuously acting spring tends to pull the plate **3** clockwise after the type wheel has struck the platen and has rebounded. Unless the cam **9** is very accurately timed, the type wheel may strike the platen a second time. This tends to produce a blurred impression of the character, particularly if the type wheel is free to rotate slightly due to wear or backlash in the driving gear train, or if there is any movement of the paper **15**.

The second advantage is that the force of impact of the type wheel on the platen is reduced for a given initial acceleration of the plate. The force exerted by the spring is determined largely by the necessity for rapid acceleration of the plate **3** from rest, so that with a continuously acting spring the type wheel may strike the platen with considerably more force than is necessary to produce a clear impression of the character. The reduction of this force of impact is of considerable importance if a large number of wheels are mounted side by side to form a multi-column printing mechanism.

The distance between the centre of the shaft **4** and the point at which the spring **11** is attached to the plate **3** is approximately twice the distance between the centre of the shaft **4** and the centre of the type wheel **1**. This allows a reasonable difference between the stressed and unstressed lengths of the spring **11** even when the movement of the type wheel to effect printing is quite small.

It will be appreciated that the same result may be obtained by fixing the upper end of the spring **11** and forming the lower end of the spring into a U-shaped loop which passes through a slotted hole in the plate **3**.

If extremely rapid acceleration of the plate **3** is required, it may be secured by the use of a second cam **27** (Figure 3) instead of the spring **11**. This cam **27** is driven in synchronism with the cam **9**. It has a single projection on the periphery which engages the lower edge of the plate **3** when the projection **8** reaches the notch **10**. The height of the projection on the second cam is such that it is in contact with the plate **3** over only the initial part of the movement of the plate.

In the form of construction described in British Patent No. 704,764 a line joining the centres of the type wheel and the platen is horizontal. In the present mechanism a line joining these centres is at approximately 45° to the horizontal, which makes it easier for an operator to see the printed result as the platen rotates clockwise.

When a large bank of type wheels is used, it should be possible to adjust the impact pressure of all the wheels simultaneously, to allow for variations in the number of copies being taken, and of each wheel independently, to allow for slight differences in the springs and the frictional forces on the plate **3**. A modified form of the invention which allows this adjustment is shown in Figure 2.

One end of a wire **17** is attached to the extension of the plate **3**. The other end of the wire **17** is formed with a loop which is slidable in an elongated slot **26** in a rod

18. The rod 18 may slide vertically in a plate 19. Lock nuts 21 on the upper end of the rod 18 retain a spring 20 under compression, tending to lift the rod upwards.

When the plate 3 is released by the cam 9, the rod 18 is lifted by the spring 20, until the upper one of a pair of lock nuts 22 on the rod comes into contact with the lower surface of the plate 19. The plate 3 continues to move under its own momentum, the wire 17 sliding in the slot 26 in the rod 18.

The position of the lock nuts 21 determines the initial force exerted by the spring 20, and the lock nuts 22 allow adjustment of the portion of travel of the plate 3 for which the spring is effective.

The plate 19 may slide vertically on a number of guide pins, such as 23, which are mounted in a fixed cross member 24. An adjusting screw 25 passes through the member 24 and engages a threaded hole in the plate 19. If the plate 19 is moved by turning the adjusting screw 25, both the force of the springs and the distance over which they are effective are altered simultaneously for all the type wheels of the bank.

What we claim is:

1. Printing apparatus comprising a type wheel, a pivoted member on which said type wheel is mounted and which is pivotally movable along a predetermined path from a rest position through an intermediate position to a printing position, a platen co-operating with said type wheel when in said printing position to effect printing, release means for normally retaining said member in said rest position, for releasing said member for movement towards said printing position and for subsequently returning said member to said rest position, and a resilient member which is operatively connected to said pivoted member and which is stressed while said pivoted member is between said rest and intermediate positions to apply a force to said pivoted member accelerating said pivoted member towards said printing position but in which there is no change in stress when the pivoted member is between said intermediate and printing positions, said pivoted member being substantially free of all restraint while between said intermediate and printing positions but being driven to said printing position under the impetus given to said pivoted member by said resilient member between said rest and intermediate positions.

2. Printing apparatus comprising a type wheel, a pivoted member on which said type wheel is mounted and which is pivotally movable along a predetermined path from a rest position through an intermediate position to a printing position, a platen co-operating with said type wheel when in said printing position to effect printing, release means for normally retaining said member in said rest position, for releasing said member for movement towards said printing position and for subsequently returning said member to said rest position, a fixed member, and a tension spring acting between said pivoted member and said fixed member to apply a force accelerating said pivoted member towards said printing position when said pivoted member is between said rest and intermediate positions, said tension spring being movable relative to one of said members and exerting no force on said pivoted member when said pivoted member is between said intermediate and printing positions, said pivoted member being substantially free of all restraint while between said intermediate and printing positions but being driven to said printing position under the impetus given to said pivoted member by the tension spring between said rest and intermediate positions.

3. Printing apparatus comprising a type wheel, a pivoted member on which said type wheel is mounted and which is pivotally movable along a predetermined path from a rest position through an intermediate position to a printing position, a platen co-operating with said type wheel when in said printing position to effect printing, release means for normally retaining said member in said rest position, for releasing said member for movement towards said printing position and for subsequently returning said member to said rest position, a fixed support, a slidable member slidable in said support, means coupling said slidable member to said pivoted member, said coupling means permitting relative movement between said pivoted member and said slidable member when said pivoted member is between said intermediate and printing positions, and a compression spring acting on said slidable member and applying to said pivoted member through said slidable member a force accelerating said pivoted member towards said printing position only when said pivoted member is between said rest and intermediate position, said pivoted member being substantially free of all restraint while between said intermediate and printing positions but being driven to said printing position under the impetus given to said pivoted member by said compression spring between said rest and intermediate positions.

4. Printing apparatus as claimed in claim 3 comprising also means for adjusting the accelerating force applied by said compression spring to said pivoted member, and the location of said intermediate position.

5. Printing apparatus comprising a type wheel, a pivoted member on which said type wheel is mounted and which is pivotally movable along a predetermined path from a rest position through an intermediate position to a printing position, a platen co-operating with said type wheel when in said printing position to effect printing, a rotary cam having a cam surface against which said pivoted member bears and which normally retains said pivoted member in said rest position, but on rotation of said cam releases said pivoted member for movement to said printing position and subsequently returns said pivoted member to said rest position, a fixed member, a rod slidable in said fixed member, a tension spring connected between said rod and said pivoted member, and stop means limiting movement of said rod towards said pivoted member, said spring being stressed only while said pivoted member is between said rest and intermediate positions to apply an accelerating force to said pivoted member when released by said cam but applying no force when said pivoted member is between said intermediate and printing positions, said pivoted member being substantially free of all restraint while between said intermediate and printing positions, between which positions said rod slides in said fixed member.

6. Printing apparatus comprising a type wheel, a pivoted member on which said type wheel is mounted and which is pivotally movable along a predetermined path from a rest position through an intermediate position to a printing position, a platen co-operating with said type wheel when in said printing position to effect printing, a rotary cam having a cam surface against which said pivoted member bears, and which normally retains said pivoted member in said rest position but on rotation of said cam releases said pivoted member for movement to said printing position and subsequently returns said pivoted member to said rest position, a support, a rod slidable in said support, an abutment on said rod, a compression spring mounted on said rod between said abutment and said support, and a connection attached to said pivoted member and slidable in a slot located within said rod at the side of said support opposite to said spring, said compression spring applying a force accelerating said pivoted member towards said printing position, only while said pivoted member is between said rest and intermediate positions, but said connection sliding in said slot while said pivoted member moves between said intermediate and printing positions, between which said pivoted member is substantially free of all restraint.

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