

Jan. 5, 1937.

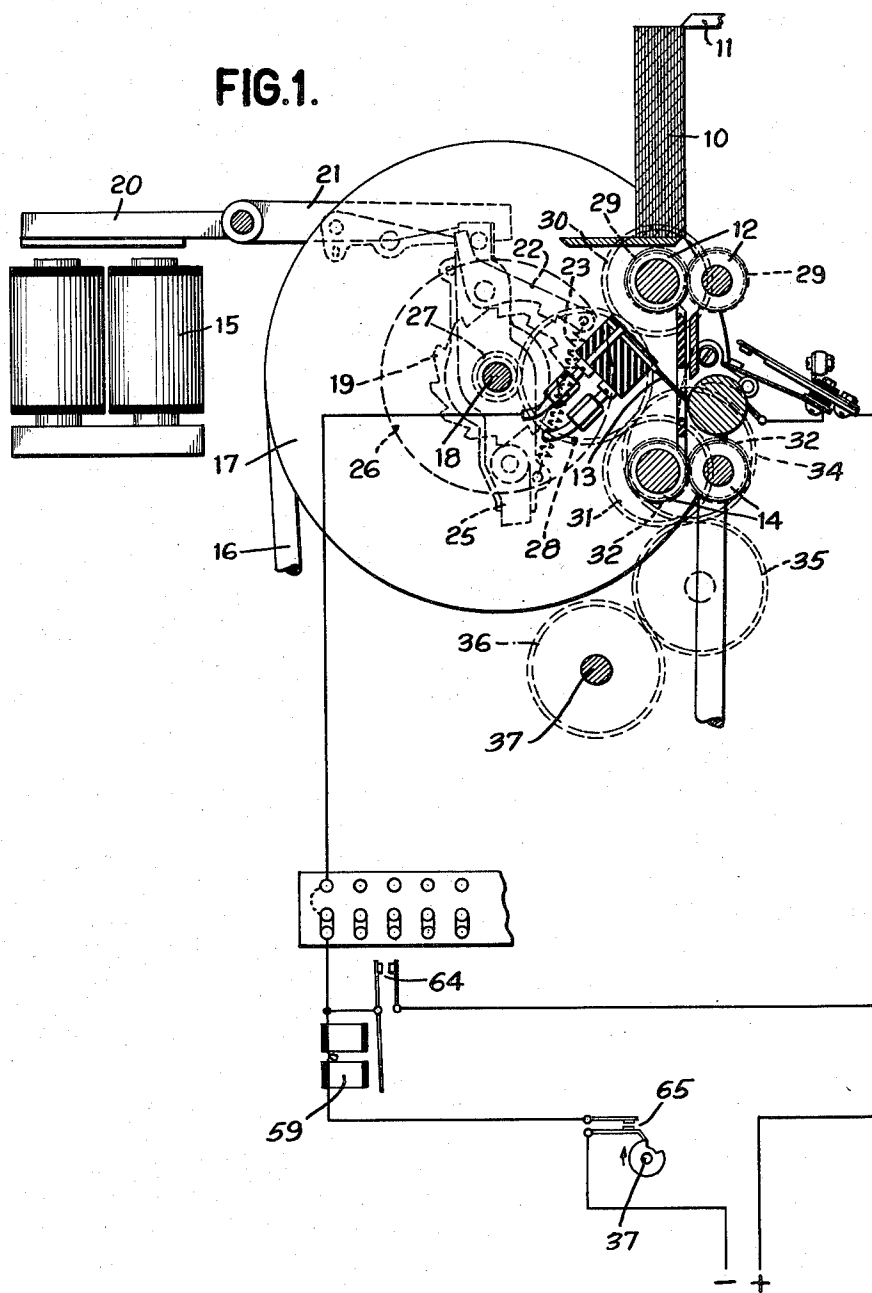
G. TAUSCHEK

2,066,748

PRINTING MECHANISM FOR TABULATING MACHINES

Filed Dec. 28, 1935

2 Sheets-Sheet 1



INVENTOR
Gustav Lamschek
BY *Wm. M. Wilson*
ATTORNEY

UNITED STATES PATENT OFFICE

2,066,748

PRINTING MECHANISM FOR TABULATING MACHINES

Gustav Tauschek, New York, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application December 28, 1935, Serial No. 56,420

6 Claims. (Cl. 101—96)

This invention relates to improvements in printing mechanism adapted to print characters such as, numerals, alphabetical characters, etc., upon a record sheet.

The main object of the present invention is to devise a printing mechanism which is especially adapted for performing printing operations at high speeds.

In carrying out the main object of the invention the printing type are carried by a wheel which is driven by a drive shaft through an impositive clutch until the preselected type is at the printing line.

A still further object of the invention is to provide a suitable mechanism so that the printing wheel may be rotated in synchronous relationship with the controlling element, which in the present instance, comprises a moving perforated tabulating card and to cause by the perforation in the card the stopping of the movement of the printing wheel for the selection of a type. In the present instance the main drive shaft is further rotatable to complete its revolution after the printing wheel has been stopped for the selection of a type, and another object of the invention is to provide an improved form of mechanism for resetting all the printing wheels that have been stopped to again bring them in the proper operative relationship with the drive shaft.

The improved form of clutch, which may be used for other and varying purposes in accounting machines, comprises a spring-pressed ball interengaging one of a series of wedge-shaped notches of a ring, the ball being in a recess of an element rotatable with the drive shaft and the wedge-shaped notches being internally formed in a ring attached to the printing wheel.

This impositive form of clutch is capable of automatically re-aligning the printing wheel with the drive shaft if in the movement of the drive shaft the latter moves ahead of the printing wheel, as occurs in the present instance in the initial release of a printing wheel.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a sectional view of a mechanism ordinarily employed in a conventional tabulating machine for feeding and analyzing tabulating cards.

Fig. 2 is a sectional view in side elevation illustrating the parts necessary for a single unit of the improved printing mechanism.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

The machine in which the present improve-

ments have been incorporated is well known and is fully disclosed in the patents to Lake No. 1,379,268, dated May 24, 1921, No. 1,600,413, dated September 21, 1926, and the patent to Daly et al., No. 1,896,540, dated February 7, 1933.

In machines illustrated in detail in the above described patents and generally herein, tabulating cards 10 (Fig. 1) are adapted to be fed singly by a picker 11 from a supply stack to a pair of upper feeding rollers 12 which convey the card so as to have the perforations of the card analyzed by the usual perforation analyzing brushes 13 while the card is in motion. The card analyzed then passes to a lower set of feeding rollers 14 which then convey the card to a storage hopper, usual in the type of machine referred to.

Card feeding operations are instituted by the usual manual start key designated as ST in the last mentioned patent so as to cause by an electrical circuit the energization of a card feed clutch magnet 15.

The power for driving the card feeding rollers and other parts of the machine is derived from a motor (not shown) which by a belt 16 and pulley 17 constantly rotates a ratchet wheel 19 secured thereto. The pulley 17 and ratchet wheel 19 are loosely mounted upon a shaft 18.

In Fig. 1 there is shown the card feed clutch for causing card feed which is similar to the card feed clutch disclosed in Fig. 1a of the Lake Patent No. 1,822,594, dated September 8, 1931 to which reference should be had for details of construction and operation.

Upon completion of the electrical circuit to clutch magnet 15 the latter attracts its armature to raise a clutch lever 21 to thereby unlatch the latter from a clutch pawl 22. The latter is then drawn by a related spring 23 to engage the constantly rotating ratchet wheel 19. The clutch pawl 22 is carried by a bar 25, which is secured to a disk 26 secured to shaft 18 and to the latter there is secured a pinion 27.

The construction and operation of the card feed clutch, as is well known, is such that upon energization of magnet 15, disk 26 will be rotated and successive rotations of the shaft 18, and therefore pinion 27, will ensue as long as tabulating operations are desired.

The pinion 27 is in mesh with a gear 28 and the latter drives the upper set of feeding rollers 12 and the lower set of feeding rollers 14. The upper set of feeding rollers is intergeared by pinions 29 one of which is rotatable with a gear 30 in mesh with the driving gear 28. The latter also meshes with a pinion 31 which is rotatable with

one of a pair of intergeared pinions 32 carried by the rollers 14 which drive the lower set of feeding rollers 14 in opposite directions. The driving gear 28 is of sufficient width to drive a gear 34 so that by a train of gears 35, 36 a shaft 37 is driven. It is understood that as is usual in tabulating machines the card feed clutch is so designed and the gears are so proportioned that shaft 37 will be given a complete revolution in the arrow direction shown in Fig. 2.

It is customary in the type of machine described to cause printing from type of a printing mechanism which are presented to a printing line in synchronous relationship with the analyzing of the index points of the card and to carry out the printing function in a novel manner an improved construction will now be described with particular reference to Figs. 2 and 3.

The shaft 37 has attached thereto a gear segment 38 adapted to mesh with a pinion 39 secured to a drive shaft 40 the gear ratio being so selected that three quarters of a revolution of the shaft 37 will drive the shaft 40 a complete revolution by the segment 38 and pinion 39.

The shaft 40, for each unit of the printing device, has splined thereto a circular disk 41 provided with a hole 42 (Fig. 3) in which there is fitted a spring-pressed clutch ball 43. Overlying the disk 41 and in the plane therewith is a ratchet wheel 44 of a ring-like formation, the inner periphery being provided with a series of wedge-shaped clutch teeth 45 one of which is engaged by the spring-pressed clutch ball 43. It is obvious, therefore, that this engagement provides an impositive clutch connection between the shaft 40 and the ratchet wheel 44. Attached to the ratchet wheel 44 is a gear wheel 46 which is intergeared with a gear 47 pivoted at 48 on an arm 49. To the gear 48 there is secured a type wheel 50 carrying spaced numeral type 51. Each printing unit comprising a ratchet wheel 44 and gear wheel 46 is spaced apart from another unit by a spacer disk 71 (Fig. 3).

To the shaft 37 there is secured a cam 52 having a high portion 53 normally contacting with a finger 54 of one arm 55 of a pair of arms pivoted by a rod 56 and connected together by a rod 57. A spring 57a urges the finger 54 to contact with the cam 52 to position the rod 57 as shown in Fig. 2. In this position of the rod 57 each armature 58 of a printing control magnet 59 is urged by its related spring 60 so that a stop pin 61 pivoted to the armature is out of cooperation with the teeth of the ratchet wheel 44.

The shaft 37 rotates synchronously with the passage of the card past the analyzing brushes 13 so that a type 51 is presented to a platen 62 corresponding to the numerical value of the index point analyzed. Also at the initial rotation of cam 52 the high portion 53 thereof will be moved out of cooperation with the finger 54 whereby the spring 57a will move the rod 57 to the right.

Thereupon each armature spring 60 will move the related stop pin 61 out of cooperation with a zero stop projection 63 of a related ratchet wheel 44.

It will be understood that shaft 40 has already been turned a slight extent so that the clutch ball 43 is moved out of engagement with the deepest part of the wedge-shaped notch 45. After this partial movement of shaft 40 the ratchet wheel 44 is unlocked by the shifting of the stop pin 61 so that the clutch ball 43 will by the action of the clutch spring enter the deepest part of the

notch 45 thereby re-aligning the ratchet wheel 44 and type wheel 50 and bring them in normal relationship. This again places the type wheel 50 in synchronism with the shaft 37 and the type wheel 50 will rotate until the magnet 59 is energized which occurs when a perforation is encountered. The related stop pin 61 is now shifted to the left to engage with a notch of the ratchet wheel 44 thereby stopping the rotation of the printing wheel and retaining the selected type 51 at the printing line. The shaft 40 by the impositive clutch connection rotates up to the completion of a full revolution of the shaft effected by the segment 38.

When a magnet 59 is energized it will close its contacts 64 thereby providing as shown in Fig. 1 a stick circuit for the magnet to keep it energized irrespective of the opening of the circuit by the shifting of the analyzing brush 13 out of the perforation. The magnets are held energized until cam controlled contacts 65 (Fig. 1) open at the end of a full revolution of shaft 37.

After the segment 38 has driven the shaft 40 a complete revolution and before a segment 66 attached to shaft 37 moves into mesh with a gear 67 attached to the shaft 40 a printing cam 68 secured to shaft 37 engages a roller 69 carried by the arm 49 and rocks the arm 49 thereby moving the printing wheel 50 against a platen 62 to cause by the usual inking ribbon 70 an impression from the selected type 51 on a record strip surrounding the platen 62. The gear 47 in this operation moves away from the gear 46 but not sufficient to disengage said gears.

The printing operation preferably takes place while the printing wheels are not being rotated and after this operation the segment 66 now meshes with the gear 67 and the gear ratio is so selected that shaft 40 will now be driven a complete revolution to reset all the printing wheels 50. Magnets 59 are, of course, deenergized to bring the stop pins 61 out of cooperation with the ratchet wheels 44. The cam 52 is also effective when the second revolution of shaft 40 commences to shift the rod 57 forcing pins 61 a sufficient distance so as to act as abutments for the stop projections 63 of the ratchet wheels 44.

When the printing wheels 50 have been reset the parts are now at normal and in the position shown in Fig. 2 ready for another setting of the printing wheels 50.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a cyclically operable machine, the combination with a drive shaft, of a printing wheel provided with a series of printing characters, an impositive clutch connection between said printing wheel and said drive shaft, means operable during the first rotation of said drive shaft and when a character is to be selected for interrupting the rotation of said printing wheel, said drive shaft then completing its first rotation, and means for releasing said printing wheel and causing a second rotation of said drive shaft to reset by said impositive clutch said printing wheel.

2. In a printing machine, the combination with a main drive shaft, of a printing wheel, an impositive clutch connection between said printing wheel and a second drive shaft, means including a segment operated by said main drive shaft to give the second drive shaft a complete rotation, means operable during the rotation of the second drive shaft for effecting the interruption of the movement of said printing wheel to select a printing type thereof, means including a supplemental segment operated by said main drive shaft to effect a supplemental rotation of the second drive shaft to reset the printing wheel, and means effective when neither segment drives the second drive shaft to effect a printing operation from the selected type.

3. In a machine of the class described, in combination, a printing element, a drive shaft, a member rotatable with said printing element and having a plurality of notches, an element rotated by said drive shaft and carrying spring urged means engaging one of said notches to form an impositive clutch connection between said drive shaft and said printing element, means for rotating said shaft uni-directionally, and means for stopping the operation of said printing element during the rotation of said drive shaft.

4. In a machine of the class described, in combination, a rotatable drive shaft, a circular element attached to the drive shaft and provided with an aperture receiving a spring urged clutch ball, a ring-shaped element in the plane of said circular element and provided with internal

wedge-shaped notches, one of which receives said clutch ball, a printing element rotatable with said ring and having printing type, means for rotating said drive shaft uni-directionally, and means for interrupting the rotation of said printing element during the rotation of said drive shaft to select a printing type.

5. In a machine of the class described, in combination, a drive shaft, a printing wheel adapted to have movements synchronous with said drive shaft, an impositive clutch connection between said printing wheel and said drive shaft comprising a spring-pressed element and an element having wedge-shaped notches one of which receives said spring-pressed element, means for normally locking said printing wheel during the initial rotation of said shaft, said spring pressed element being arranged to subsequently re-align said printing wheel and said drive shaft.

6. In a machine of the class described, a drive shaft, a synchronously rotatable printing wheel, a member rotatable with said wheel and an impositive clutch between said wheel and said shaft including a spring urged clutch member engaging one of a series of notches of said member, means for normally locking said printing wheel during the rotation of said shaft, said spring pressed clutch member being constructed to engage with the inclined edge of a notch to automatically re-align said wheel and said shaft when they are moved out of synchronism with each other.

GUSTAV TAUSCHEK.