Nov. 18, 1969 T. ARVAI 3,478,858

INKING MECHANISM FOR CALCULATORS AND LIKE MACHINES

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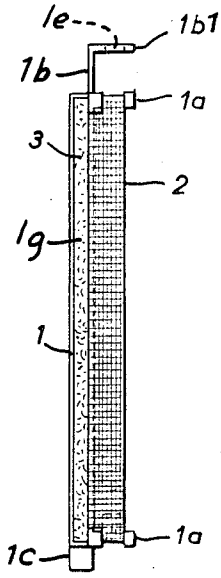


FIG. 3

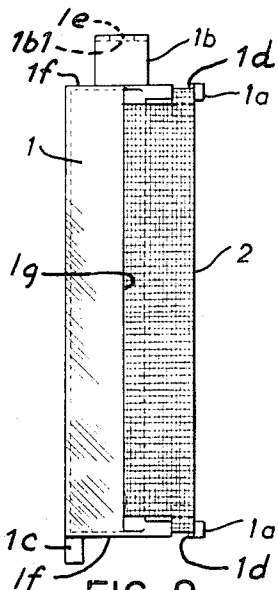


FIG. 2

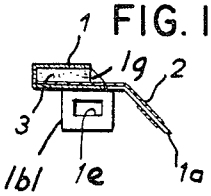


FIG. 1

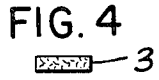


FIG. 4

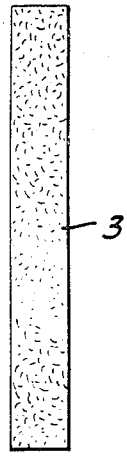


FIG. 5

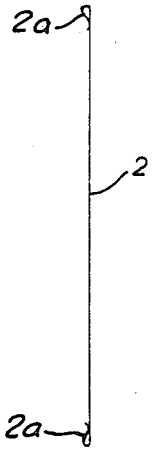


FIG. 6

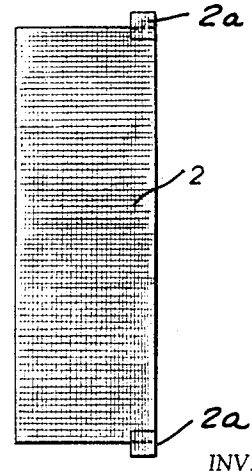


FIG. 7

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FIG. 9

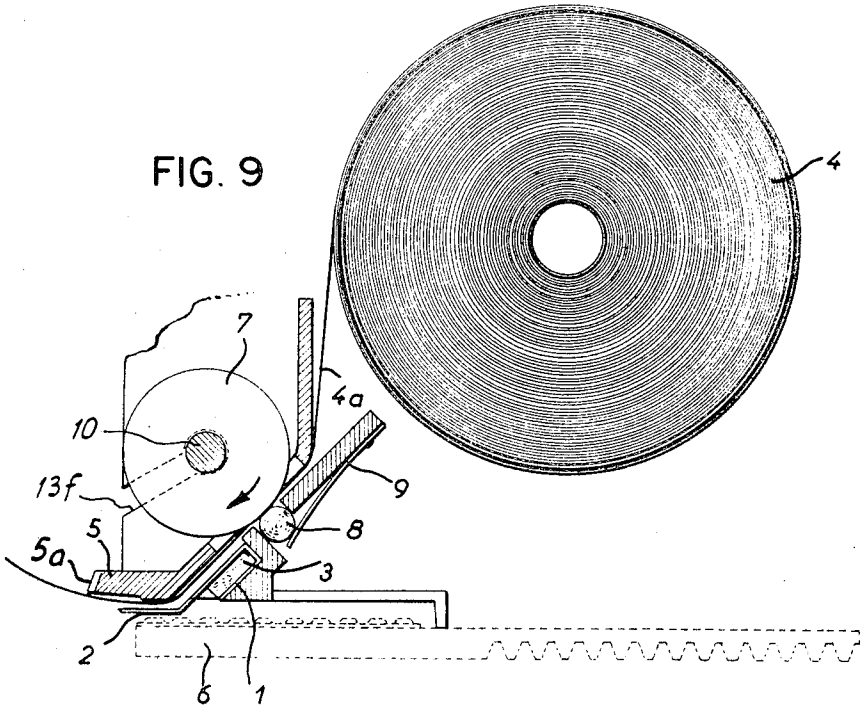


FIG. 8

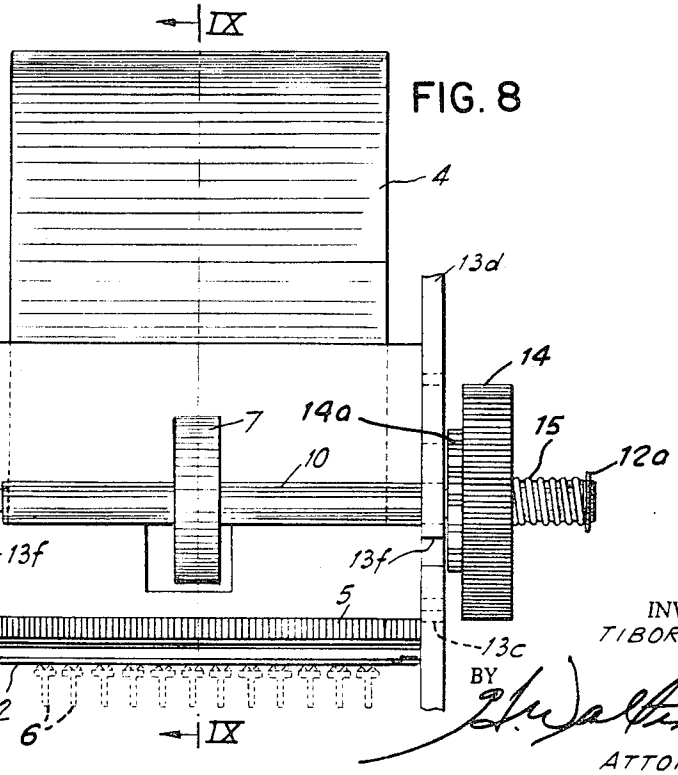
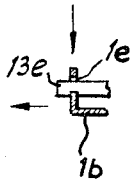


FIG. 10



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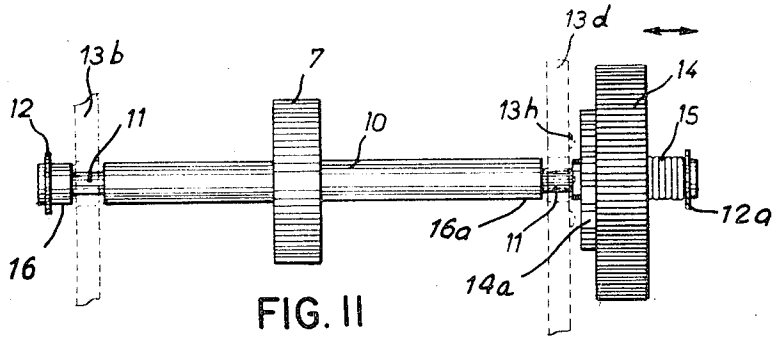


FIG. 11

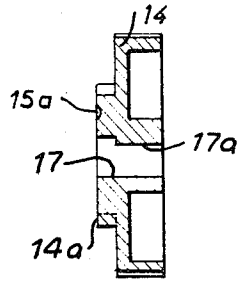


FIG. 12

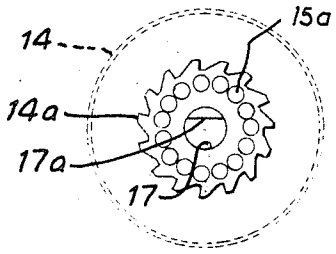


FIG. 13

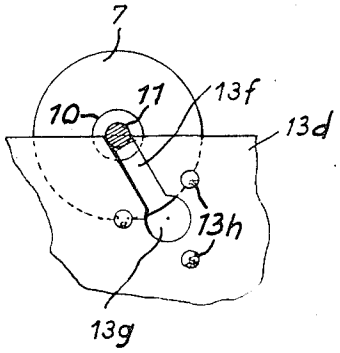


FIG. 14

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United States Patent Office 3,478,858
Patented Nov. 18, 1969

3,478,858

INKING MECHANISM FOR CALCULATORS AND LIKE MACHINES

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Claims priority, application France, Mar. 24, 1966, 54,901
Int. Cl. B41j 33/14
U.S. Cl. 197—151 1 Claim

ABSTRACT OF THE DISCLOSURE

An ink retaining member in an interchangeable cartridge feeds ink by capillary action to an inking ribbon projecting therefrom into a position between a platen and type bars whereby printing may be effected on paper fed between the ribbon and the platen by paper feeding apparatus utilizing detented ratchet means to rotate a shaft predetermined discreet amounts upon each ratchet actuation whereby paper engaging means on the shaft moves the paper a predetermined distance.

CROSS REFERENCES TO RELATED APPLICATIONS

The invention disclosed in the present application may be conveniently employed with the calculator disclosed in my application filed Mar. 27, 1967, Ser. No. 626,284 and entitled "Improvements in Calculating Mechanisms for Calculating Machines" and the keyboard and sentry mechanism disclosed in my application filed Jan. 23, 1967, Ser. No. 611,037, and entitled "Improvements in Calculating Machines."

BACKGROUND OF THE INVENTION

The present invention relates to an inking mechanism which may be conveniently employed with adding or calculating machines of the small desk-top variety. Numerous machines of this type are known to the prior art and in view of the operations they are required to carry out, they tend to be extremely complicated mechanisms. Such complications not only result in higher costs of manufacture, but as well may readily lead to breakdowns and difficulties in servicing and maintenance. Thus, any simplifications which may be obtained are likely to prove advantageous.

The present invention avoids complications hitherto encountered in inking mechanisms previously found in printing calculators. In such known prior art machines it is common to provide an elaborate paper feed mechanism utilizing double ratchets to ensure that the paper is advanced by a definite amount with each cycle. It is also common practice to provide an inking mechanism in the form of spools containing ribbon much as in typewriters and similar machines. The spools must be rotated so as to enable continuous presentation of a fresh ribbon surface to the printing mechanism and periodically the direction of rotation must be reversed. It is common practice to arrange the drive of the ink ribbon mechanism and the paper feed mechanism in common and such drives give rise to the complications which the present invention seeks to avoid.

In the present invention it has been found possible to manufacture most of the parts from plastic mouldings in view of the simplicity achieved. Thus, most of the previous complex mechanisms have been suppressed with the result that there is no need for the complex linkages found in prior art arrangements. The number of parts has been very considerably reduced over known prior arrangements. Metal fastenings such as bolts, nuts or rivets are substantially eliminated and a very considerable reduction is achieved in the necessity of employment of skilled labor during manufacturing and assembly processes.

SUMMARY OF THE INVENTION

In accordance with the above and first briefly described the invention comprises an apparatus wherein an interchangeable cartridge provides an ink reservoir from which ink retaining means feeds ink through capillary action to an inking ribbon projecting therefrom into the printing station of a calculator or the like, through which paper is fed by paper advance mechanism.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 shows a cross section of the inking arrangement;

FIGURE 2 shows a top view of the arrangement of FIGURE 1;

FIGURE 3 shows a side view of the arrangement of FIGURE 1;

FIGURES 4 and 5 show respectively a cross section and a front view of the inking felt;

FIGURES 6 and 7 show respectively a side view and a front view of the inking ribbon;

FIGURE 8 is a top plan view of the paper advance mechanism and assembled therewith is shown the inking arrangement;

FIGURE 9 is a cross section taken along line IX—IX of FIGURE 8;

FIGURE 10 shows an assembly detail regarding the mounting of the inking cartridge;

FIGURE 11 indicates the assembly of the drive shaft of the paper advance mechanism with the framework of the machine;

FIGURES 12 and 13 show respectively a cross section and front view of a spur wheel utilized with the paper advance mechanism; and

FIGURE 14 shows a detail in the step of assembling the paper drive mechanism as shown in FIGURE 11.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The inking arrangement as shown by FIGURES 1 to 7 inclusive comprises a reservoir **1** in the form of an elongated hollow trough **1** closed at both ends **1***f*. Projecting from the open side **1***g* of this trough **1** at each end **1***f* thereof are flexible projections or arms **1***a* preferably bent back from the open side of the trough **1** at an angle more particularly observable in FIGURE 1. Each of the flexible arms **1***a* is provided at its end remote from the trough with a notch **1***d* as more particularly seen in FIGURE 2. Extensions **1***b* and **1***c* project from each end **1***f* of the trough **1** with the extension **1***b* being bent back at an angle, as indicated at **1***b*. Extensions **1***b* and **1***c* are for retaining the inking assembly in place on a calculating or like machine as may be observed hereinafter. The reservoir **1** together with the various extensions forming part thereof may be conveniently moulded from a plastic material in one piece.

As shown in FIGURES 4 and 5, a piece of ink retaining material **3**, such as felt, is provided in the trough portion **1** of the reservoir. An inking ribbon **2** provided with tab loops **2***a*, as more particularly shown in FIGURES 6 and 7, has a portion thereof positioned in reservoir **1** and retained therein by the felt piece **3** as shown in FIGURE 1. The tab loops **2***a* fit over the flexible arms **1***a* and are received and retained by the notches **1***d*.

It can be seen that with the felt piece **3** well saturated with ink such ink will be imbibed by the ribbon **2** through capillary action.

FIGURE 9 shows an assembly of the inking mechanism of the present invention with a paper feed mechanism and shows how a portion of the inking ribbon **2** projects between a platen **5** and a type bar **6**. FIGURE 8 shows a top view of the paper feed and inking mechanism assembly and shows how the reservoir assembly may be fitted in and slid out of the overall arrangement. The inking assembly (FIGURE 1) is slid through opening **13***a* in frame member **13***b* until extension **1***c* is engaged in slot **13***c* in frame member **13***d*, and extension **1***b* is engaged over extension **13***e* on frame member **13***b* by way of opening **1***e* as seen in FIGURE 1. FIGURE 10 shows a detail of this indicating how the bent over projection **1***b* fits over extension **13***e* of frame member **13***b* in order to retain the ink cartridge in place.

The paper feed arrangement is more particularly shown in FIGURES 8 and 9 with details thereof in FIGURES 11, 12 and 13. By referring to FIGURE 11 one will be able to observe the basic mechanism. Shaft **10** is provided with cut away portions **11**, adjacent the ends thereof. Formed integrally with shaft **10** is a milled spur wheel **7** which is arranged to bear against a paper ribbon 4A as may be more particularly observed in FIGURE 9. During assembly of the mechanism as may be seen from FIGURE 14 notched portions **11** of shaft **10** are receivable in slots **13***f* in frame portions **13***b* and **13***d*. At the bottom of these inclined slots **13***f* is an enlarged circular opening **13***g* capable of accepting and retaining the full diameter of shaft **10**. From FIGURE 11 it will be observed that the right hand end of shaft **10** has mounted thereon a milled spur wheel **14**. Details of this latter may be observed from FIGURES 12 and 13. Spur wheel **14** serves to advance the paper by rotating the shaft **10** either manually or through a mechanism driven from the associated adding or calculating machine.

Spur wheel **14** is formed integrally with a ratchet **14***a* on the inner face thereof. A center hole **17** is provided which accommodates shaft **10**. Through part of its length the center hole **17** is flattened as shown at **17***a* and the outer end of shaft **10** will be likewise flattened. Thus spur wheel **14** and the associated ratchet **14***a* will be free to slide, but not to turn relative to shaft **10**. On the interior face of ratchet **14***a* as more particularly seen in FIGURE 13 are a plurality of detent notches **15***a* in a circular formation. Arranged to cooperate with such notches **15***a* are a plurality of studs **13***h* mounted on frame portion **13***d* as seen in FIGURE 11. On the left hand end of the shaft **10** as viewed from FIGURE 11 is a retaining washer **12**. On the right hand end of said shaft **10** will be observed a retaining washer **12***a*. Between washer **12***a* and the outer face of spur **14** there is a helical compression spring **15**.

It will be observed that during assembly notches **11** may be received by slots **13***f* if spring **15** is first compressed. With shaft **10** in place the spring **15** may be released whereby spring **15** will bear against spur wheel **14** and draw shaft **10** to the right so that the end portion **16** now is received as a journal by the enlarged portion **13***g* of the slot **13***f*. At the right hand end likewise the notch **11** will be disengaged from the enlarged portion **13***g* so that the adjacent portion **16***a* of the shaft **10** to the left acts as a journal.

No specific apparatus has been shown by which the ratchet **14***a* is actuated. However, many such may be readily imagined. For example, a lever may be provided with a pawl on one end thereof adapted to engage the ratchet-teeth. The other end of such lever may be led to an eccentric or other cam arrangement on the main cam shaft of an associated calculator so that at each cycle such cam serves to move the lever whereby the pawl forces the ratchet to move one or more tooth spaces

according to requirements. When the ratchet **14***a* is thus engaged or alternately by manual engagement of spur wheel **14** the spring **15** tends to hold ratchet notches **15***a* in engagement with studs **13***h* thus preventing a turning movement. However, since the assembly consisting of spur wheel **14** and ratchet **14***a* may slide on shaft **10** against the bias of spring **15** it is obvious that the turning force will initially effect such sliding thereby permitting the rotational displacement of the shaft **10** by the distance equivalent to at least a space between two of the notches **15***a*. It will be evident that the spacing of notches **15***a* will determine the line spacing since following each cycle of operation spring **15** will once again force notches **15***a* into engagement with studs **13***h*.

A cross sectional view of the complete assembly is shown in FIGURE 9 in which **4** represents a roll of paper ribbon with **4***a* showing the paper strip. As may be seen such paper is engaged on one side by the milled spur wheel **7** and suitable pressure may be exerted on the other side of the paper by means of a ball bearing **8** which is retained in place by means of a spring **9** fastened to a part of the framework. The platen and paper guide **5** may conveniently be provided with a milled upper surface **5***a* which facilitates tearing off the used ribbon.

With the exception of the springs **15** and **9** and the retaining washers **12** and **12***a* it will be noted that all parts are so designed that they may be conveniently moulded from a plastic material although there is no intention to limit the invention to the choice of this or any other material.

What is claimed is:

1. An inking cartridge for use in calculators and like machines comprising:

(a) an elongated rectangular trough having one side, open and closed ends

(b) a pair of arms integrally formed with said trough one arm extending at each closed end proximate to the open side, and provided with retaining notches adjacent their outer ends;

(c) an inking ribbon positioned in said trough and having a length corresponding substantially to the interior length of said trough and a width sufficient to enable said ribbon to extend from the open side of said trough and a pair of loops, one on each side of said ribbon, said loops being engaged with said retaining notches so as to extend said inking ribbon between said arms; and

(d) ink retaining means positioned in and substantially filling said trough, said ink retaining means being arranged to contact said inking ribbon so as to transfer ink thereto by capillary action.

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U.S. Cl. X.R.

197—133, 138, 153