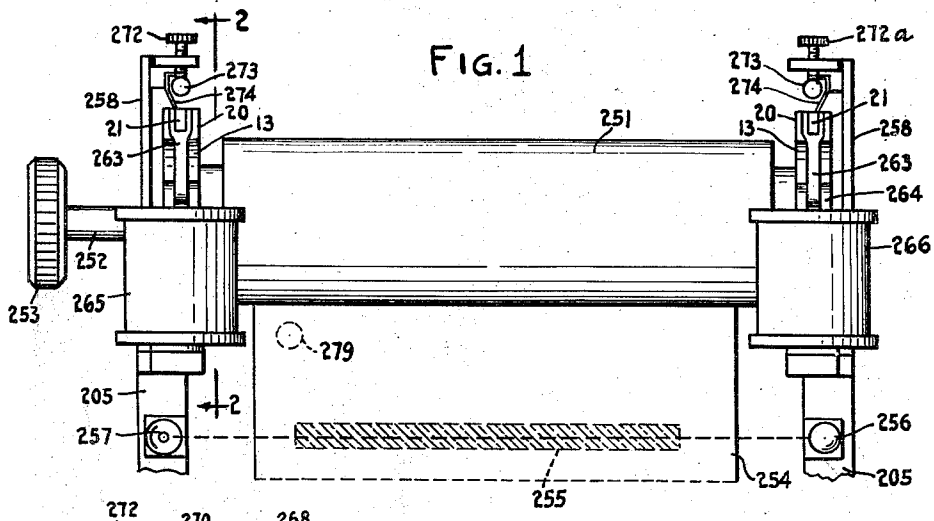
June 13, 1950 M. H. LOUGHRIDGE 2,511,596

SHEET FEEDING MECHANISM

Original Filed May 15, 1940

FIG. 1



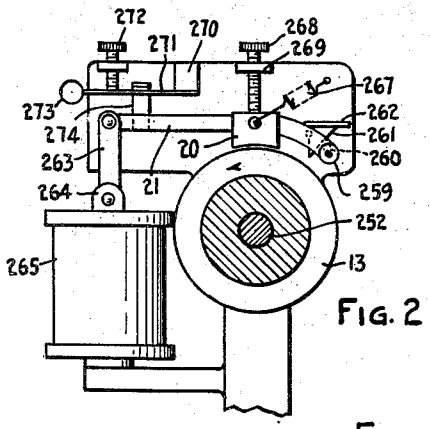


FIG. 2

FIG. 3

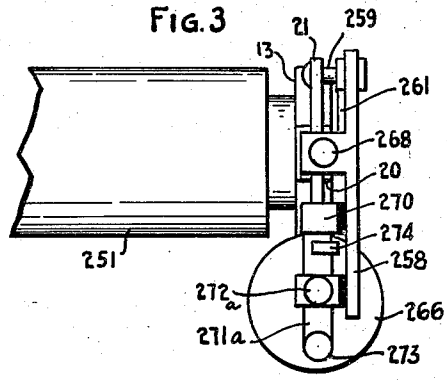


FIG. 4

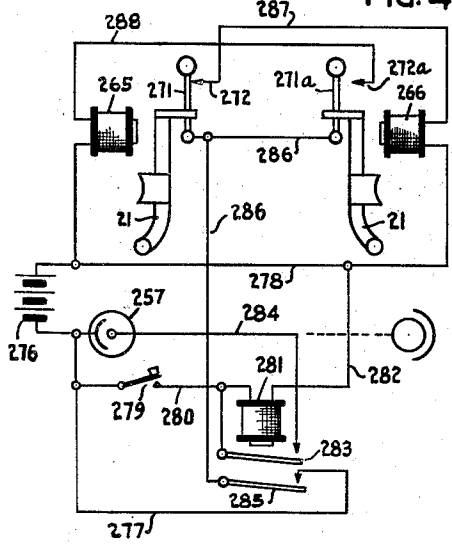
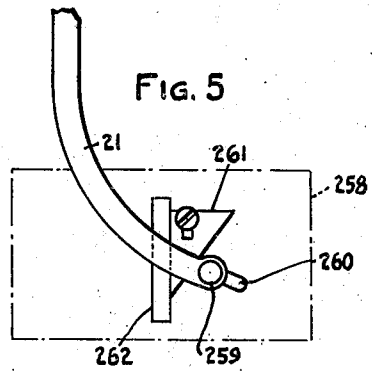


FIG. 5



INVENTOR.
MATTHEW H. LOUGHRIDGE, DECEASED,
BY WILLIAM R. LOCKRIDGE, ADMINISTRATOR,
BY M. Theodore Simmons
ATTORNEY.

Patented June 13, 1950 2,511,596

UNITED STATES PATENT OFFICE

2,511,596

SHEET FEEDING MECHANISM

Matthew H. Loughridge, deceased, late of Bogota, N. J., by William R. Lockridge administrator, Clifton, Mass.

Original application May 15, 1940, Serial No. 335,391. Divided and this application April 7, 1947, Serial No. 739,857

9 Claims. (Cl. 197—127)

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The present invention relates to automatic, or semi-automatic sheet feeding mechanisms, more particularly to such mechanisms when arranged to accurately position the sheet as to some lengthwise position.

This application is a division of copending application of Matthew H. Loughridge, Serial No. 435,594, filed March 20, 1942, now Patent No. 2,418,474, issued April 8, 1947; which application was a division of an application of said Matthew H. Loughridge, Serial No. 335,391, filed May 15, 1940, now Patent No. 2,283,680, issued May 19, 1942.

The later of the above applications describes and claims a justifying mechanism as applied to adjusting the spacing of letters and words near the right hand margin of a typewritten line so that the right hand margin of the page of typewriting will be uniform. Reference may be had to that patent for a further understanding of the working of the mechanism for producing variable amounts of rotary motion and return of the mechanism to a fixed, normal position, ready for the next stroke.

In the present instance, the mechanism for translating linear motion into rotary motion is illustrated, by way of example, as applied to the platen of a typewriter and is intended to automatically feed the sheet of paper, or the like, either to a fixed, predetermined position, whereupon the mechanism will automatically stop the sheet at such position, or to a selected position at the will of the operator. In other words, the former case pertains to lateral or marginal justification, and the present case might be said to relate to linear justification to meet varying conditions.

It will be understood that the mechanism shown and described in the present application is only by way of illustration of a mechanism for accomplishing the particular object and that other mechanisms can be devised for obtaining the same end result.

The objects of the present invention will be more fully understood from the following specification taken in conjunction with the accompanying drawings, in which—

Fig. 1 is a plan view of a platen with the mechanism of this invention applied thereto for the feeding of a sheet of paper or the like;

Fig. 2 is an elevation of a portion of one of the pairs of stepping mechanisms, the view being taken on the line 2—2 of Fig. 1;

Fig. 3 is an end view of the mechanism which corresponds to that shown in Fig. 2, but which is

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located at the right hand end of the platen, in the position indicated in Fig. 1;

Fig. 4 is a circuit diagram of a control that may be used in conjunction with the mechanisms of Figs. 1 to 3; and

Fig. 5 is an enlarged detail showing an adjustment for the stepping mechanism.

In general, a stepping mechanism is mounted at each end of the platen roller, and is arranged to engage a friction drum on the axis of the roller, there being a drum at each end of the platen. The stepping mechanisms are electrically controlled, and the control may be such that the mechanisms operate alternately to produce a step by step rotation of the platen roller.

The energization of the respective electromagnets in the stepping mechanisms operates a lever to move a shoe into engagement with one of the friction drums. The circuit of each electromagnet is interrupted by the operation of the other electromagnet, this arrangement permitting the associated lever to return to its starting position while the opposite lever is advancing the platen a step, and vice versa. Provision may be made for adjusting the length of stroke of each lever, and therefore the size of the rotational steps.

The apparatus also may be designed to operate rapidly, making very short steps with each operation or energization of the electromagnet, in the order of $\frac{1}{100}$ of an inch, so that the sheet being fed may be located with precision.

A photoelectric cell stop control may be used, if desired, or stopping may be effected manually.

Referring to the drawings, a platen roller 251 has a shaft 252 which is suitably mounted for rotation in the frame 205, and carries on a projecting end thereof a customary hand knob 253. A sheet of paper, or the like, such as a letterhead or a stencil, may be fed to and by the platen to bring the same into proper position for typing. A stepping mechanism for automatically rotating the platen to effect this feed is applied at each end of the platen, and these mechanisms are alike except for the reversal of the parts and the arrangement whereby the mechanisms may operate alternately.

At each side of the platen, the frame 205 has an extension plate 258. The extension plate is provided with a slot 260 in which is slidably mounted the pivot 259 of a lever 21. At its opposite end, lever 21 is connected by link 263 with the armature of an electromagnet 265, the corresponding mechanism on the opposite side of the platen being connected to the armature of an electromagnet 266.

A spring 267 restores the lever 21 to its starting position which may be determined by means of a screw 268 that is adjustable in the lug 269 on the frame extension 258. Each lever 21 carries a shoe 20 to engage with the friction drum 13 as the respective electromagnets 265 and 266 are energized, the movement of the lever and shoe being such as to rotate the drum and platen a step forward. The free movement of the lever 21 may be adjusted also by means of wedge 261 which is adjustably mounted on frame extension 258, one edge of the wedge engaging the stop 262 and the opposite edge engaging the pivot pin 259.

Part of the control mechanism to be described comprises a switch for automatically breaking and making the circuits of the electromagnets 265 and 266. Referring to Fig. 2, this switch comprises a contact spring 271, supported by pad 270 and insulated therefrom, and from the frame extension 258, the spring normally engaging the stop screw 272, both the spring and screw being included in the circuit through each stepping mechanism. Also, as will be explained, on the opposite side of the platen, the corresponding spring 271*a* is normally out of engagement with its stop screw 272*a*, where the stepping mechanisms are intended to work alternately instead of in unison. The springs 271 and 271*a* are each provided with an inertia element, such as weight 273, and each is operated by movement of lever 21 through the medium of the hook 274 which is carried by the lever and extends over the associated spring 271 or 271*a*.

One control circuit for operating the stepping mechanisms alternately is shown in Fig. 4. A source of power, indicated by batteries 276, has wire 277 connected to its positive side, and the return circuit is through wire 278. A stick relay 281 is connected to the opposite sides of the battery through wires 280 and 282, and wire 280 has a manually operated switch 279 therein. When relay 281 is energized, the holding circuit is established through its contact 283, and wire 284 to one side of photoelectric cell 257, the other side of which is connected to positive circuit wire 277.

Also, when relay 281 is energized, a circuit is established from wire 277 through relay contact 285 and wire 286 to the spring contacts 271 and 271*a* of the stepping mechanisms.

Since the circuit through spring 271 is normally closed, and that through spring 271*a* is normally open, when said relay 281 is energized, the above described circuit will cause energization of electromagnet 266. As that electromagnet moves its lever 21, spring 271*a* is brought into engagement with stop 272*a*, thus completing the circuit to electromagnet 265. Energization of this electromagnet opens the circuit through spring 271 and stop 272 to de-energize electromagnet 266. Thus, the electrical arrangement is such that one electromagnet controls the circuit to the other, and vice versa, to produce an intermittent and alternate step by step movement of the platen 251.

The inertia element 273 is used to retard the movement of the associated spring contact 271 or 271*a* relative to the movement of the lever 21 so that the lever may make a whole stroke.

The operation of the control apparatus is initiated by the switch 279 which may have any convenient location, or may be positioned to be operated by the entrance of the sheet 254 to the platen, as indicated in Fig. 1. This stepping operation will continue until the circuit to the stick relay 281 is interrupted, which may be done manually, as will be obvious, or may be done automatically.

As an example of the automatic operation, a photoelectric cell 257 may be mounted in position to receive light reflected from the lamp 256 by the sheet 254. The sheet may be provided with a non-light reflecting area 255 which, when it is fed into the path of the light beam, interrupts the reflected light, thus breaking the holding circuit of relay 281 and the operation of the system is thereby stopped. In this example, it is assumed that the area 255 is located in position to secure stopping of the sheet at the precise location desired, and that location will be uniformly selected by the described mechanism for each succeeding sheet.

In cases where the sheet is to be fed until some individually selected position is reached, as for example a blank line for information to be filled in, the suggested short steps enable the precise positioning of the sheet even under the suggested manual controls.

What is claimed is:

1. Mechanism for feeding sheet material comprising the combination of a platen roller receiving said sheet, and means for automatically rotating said roller step by step, said means comprising a pair of stepping mechanisms connected to the opposite ends of said platen roller, each having an operating electromagnet therefor, means for alternately energizing said electromagnets, and means for interrupting the energizing circuit to said electromagnets at selected times.

2. A mechanism for automatically feeding sheet material comprising the combination of a platen roller receiving said sheet, means for rotating said roller step by step, said means comprising a pair of stepping mechanisms connected to the opposite ends of said platen roller, each having an operating electromagnet therefor, means for alternately energizing said electromagnets, the latter means including a light responsive element, a light source, and means associated with said sheet for automatically interrupting the light reflected to said light responsive means from said sheet as the sheet is fed by said platen.

3. Mechanism for feeding sheet material comprising the combination of a platen roller receiving said sheet, and means for automatically rotating said roller comprising a friction drum connected to said roller, a pivoted lever carrying a shoe arranged to engage said drum to rotate the same a portion of a revolution, an electromagnet for operating said lever, and means for rapidly making and breaking the circuit to said electromagnet to feed said sheet.

4. Mechanism for feeding sheet material comprising the combination of a platen roller receiving said sheet and means for automatically rotating said roller comprising a pair of friction drums connected to said roller, pivoted levers each carrying a shoe arranged to engage said drums respectively and each operable to rotate the same a portion of a revolution, electromagnets for operating said levers, and means for rapidly making and breaking the circuits to said electromagnets to feed said sheet.

5. Mechanism for feeding sheet material comprising the combination of a platen roller receiving said sheet and means for automatically rotating said roller comprising a pair of friction drums connected to said roller, pivoted levers each carrying a shoe arranged to engage said

drums respectively and each operable to rotate the same a portion of a revolution, electromagnets for operating said levers, a switch also actuated by each electromagnet, the switch of one electromagnet controlling the circuit to the other thereof, means for energizing the electromagnets, and means for interrupting the energizing circuits of said electromagnets.

6. A feeding mechanism comprising a platen roller, a pair of levers each having a pivot to move about the axis of said roller, a friction shoe on each lever engaging said roller to rotate said roller to the extent of said pivotal movement, a magnet for operating each lever, a circuit for each magnet and means controlling the circuits of said magnets by the material fed to said platen roller.

7. A feeding mechanism comprising a platen roller, a lever pivoted to move about the axis of said roller, a shoe on said lever engaging said roller, a magnet for operating said lever to rotate said roller and means for controlling the circuit of said magnet.

8. A feeding mechanism comprising a platen roller, a pair of levers each having a pivot to move about the axis of said roller, a shoe on each lever engaging said roller, a magnet for operating

each lever to rotate the roller, a circuit controlling each magnet and each magnet controlling the circuit of the other magnet.

9. A feeding mechanism comprising a platen roller, a pair of levers each having a pivot to move about the axis of said roller, a friction shoe on each lever engaging said roller to rotate said roller to the extent of said pivotal movement, a magnet for operating each lever to engage the roller and means controlling the circuits of said magnets to operate them intermittently.

WILLIAM R. LOCKRIDGE,
Administrator of the Estate of Matthew H. Loughridge, Deceased.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,718,043	Hardingham	June 18, 1929
2,111,619	Fleming	Mar. 22, 1938
2,181,992	Ghertman	Dec. 5, 1939
2,199,556	Carroll	May 7, 1940