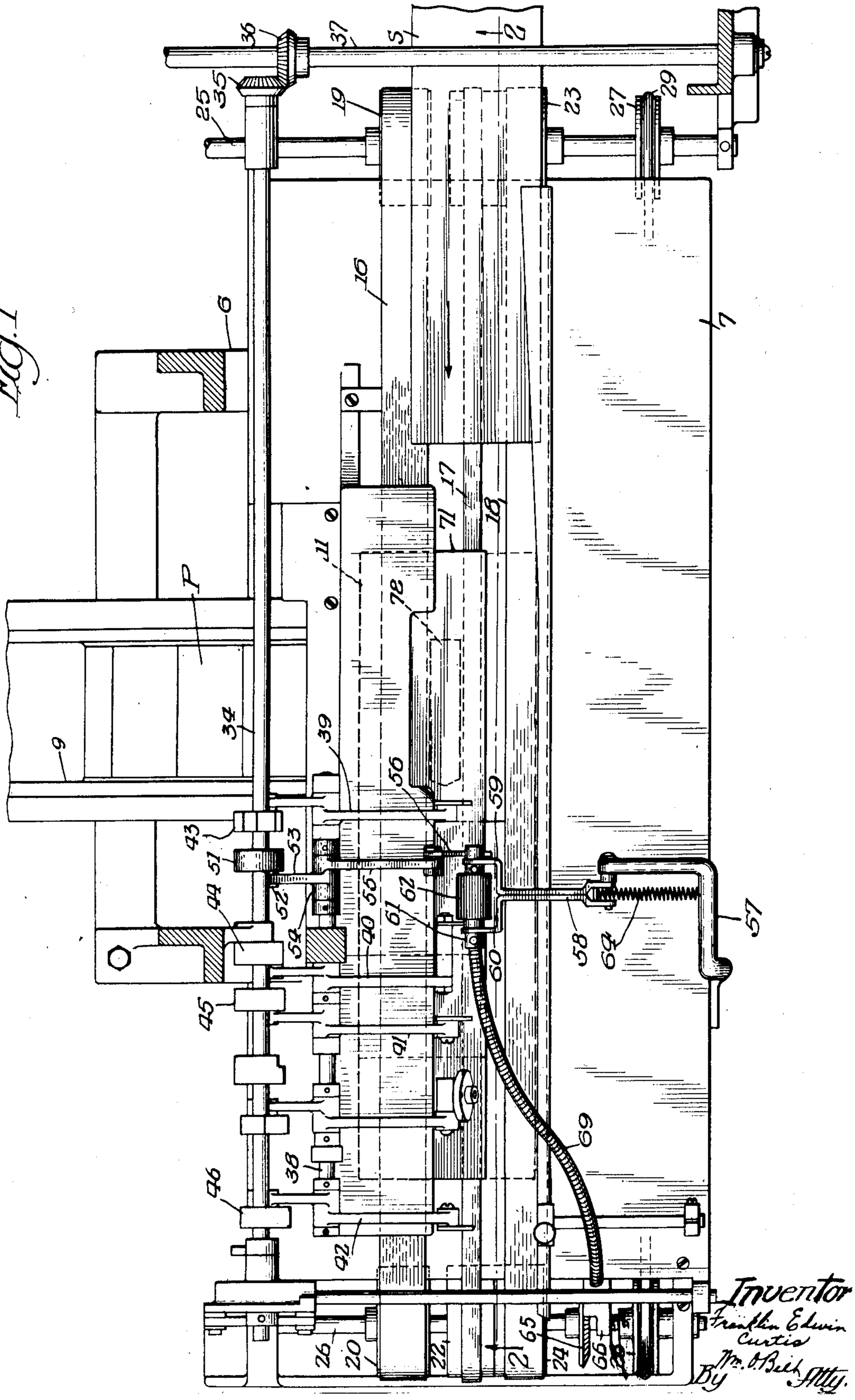
Jan. 2, 1934. F. E. CURTIS 1,941,663

PRINTING MACHINE

Filed May 22, 1930 2 Sheets-Sheet 1

Fig. 1



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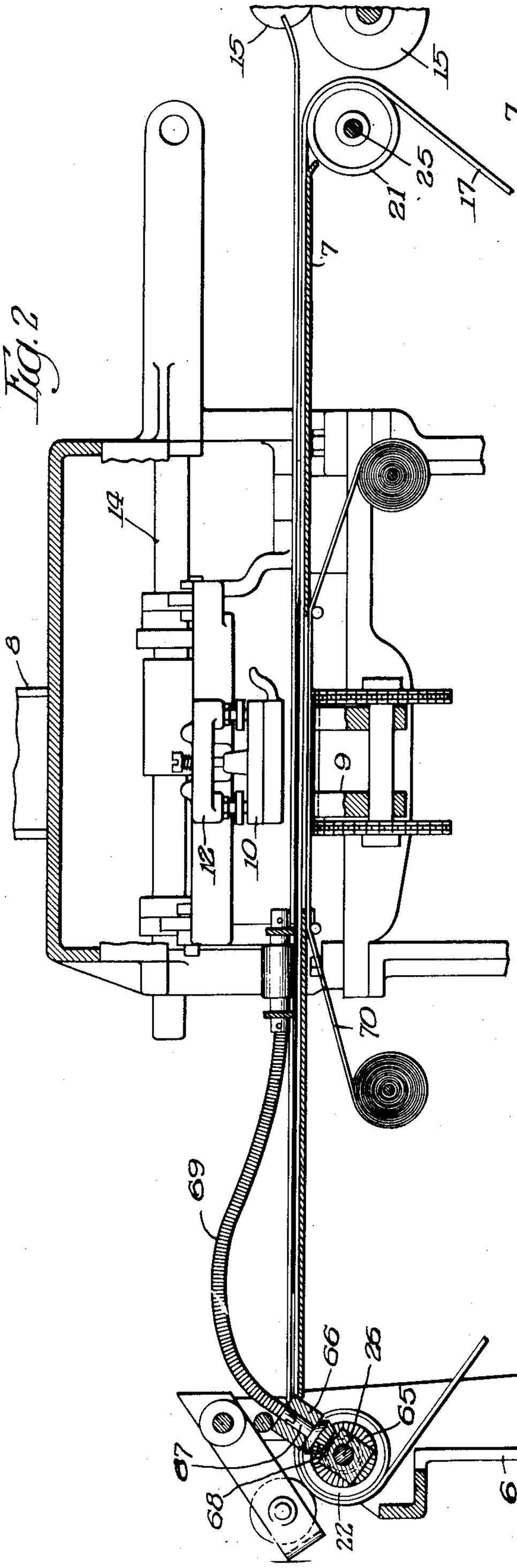


Fig. 2

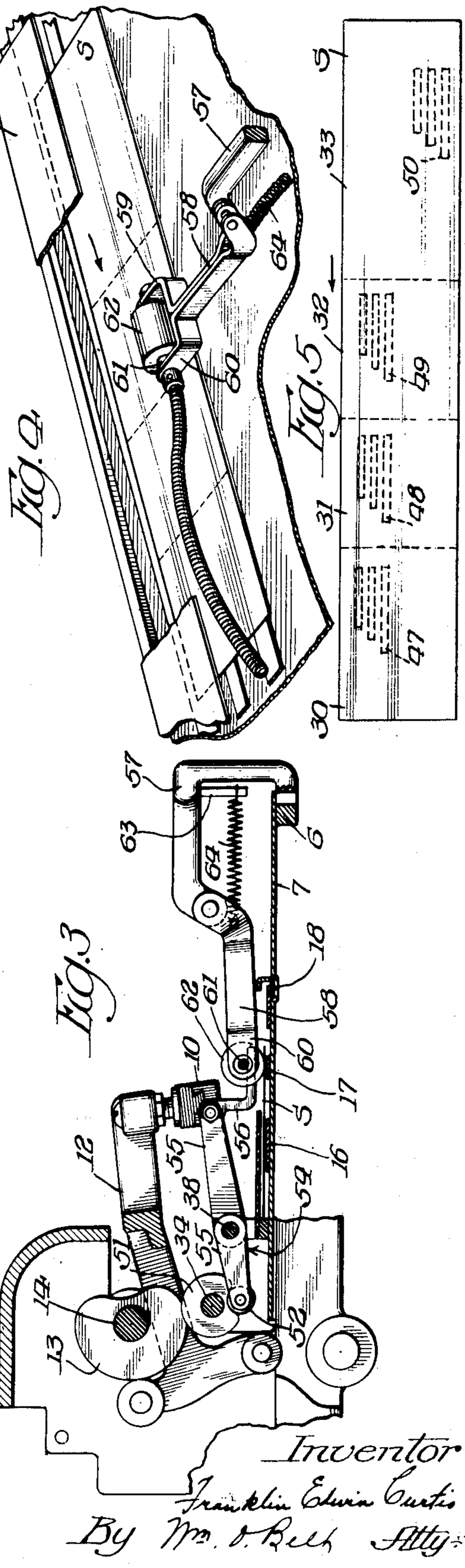


Fig. 4

Fig. 5

Fig. 3

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UNITED STATES PATENT OFFICE

1,941,663

PRINTING MACHINE

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Application May 22, 1930. Serial No. 454,595

13 Claims. (Cl. 101—287)

This invention relates to printing machines and more particularly to a printing machine in which a plurality of impressions are made on sheets from successively changed printing devices.

A particular use of my invention is in connection with printing machines wherein a name and address, or other analogous information, are printed at various places on a bill or the like. The impressions are usually made on the bill in alinement with each other, but sometimes the nature of the bill requires that certain of the impressions be offset from alinement with other of the impressions. Therefore, it is among the salient objects of my invention to provide a printing machine in which the impressions made on a sheet may be offset from alinement with each other.

Other objects of the invention are to provide a printing machine wherein the sheet may be moved relative to the printing mechanism, and to provide a machine in which an arrangement for accomplishing the foregoing sheet movements may be installed without requiring any extensive alterations in the machine.

A selected embodiment of the invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a plan view of a printing machine constructed in accordance with my invention, certain portions of the machine being omitted;

Fig. 2 is a longitudinal sectional view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view of a printing machine embodying my invention;

Fig. 4 is a perspective view of the arrangement I provide for moving the sheet; and

Fig. 5 is a view illustrating one form of sheet printed in the machine.

While my invention may be used in connection with many different types of printing machines, I have illustrated the invention in connection with a printing machine of the character disclosed in the copending application of Walter T. Gollwitzer, Serial No. 391,141, filed in the United States Patent Office on or about September 9, 1929.

Printing machines of this character are arranged to make a plurality of impressions at spaced intervals on a bill, statement, or the like, and this is accomplished by moving the bill past a printing arrangement. Such a machine includes a frame 6 which supports a horizontal flat table member 7 in its top portion along which table the sheets or bills move through printing position. Individual printing devices P are stacked in a magazine 8 at the rear of the frame. The printing devices are successively taken from the bottom of the stack and moved along the guideway 9 to printing position below the platen 10. The guideway 9 for the printing devices extends just beneath the table 7, a suitable opening 11 being provided in this table through which the printing device in printing position is exposed. The guideway 9 is extended to the forward edge of the table 7 and the printing devices P are discharged from this guideway after passing through printing position and are collected in a suitable storage member of the character well understood in the art. Any suitable or well known mechanism may be used for feeding the printing devices to printing position, holding them in printing position while the desired number of impressions are made therefrom, and removing them from printing position.

The stamper or platen arm 12, which carries the platen 10, is pivotally mounted in the frame and is intermittently lowered and raised into and out of printing contact with the printing devices by means of cams, such as 13, mounted on the shaft 14 which is driven in any suitable manner as, for example, that shown in the referred to Gollwitzer application.

The sheets S are stored in a suitable manner as, for example, in a stack arranged at the right hand side of the machine, and the sheets are taken from this stack by suitable feed means including the feed rolls 15. These feed rolls 15 feed the sheets onto the carriers or belts 16, 17 and 18, which travel along the top of the table 7. These belts are endless and the belt 16 is directed across the table 7 between the pulleys 19 and 20; the belt 17 being similarly extended between the pulleys 21 and 22; while the belt 18 is extended between the pulleys 23 and 24. The pulleys 19, 21 and 23, are fixed on the shaft 25. The pulleys 20, 22 and 24, are fixed on the shaft 26. Both the shafts 25 and 26 are journaled in the frame 6. The shafts 25 and 26 are so mounted that the pulleys carried thereby are disposed just beneath the table 7. Other pulleys are provided to guide the belts around the operating mechanisms in the machine and these pulleys, not shown, are arranged below and spaced from the table 7. A pulley 27 is fixed on the shaft 25, and a pulley 28 is fixed on the shaft 26 in alinement with the pulley 27. A driving belt 29 is extended between these pulleys and is connected to a suitable source of power, not shown. This driving belt rotates the shafts and, consequently, the pulleys carried thereby to drive the belts 16, 17 and 18, in the direction of the arrow in Fig. 1. Therefore, each sheet S delivered onto these belts 16, 17 and 18, will be carried by the belts through printing position beneath the platen 10. A sheet of the character to be operated on by the device disclosed herein is clearly illustrated in Fig. 5 and by referring thereto it may be seen that this sheet S includes four sections, 30, 31, 32 and 33. In each of these sections an impression is made from the printing device P in printing position, which device is held in this position until all of these impressions have been performed, and it is to be understood that a greater or less number of sec-

tions might be provided without departing from the purview of my invention. It is necessary that movement of the sheet S be interrupted during the time the impressions are being made and this is accomplished in the following manner: A shaft 34 is journaled in the frame 6 and has, at one end thereof, a bevel gear 35 which meshes with the bevel gear 36 on the shaft 37, said shaft being driven in any suitable or desired manner. On the portion of the frame supporting the table 7 I support a shaft 38 and pivotally mounted on this shaft 38 are stop finger arms 39, 40, 41 and 42, as many of these stop finger arms being provided as there are sections on the sheets S. These stop finger arms have rollers at corresponding ends thereof and these rollers respectively travel on the cams 43, 44, 45 and 46, mounted on the shaft 34. The shafts 14 and 34 are rotated at different speeds and the ratio of the rotative speeds is equal to the number of sections on the sheet S. Thus, if, as in the present instance, the sheet S has four sections the shaft 14 rotates four times as fast as the shaft 34. Therefore, as the sheet S moves along with the belts 16, 17 and 18, and when the section 30 moves into printing position, the cam 43 acts on the arm 39 to move the stop finger thereon down into position whereby the end of the sheet S abuts thereagainst and the sheet is held in printing position until the platen 10 has operated to make the impression 47 in the section 30. After the platen has operated, the cam 43 permits retraction of the arm 39 and the sheet S again moves with the belts until the leading end of the sheet engages the stop finger 40 which will have been moved into stopping position by the cam 44. The platen will, therefore, operate to make the impression 48 in the section 31, which section will be alined with the platen when the front edge of the sheet engages the stop finger 40. As soon as this impression has been made the stop finger 40 is retracted and the sheet again moves with the belts 16, 17 and 18, until it engages the stop finger 41 which will have been moved into stopping position by the cam 45 and, at this time, the section 32 will be alined with the platen and, therefore, when the platen is operated the impression 49 will be made in this section 32. As the sheet S merely rests lightly on the belts 16, 17 and 18, it is apparent that when the sheet is engaging one of the stop fingers the belts will merely move thereby, but as soon as one of the stop fingers is retracted the sheet will again move with the belts.

The impressions 47, 48, and 49, are all made in alinement on the bill or sheet S. However, under certain conditions, it is desirable that an impression be made on the bill in a position not in transverse alinement with the other impressions. This may be done to facilitate the separation and handling of sections of the sheet S after they are torn from the sheet. In the sheet illustrated in Fig. 5 the impression 50 on the section 33 is out of transverse alinement with the impressions 47, 48 and 49. The mechanism which enables the accomplishment of this is the main feature of my invention and includes the following structure: Mounted on the shaft 34, in the present instance intermediate the cams 43 and 44, is a cam 51 engaged by a roller 52 on the arm 53 of the lever, generally indicated by 54, which lever is pivotally mounted on the shaft 38. At the forward end of the arm 55 of the lever 54 a substantially L-shaped finger 56 is mounted. Mounted along the forward edge of the table 7 is a bracket 57. Pivotally mounted on this bracket structure is an arm 58 which includes spaced apart end portions 59 and 60 including bearing portions in which a shaft 61 is journaled. Mounted on the shaft 61, intermediate the end portions 59 and 60, is a roller 62. A pin 63 depends from the bracket 57 and a spring 64 extends between this pin and the arm 58 and this spring urges the arm downwardly so that the end carrying the roller 62 rests on the foot portion of the L-shaped finger 56. After the impression 49 has been made and the stop finger 41 has been retracted the sheet S starts to move toward the stop finger 42 which moves down into stopping position. At this time the roller 52 moves from the rise of the cam 51 into a depression therein and thus the lever 54 pivots to permit the outer end of the arm 55, and therefore the finger 56, to move downwardly, and the roller 62 therefore moves downwardly into engagement with the sheet S, as clearly illustrated in Fig. 3. The roller 62 rotates in a clockwise direction, as viewed in Fig. 3, and the sheet S is moved transversely of the belts 16, 17 and 18 when the roller is engaged therewith. The amount of this movement depends upon the length of time the roller 62 contacts with the sheet S and this is determined by the length of the depression in the cam 51 for as soon as the roller 52 moves from the depression of the cam onto the periphery thereof the lever 54 is pivoted to elevate the roller 62 and thus disengage it from the sheet S. After the sheet has been moved by the roller 62 and has engaged the stop on the stop finger 42 the platen is operated to make the impression 50 which will manifestly be out of alinement with the previously made impressions. In order to rotate the roller 62 I provide a bevel gear 65 on the shaft 26 and arrange a bearing structure 66 on the shaft 26. In this bearing structure 66 is a shaft 67 on which a bevel gear 68 is secured which meshes with the gear 65. A flexible shaft, generally indicated by 69, interconnects the shafts 67 and 61 and therefore the roller 62 is rotated with the shaft 26. After the impression 50 has been made, the sheet S will be discharged from the machine and a new sheet will move into position to be printed in the above described manner.

The printing operation is performed by the platen 10 which forces the sheet toward the printing device P in printing position, a ribbon 70 being interposed between the printing device P and the sheet. A mask 71 protects the sheet from the ribbon, said mask having an opening 72 therein through which the printing operation is performed.

In the foregoing description, I have set forth how the device is arranged to shift the sheet to cause one impression to be made out of alinement with the other impressions on the bill, and I have described this impression as being the last one to be made. However, by merely changing the location of the device, the sheet may be shifted at any time during its movement thereof past the printing means and by providing two such devices operable in opposite directions the sheet may be shifted so that an impression intermediate longitudinally alined impressions may be offset from the alined impressions. Many modifications of this arrangement may be provided, and all of these are intended to be within the contemplation of my invention.

While I have illustrated and described the preferred form of construction for carrying my in-

vention into effect, it is to be understood that this is capable of variation and modification without departing from the purview of the following claims.

I claim:

1. The combination with a printing machine embodying printing means, and a carrier for moving a sheet past the printing means, of means including an operating part normally disengaged from the sheet and adapted to be engaged with the sheet, the operating movement of said part moving the sheet relative to the printing means and transversely of the movement imparted thereto by the carrier when said part is engaged with the sheet.

2. The combination with a printing machine embodying printing means, and a carrier for moving a sheet past the printing means, of pivotally mounted means including an operating part yieldably urged toward and adapted to engage the sheet, the operating movement of said part moving the sheet relative to the printing means and transversely of the movement imparted thereto by said carrier when said part is engaged with the sheet, and means holding said part out of engagement with the sheet.

3. The combination with a printing machine embodying printing means, a table, and a carrier extending across the table and adapted to move a sheet past the printing means, of means including a part adapted to cooperate with the carrier and table to clamp the sheet and move it relative to the printing means and transversely of the movement imparted thereto by the carrier.

4. The combination with a printing machine embodying printing means, and means for longitudinally moving a sheet to be printed past the printing means, of rotary means for moving the sheet transversely of the means imparting the longitudinal movement to the sheet, means for urging said rotary means into operating position, and means acting against said urging means for holding said rotary means out of operating position.

5. The combination with a printing machine embodying printing means, a carrier for moving a sheet past the printing means, and operating means for said carrier, of means including a rotary part engageable with the sheet to move the same relative to the carrier, and means connecting the rotary part to said operating means.

6. The combination with a printing machine embodying means for moving a sheet, and means for making impressions on the sheet at spaced intervals, of means including a rotary part engageable with the sheet to move the same intermediate operations of the impression making means whereby an impression may be made thereon out of alinement with other impressions made thereon by said impression making means.

7. The combination with a printing machine embodying means for moving a sheet, and means for making impressions on the sheet at spaced intervals, of means for moving the sheet transversely of the first sheet moving means intermediate an operation of said impression means, and means controlling the operation of said last named means and holding the same in an inoperative position intermediate certain of the operations of the impression means.

8. In a printing machine, printing means, means for longitudinally moving a sheet past the printing means, means for interrupting movement of the sheet, means for operating said movement interrupting means, means including a rotary part engageable with the sheet for moving the same relative to the longitudinal movement thereof, means urging said rotary part toward the sheet, and means operable from the means operating said movement interrupting means for controlling movement of said rotary part.

9. In a printing machine, printing means, means for moving a sheet past said printing means whereby a plurality of alined impressions may be made thereon at intervals, and means for moving the sheet in a predetermined amount transversely of the means for imparting longitudinal movement thereto whereby other impressions may be made thereon longitudinally spaced from but out of transverse alinement with the alined impressions.

10. In a printing machine, printing means, carrier belts for longitudinally moving a sheet past the printing means, stop fingers, means for successively moving said stop fingers into operative position for interrupting the movement of a sheet past the printing means whereby successive portions of the sheet may be alined with the printing means to receive impressions from said printing means, a bracket carrying a roller, means for rotating said roller, and means operable from the means for moving said stop fingers into operative position for lowering the rotating roller into engagement with the sheet to move said sheet transversely of said carrier belts.

11. In a printing machine, a bed, shafts opposite ends of said bed, means for synchronically operating said shafts, carrier belts directed across said bed and about said shafts and adapted to successively move sheets longitudinally across said machine past said printing means, means for interrupting the movement of said sheets with said carrier belts and adapted to aline different portions of the sheets with the printing means whereby impressions may be made at spaced intervals on said sheets, and means operable from one of said shafts for moving said sheets transversely of said carrier belts intermediate successive operations of said printing means whereby certain of said impressions may be made on said sheets out of longitudinal alinement with other impressions on said sheets.

12. In a printing machine, printing means, a bed, sheets opposite ends of said bed, carrier belts directed about said shafts and across said bed for moving sheets longitudinally of the machine past said printing means, stop fingers, a cam shaft for moving said stop fingers into position to interrupt movement of said sheets whereby successive portions thereof may be alined with said printing means to receive impressions at spaced intervals thereon from said printing means, sheet moving means constantly operated from one of said shafts and normally held in an inoperative position, and means controlled from said cam shaft for moving said sheet moving means into operative position whereby said sheets may be moved transversely of said belts so that certain impressions may be made thereon from said printing means out of longitudinal alinement with other impressions.

13. In a printing machine, a bed, printing means, means for longitudinally moving a sheet past said printing means whereby impressions may be made at spaced intervals thereon, and means carried by said bed and including a roller for moving the sheet transversely of the longitudinal movement thereof, said roller being intermittently engaged with the sheet whereby impressions may be made on the sheet out of transverse alinement with other impressions made thereon.

FRANKLIN EDWIN CURTIS.