March 18, 1941. C. F. WEBB 2,235,130

TICKET-ISSUING MACHINE

Filed Dec. 16, 1939 2 Sheets-Sheet 1

Fig. 1.

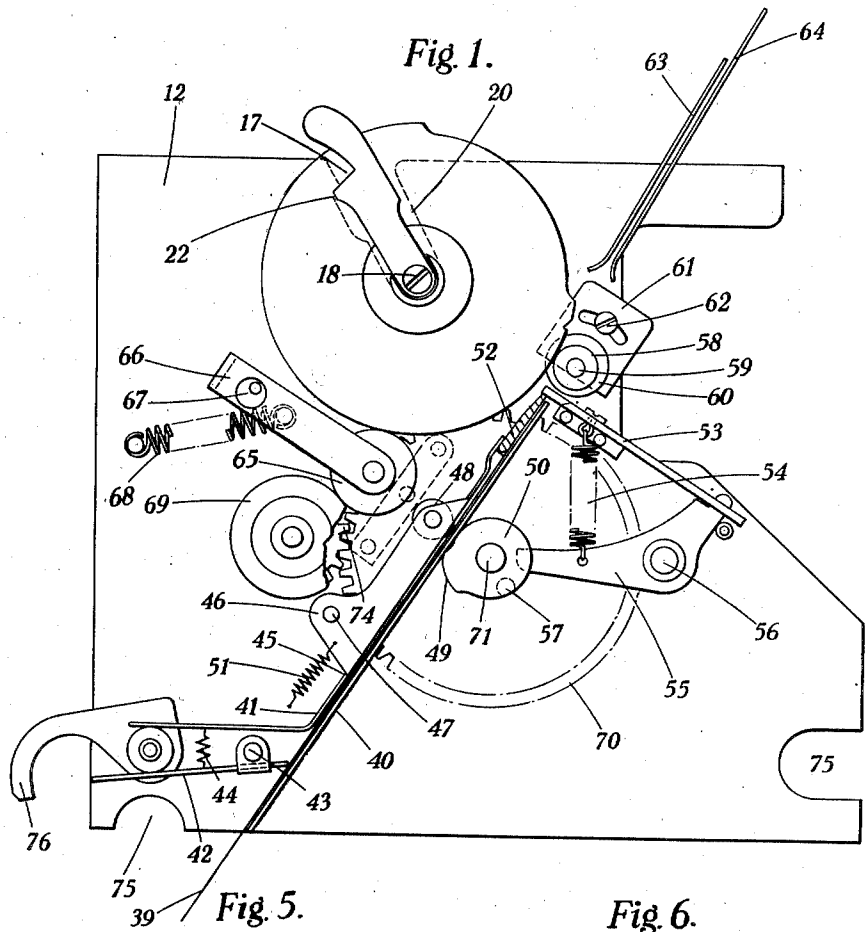


Fig. 5.

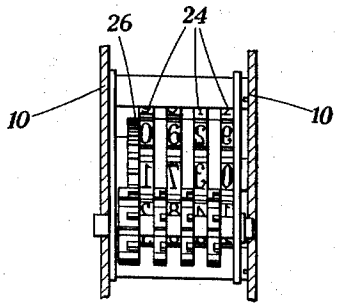
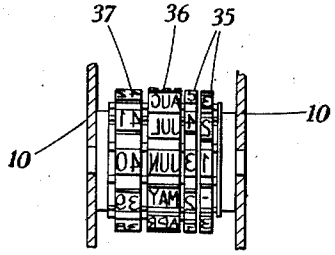


Fig. 6.



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TICKET-ISSUING MACHINE

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Fig. 2.

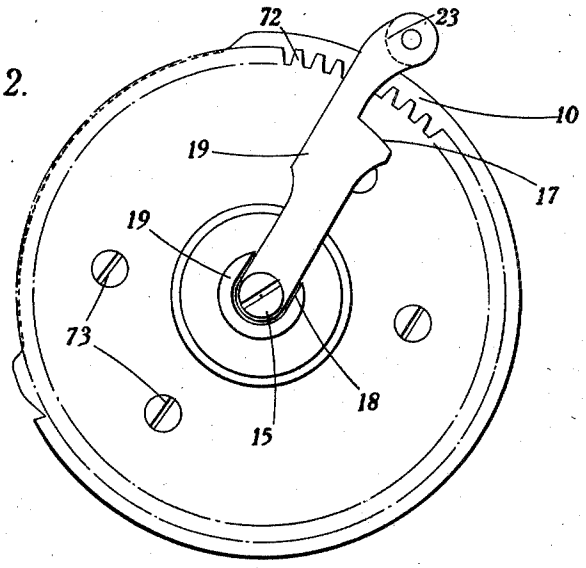


Fig. 3.

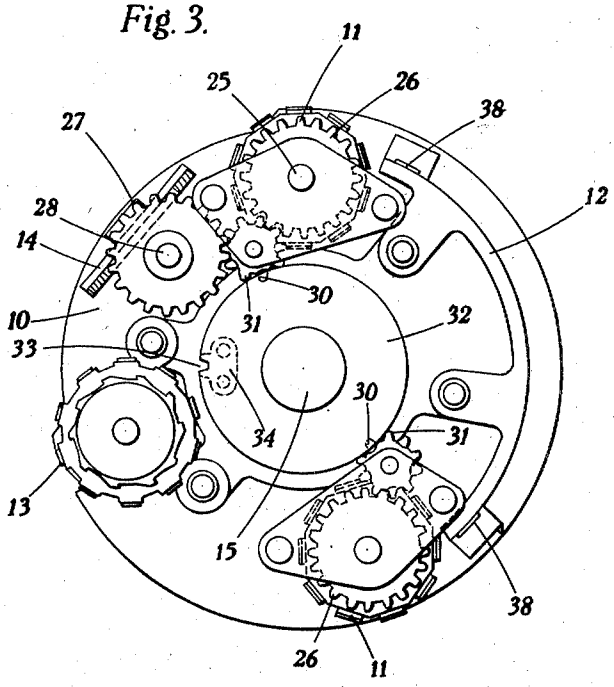
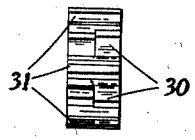


Fig. 4.



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2,235,130

UNITED STATES PATENT OFFICE

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TICKET-ISSUING MACHINE

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Application December 16, 1939, Serial No. 309,535
In Great Britain December 4, 1938

2 Claims. (Cl. 101—227)

This invention has for its object to provide an improved machine for the printing and issuing of tickets, receipts, vouchers and the like, such tickets being produced from a continuous web of paper retained in the machine.

The invention comprises a machine as aforesaid in which the ticket is first printed, while still forming part of the continuous web, with a portion of the matter to be printed thereon, the ticket being subsequently severed from the strip and after such severing being printed with the remaining part of the aforesaid matter.

The accompanying drawings show one manner of carrying the invention into effect.

Fig. 1 is a side elevation of a ticket printing and issuing machine constructed in accordance with the invention, the parts of the machine which are not essential to the understanding of the invention being omitted.

Figs. 2 and 3 show, to a larger scale than Fig. 1, a side elevation and sectional side elevation respectively of the removable printing head.

Fig. 4 is an end view of a detail in the aforesaid printing head.

Figs. 5 and 6 show respectively a number printing device and a date printing device incorporated in the printing head.

The machine illustrated is adapted to print each ticket with the following matter in the following order: a serial number at or near one end of the ticket; the main body of the ticket, for example the price of the ticket, the issuing station and the destination; a repeat of the serial number previously printed; and at or near the other end of the ticket the date of issue. The ticket printing and issuing mechanism illustrated in the drawings is shown in the form of a unit which can be positioned in and readily removed from a casework, a plurality of such units being preferably arranged in the one casework and being operated from a single electric motor or other convenient source of power. In the example shown the unit comprises a pair of side plates 21 (one only of which is shown) between which the parts of the printing and issuing mechanism are contained, the said plates being formed with recesses 75 whereby the unit can be supported on suitable members, for example rods, in the casework, and with a catch piece 76 which can be hooked under one of the said members to hold the unit in position.

The various printing members of the unit are carried in a printing head which is constructed to be readily removable from the ticket issuing unit so as to permit the printing of different kinds of tickets in the same unit. This removable printing head is illustrated in detail in Figs. 2 and 3 and comprises a pair of parallel plates 10 between which are carried a pair of number printing devices 11 arranged at opposite sides of the axis of rotation of the head, a curved support 12 for a printing stereo, a date printing arrangement 13 and a counter 14. The plates 10 are rotatable around a spindle 15 and to the ends of this spindle are secured by screws 18 the free ends of the arms 16 of a yoke piece arranged to embrace the printing head. The arms 16 are each formed with a shoulder 17 for a purpose hereinafter described and the ends of the spindle 15 are formed with a groove 19 in which the ends of the arms 16 are located to prevent relative movement between the yoke piece and the spindle 15. When the printing head is positioned in the ticket issuing unit the ends of the spindle 15 rest in the lower ends of recesses 20 in the side plates 21 of the unit and the shoulder 17 is located below a shoulder 22 in the slot 20 as shown in Fig. 1, the yoke being held in this position by a pivotal catch piece (not shown) which can engage over the cross member 23 (Fig. 2) of the yoke piece. To remove the printing head from the ticket issuing unit the catch piece aforesaid is lifted to release the cross piece 23 and after swinging the yoke through a small distance in a clockwise direction as viewed in Fig. 1 the printing head can be lifted out of the unit.

Each number printing device 11 comprises a set of figure wheels 24 (Fig. 5) bearing the figures 0 to 9 and rotatably mounted on a spindle 25 carried between the side plates 10. To the units figure wheel is connected a gear wheel 26 by means of which the units wheel can be rotated through one digit at a time, the transfer to the 10's figure wheel being effected after each complete rotation of the units wheel by any known form of transfer mechanism. Also the counter 14 is of known form and is advanced by means of a gear wheel 27 which gear wheel and the figure wheels of the counter are mounted on a spindle 28. The counter is supported in the printing head by a frame 29 secured in any convenient manner to the plates 10.

The upper number printing device 11 (as viewed in Fig. 3) and the counter 14 are actuated from a common pinion, end view of which is shown in Fig. 4, this pinion in effect comprising two pinions, the one a 10-tooth pinion 30 arranged in engagement with the gear wheels 26, 27 and a 5-tooth pinion 31 the teeth of which

coincide with alternate teeth of the pinion 30. As shown more particularly in Fig. 4 these two pinions are constructed integrally one with the other but for simplifying the description they may be regarded as two separate but interconnected parts.

Situated between the plates 10 and secured to the spindle 15 is a circular plate 32 formed at one side with a recess 33 and to the rear side of the plate 32 (as viewed in Fig. 3) is secured a part 34 shaped as shown in Fig. 3 and formed with a recess arranged to coincide with the recess 33. The arrangement of parts is such that the part 34 lies in the path of movement of the teeth 30 while normally the pinion 31, and hence also the pinion 30, is held against movement by two of the teeth of the pinion 31 running on the circumference of the plate 32 as shown in Fig. 3. When, however, during the rotation of the plates 10 the pinion 30 reaches the part 34 the tooth of the pinion 30 which extends beyond the periphery of the plate 32 engages with the leading end of the part 34 and when passing over the latter the pinion 30 is rotated through two teeth, the intermediate tooth moving into the recess in the part 34. During this rotation of the pinion 30 the pinion 31 is rotated through one tooth, the said tooth passing into the recess 33 during rotation of the pinion. Hence therefore after the pinions 30 and 31 have passed the part 34 the pinion 30 will have been rotated through two teeth and the pinion 31 through one tooth and two teeth of the pinion 31 will again be resting on the circumference of the plate 32 so as to hold the pinions against movement until the plates 10 have completed a further rotation. The gear wheels 26 and 27 which engage with the pinion 30 are each provided with 20 teeth so that rotation of the pinion 30 through two teeth produces a rotation of each gear wheel of one tenth of a revolution and therefore serves to advance the number printing device and the counter by one digit. It will be apparent that each rotation of the plates 10 serving to print one ticket also serves to increase the number printing device and the counter by one digit. It will be observed that Figs. 2 and 3 show the reverse side of the printing head to that shown in Fig. 1, the head being arranged to rotate in a counter-clockwise direction as viewed in Fig. 1 and in a clockwise direction as viewed in Figs. 3 and 4.

The lower number printing device (as viewed in Fig. 3) is advanced in exactly the same manner as the upper number printing device and is associated with a second combined pinion 30, 31.

The date printing device is of well-known form and comprises number wheels 35 for printing the day of the month, a wheel 36 for printing the month in words, and a wheel 37 for printing the last two figures of the year, these wheels being adjusted by hand to the required positions at the commencement of each day's issue of tickets.

The curved support 12 is intended to carry a curved printing stereo (not shown) which may be secured to the support by any suitable means, for example screws 38.

The printing mechanism including the removable printing head is shown in side elevation in Fig. 1, the parts of the mechanism not essential to the understanding of the invention having been omitted. As shown in Fig. 1 the blank ticket strip 39, which is fed off a reel (not shown), passes between ticket guides 40 and 41, the ticket strip being prevented from slipping downwardly when released by the printing mechanism by means of a gripper piece 42 pivotally mounted at 43 and acted upon by a spring 44 serving to hold the gripper 42 in contact with the paper web 39. The arrangement is such that the web 39 can be moved comparatively freely in an upward direction but is prevented from moving downwardly by the end of the gripper 42 biting into the web. The guides 40 and 41 are supported in the unit by any convenient means (not shown). Located in an aperture 45 formed in the guide 41 is a part 46, the said part being pivotally mounted at 47 and carrying at its upper end a roller 48 arranged to cooperate with a raised portion 49 of a rotary part 50 to advance the ticket strip in an upward direction, the roller 48 being urged in a direction towards the part 50 by means of a spring 51 secured to the part 46.

At the upper end of the ticket guides 40, 41 is located mechanism for severing the tickets from the strip, this mechanism comprising a fixed knife blade 52 and a movable knife blade 53, the leading end of the latter resting on the upper end of the fixed blade 52 and being inclined to the direction of movement of the movable blade 53 so as to produce a shearing action. The movable blade is held in position in contact with the fixed blade 52 by means of a spring 54 and is actuated by means of a bell crank 55 pivotally mounted at 56 and having one end projecting through a hole in the movable blade 53 and the other end lying in the path of movement of a pin 57 carried on the rotary part 50. The part 50 is arranged to rotate in a clockwise direction as viewed in Fig. 1 and when the pin 57 engages the bell crank 55 the knife blade is moved from the open position shown in Fig. 1 to sever the ticket strip, the bell crank 55 and the movable blade 53 being restored to their original positions by the spring 54, which is connected as shown between the bell crank and the movable blade, after the pin 57 has released the end of the bell crank.

Situated above the knife mechanism is a platen roller 58 made of rubber, felt or other suitable material, this platen roller being adapted to cooperate with the printing surfaces in the printing head to print the ticket and at the same time advance the same through the machine. The roller 58 is mounted on a spindle 59 carried by an eccentric 60 mounted in a plate 61 adjustably secured by means of a screw 62 to one of the side plates 21 of the machine, the screw 62 and eccentric 60 permitting the pressure between the platen roller 58 and the printing surfaces to be adjusted. Above the platen roller are situated ticket guides 63 and 64 through which the ticket is ejected after printing.

The printing surfaces are inked through the intermediary of a roller 65 carried at the end of an arm 66 pivotally mounted on an adjustable eccentric 67 and acted upon by a spring 68 serving to urge the roller 65 into contact with a roller 69 to which ink is supplied from any convenient source (not shown).

The parts of the unit receive movement from a gear-wheel 70 secured to the spindle 71 to which the part 50 is fixed, a gear wheel 72 secured by screws 73 to one of the plates 10 being arranged to engage with the gear wheel 70 when the printing head is located in its operating position in the unit. Hence therefore rotation of the gear wheel 70 will effect rotation of the printing head. Also the gear wheel 70 engages with a pinion 74 connected to the inking roller 69. The gear wheel

70 receives movement from any convenient source of power, for example an electric motor, the circuit of which can be completed and interrupted at the appropriate times by any suitable known type of mechanism. As the means for driving the gear wheel 70 form no part of the present invention they have not been shown in the drawings.

The operation of the mechanism above described is as follows:

With the machine at rest the upper end of the ticket strip 39 lies at the knife mechanism, this end having remained at this point since the severance from the strip of the previous ticket. At the commencement of a cycle of operations, which may be initiated in the usual manner by depression of a button or a key, the raised portion 49 of the rotary part 50 first engages the strip and advances the same through a small amount sufficient to move the leading end of the strip up to the platen roller 58. Immediately afterwards the strip is picked up by the lowermost number printing device (Fig. 3) which simultaneously with the printing of a serial number advances the strip a still further small amount. Subsequently the ticket strip is engaged and printed by the stereo which advances the strip through a distance equal to the length of the printed matter on the stereo, the ticket strip remaining at rest during the interval between its advance by the raised portion 49 and printing by the number device and during the interval between the latter printing and printing by the stereo, and being held against rearward movement during these intervals by the gripper piece 42. Immediately after the stereo has released the ticket strip and the latter has again come to rest, the strip is printed by the second number printing device, such operation serving to advance the strip a further small amount, and immediately after this the strip is severed by the knife, the point of severance being spaced a small distance from the second serial number. Subsequent to the severing of the partially printed ticket from the strip the ticket is engaged at the position between the serial number last printed and the newly severed end by the dating device which simultaneously serves to print the date of issue on the ticket and to eject the latter from the machine.

By suitable adjustment of the mechanism the printed matter on the ticket can be printed as near each end of the latter as may be required. In the arrangement above described a portion of the ticket matter is printed while the ticket still forms part of the strip, the ticket being then severed from the strip and being subsequently ejected from the unit by means serving to print the remaining portion of the printed matter on the ticket.

By this invention we are able to provide a ticket printing and issuing machine of simple and efficient construction which can print the required matter on the ticket with a minimum of paper waste. This is in contradistinction to the majority of ticket printing and issuing machines at present in use which either have to leave an appreciable gap between each end of the ticket and the printed matter or have to incorporate complicated mechanism for overcoming this defect. Also in view of the fact that the ticket is severed from the strip after the printing thereon of the stereo matter the length of the ticket automatically adjusts itself to the amount of printed matter to be applied to the ticket. Further, by the provision of a readily removable printing head the type or class of ticket printed in the machine can be rapidly altered.

The invention is not limited to the example above described as subordinate details of construction can be varied to meet different requirements.

I claim:

1. A ticket printing and issuing machine comprising means providing a guideway for a ticket strip, severing means for cutting transversely a strip moving along said guideway, a rotary member carrying a plurality of printing elements spaced circumferentially and arranged to engage said strip at a location beyond said severing means in the direction of movement of the strip, thereby to print and feed said strip along the guideway, means effecting location of a leading end of the strip in position for engagement by one of said printing elements, and means arranged in a cycle of operation of the machine to operate said severing means between feeding movements of the strip under the action of said circumferentially spaced printing elements, so that the unsevered strip is printed and fed by one of said spaced printing elements prior to severing, and final printing and feeding of the strip takes place by the action of another of said printing elements on the severed portion thereof after the severing operation.

2. A ticket printing and issuing machine comprising means providing a guideway for a ticket strip, severing means for cutting transversely a strip moving along said guideway, a rotary member carrying a plurality of printing elements spaced circumferentially and arranged to engage said strip at a location beyond said severing means in the direction of movement of the strip, thereby to print and feed said strip along the guideway, means imparting at the beginning of a cycle of operation of the machine an initial movement to the strip to bring its leading end in position for engagement by one of said printing elements, and means arranged in a cycle of operation of the machine to operate said severing means between feeding movements of the strip under the action of said circumferentially spaced printing elements, so that the unsevered strip is printed and fed by one of said spaced printing elements prior to severing, and final printing and feeding of the strip takes place by the action of another of said spaced printing elements on the severed portion thereof after the severing operation.

CHRISTOPHER FREDERICK WEBB.