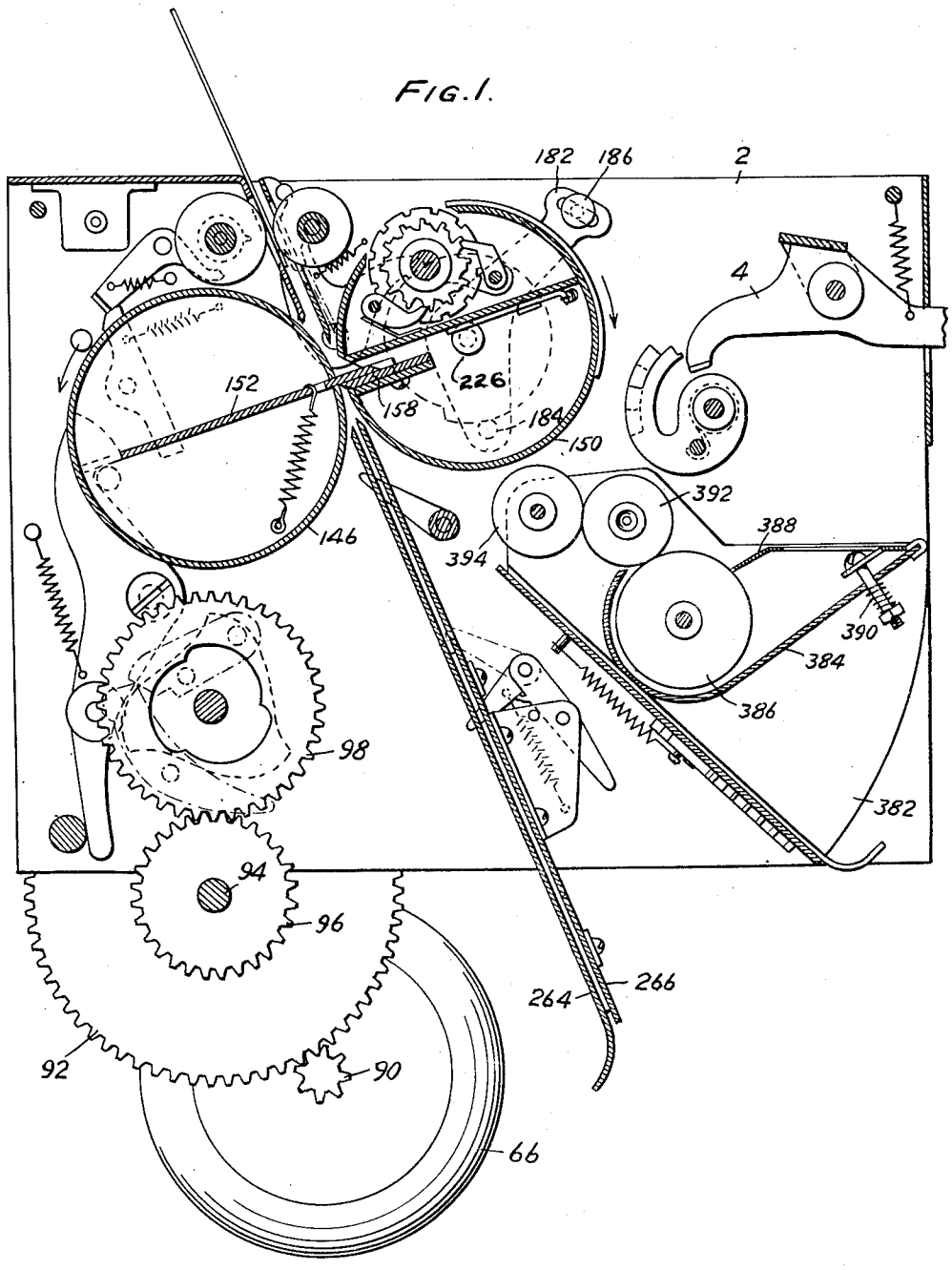
June 21, 1938. R. H. HELSEL 2,120,976

TICKET ISSUING MACHINE

Original Filed April 10, 1933 2 Sheets-Sheet 1

FIG. 1.



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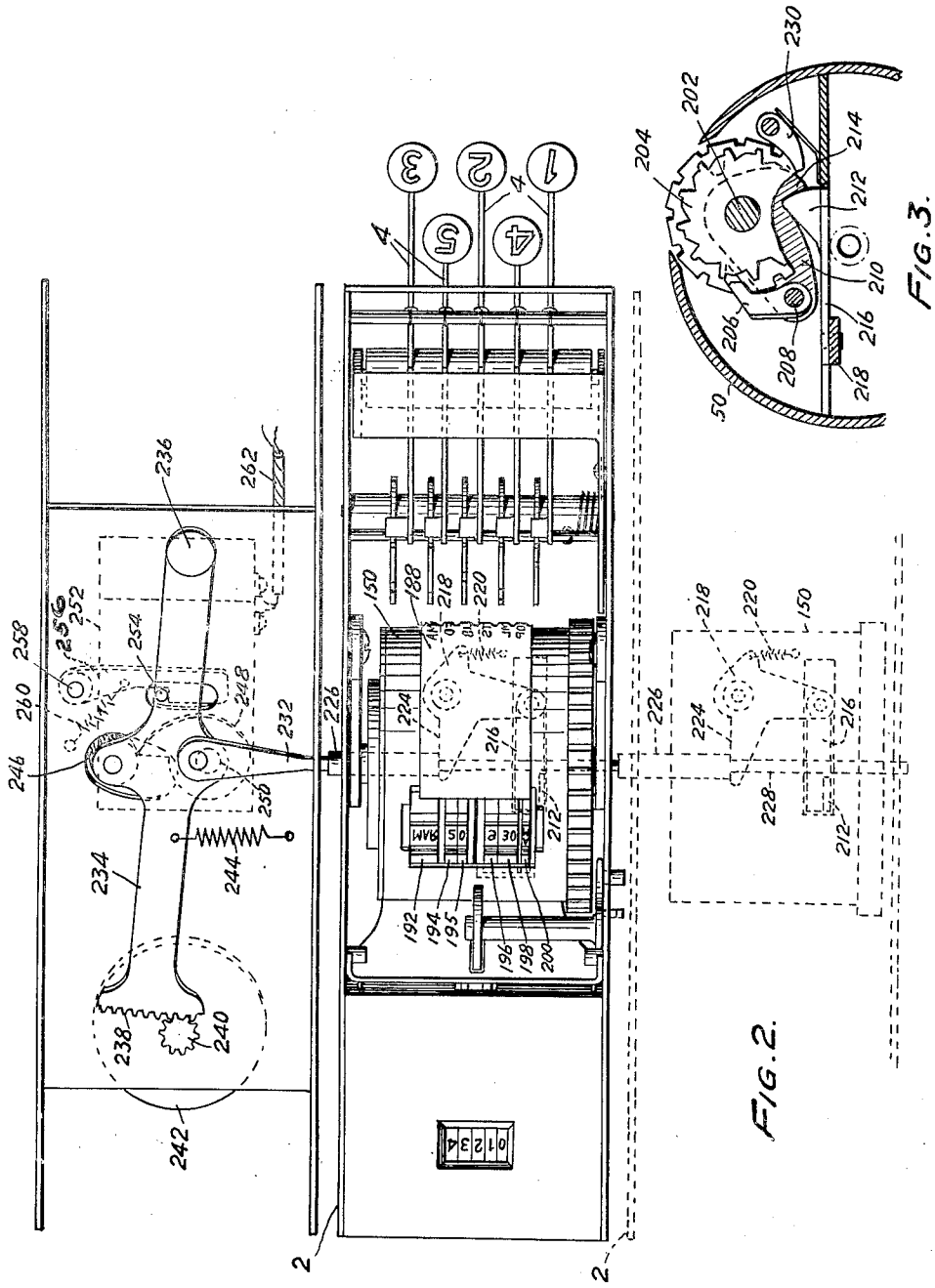

FIG. 3.

FIG. 2.

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TICKET ISSUING MACHINE

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Original application April 10, 1933, Serial No. 665,386, now Patent No. 2,097,485, granted November 2, 1937. Divided and this application October 12, 1935, Serial No. 44,647

6 Claims. (Cl. 235—31)

This invention relates to ticket issuing machines and more particularly to machines for issuing tickets or checks for theatres, restaurants, amusements, railways, busses, or the like. The invention is primarily directed to a type of mechanism which with slight modifications is adapted for various uses, for example, in the issue of preprinted tickets or the printing and issuing of tickets accomplished either by selective operation of keys or by automatic operation initiated by removal of a ticket presented to a patron of, for example, a cafeteria. This application is a division of my Patent No. 2,097,485, granted Nov. 2, 1937. In the parent application a preferred embodiment of the invention is described in detail. Since the present application concerns only certain features of the invention, the complete details are not disclosed and reference may be made to the parent application therefor.

It is the object of the invention involved in the present case to provide in a machine of the character described means for printing on the tickets the time of issue. The printing of the time in conjunction with a date which may be preprinted on the ticket or printed thereon simultaneously with the time when the ticket is issued is particularly important in connection with transfers or other tickets which should become invalid after the expiration of a limited time. In accordance with the present invention, mechanism is provided for printing the time on the issued tickets, the time-printing means being preferably controlled by a synchronous alternating current motor driven from the usual commercial alternating supply of controlled constant frequency so that the time printed on the tickets is accurately indicated. The intervals at which the type faces are changed for printing the time may vary. For example, the interval may be one minute, five minutes, or even longer, depending upon the particular desires of the user of the mechanism. In the mechanism illustrated herein intervals of five minutes are indicated as such intervals are usually sufficient for taking care of the time limits of the validity of transfers or the like. Of course the time printing mechanism may be used where it is merely desirable to have a check upon the concentration of patrons throughout any intervals.

The machines of the type disclosed in said parent application are particularly adapted to be associated as a plurality of units. The operating mechanism for changing the time printing device is so arranged that a single controlling clock mechanism, whether motor or spring operated, will control the time printing devices of all of the units. Specifically this is accomplished by providing plungers extending transversely of the various units and contacting with each other so that impulse received at one end of the series will be transmitted through them for the simultaneous actuation of the time printing devices of each. Such plungers may also be provided if the time printing mechanisms are to be manually changed.

The above and other objects of the invention particularly relating to details of construction will become apparent hereafter from the description read in conjunction with the accompanying drawings, in which:

Fig. 1 is a vertical section of the unit taken transversely to the driving shaft and showing relations between the various parts;

Fig. 2 is a plan view of a unit associated with the time printing controlling devices and also illustrating in construction lines an adjacent unit to show the simultaneous operation by the timing mechanism; and

Fig. 3 is a transverse section through a portion of the printing roller illustrating the mode of operation of the time printing mechanism.

In view of the fact that the invention claimed in this application concerns only a portion of the ticket issuing machine described in the parent application, there is illustrated herein only so much of the apparatus as is necessary for an understanding of the subject matter claimed. Reference may be made to the parent application for a complete disclosure of details.

A complete ticket issuing machine comprises a plurality of units which may be arranged side by side and driven by a common motor. Each of these units, one of which is illustrated in Fig. 1 and also at the central portion of Fig. 2, comprises a frame 2 formed by side plates and transverse connecting members to provide proper support for the operating parts. The operation of each unit is controlled by the actuation of any one of a plurality of keys 4 thereof which may be selectively operated to effect the issue of predetermined numbers of tickets, for example, in the machine illustrated, one to five tickets. The controlling mechanism whereby this selective operation is secured is not illustrated herein in detail since it forms no essential part of the invention herein claimed. Drive of the various parts to issue the tickets is secured from a common motor indicated at 66, driving through a pinion 90 a gear 92 secured to a transverse shaft 94 extending below all of the units. This transverse shaft 94 carries a plurality of gears 96

corresponding in number to the number of units associated together. When a unit is placed within the usual housing a gear 98 therein automatically meshes with the corresponding gear 96 to provide a driving connection between the unit and the motor. At the same time, as described in the parent application, connections are made so that actuation of a key will result in closure of the motor circuit.

The gear 98 of each unit drives through a suitable clutch, controlled by the keys, intermediate gearing and thereby a backing roller 146 which cooperates with a printing roller 150, the strip being led between these rollers from a guide provided by parallel plates indicated at 264 and 266. Feed of the ticket strip is effected by the two rollers just mentioned, specifically by the clamping of the ticket between the printing surfaces of the roller 150 and the backing roller 146. The printing surfaces of the roller 150 comprise one or more plates 188 and a dating and time printing mechanism hereafter described in detail. Adjustment of the roller 150 to secure proper printing is effected by the mounting of its hollow trunnions in levers 182, which are pivoted at 184 and held in adjusted position by screws 186. By this means the pressure of the printing surfaces upon the tickets may be finely adjusted.

Severing of the issued tickets, which preferably occurs only at the end of each series to be issued, is effected by the cooperation of a moving knife 152 carried by the roller 146 with a fixed knife 158 carried by the roller 150. Connections are provided whereby the movable knife is positively actuated in both directions. Inking means for the printing cylinder is indicated in Fig. 1 and comprises a housing 382 guided in the machine frame and including an ink well 384 into which extends a transfer roller 386 engaged by a scraper 388 urged by a spring 390 against the roller. The ink from the roller 386 is transferred to an intermediate roller 392 which serves to produce a uniform distribution of ink and is thereby transferred to the inking roller 394. These rollers are driven by suitable gearing meshing with a power driven gear, thus insuring proper inking operation. The printing cylinder carries a dating head which may be of any desired construction and which is shown specifically as provided with a plurality of cylinders indicated at 192, 194, 195, 196, 198 and 200. The first of these is provided with type so that it may print the month. The next two are adapted to print the day of the month. The three just mentioned are arranged to be moved by hand, being reset daily. The last three, however, are preferably automatically actuated and comprise the cylinder 196 carrying numbers representing the hours, the cylinder 198 carrying numbers representing, say, every five minutes of the hour, and a cylinder 200 carrying alternate type surfaces indicating "A. M." and "P. M." Associated with each of the last three cylinders is a ratchet plate 204 moving with the corresponding cylinder, all of the cylinders being journalled upon a cross shaft 202 fixed in the printing cylinder. Pawls 206 pivoted at 208 upon a rocking lever 210 journalled on the shaft 202 are arranged to advance the three cylinders when the lever 210 is oscillated. The arrangement of pawls and ratchet is conventional and need not be discussed in detail. It is only necessary to say that whenever the arm 210 is rocked the minute cylinder is advanced one step, this rocking occurring in the present instance once every five minutes so that there are provided twelve printing surfaces upon the cylinder 198. Upon each revolution of the minute cylinder 198 the pawl 206 corresponding to the hour cylinder 196 becomes active to advance the hour cylinder one step, this pawl having previously been held inactive by reason of the shallow depth of the spaces between the teeth of the ratchet associated with the minute cylinder. Again every time the hour cylinder completes a revolution the pawl 206 associated with the semi-diurnal cylinder 200 is advanced one step to change the designation from "A. M." to "P. M.", or vice versa. The lever 210 is rocked through the action of a cam 212 which, when it moves to the left as viewed in Fig. 3, gives the pawls 206 their active movements and on its return stroke retracts these pawls by engagement with the tail 214 provided on the lever 210. The pawls are thereby advanced and retracted positively. The cam 212 is carried by a slide 216 connected to a lever 218 pivoted on a web within the printing cylinder and urged in a clockwise direction, as viewed in Fig. 2, by a spring 220. An arm 224 of the lever 218 is engageable by a shoulder of a pin 226 which projects through the hollow trunnions of the printing cylinder, extending completely through the frame of its unit to engage the end of another pin 226 in an adjacent unit, as indicated in Fig. 2, a portion 228 of each pin being reduced in size to provide in a simple fashion the actuating shoulder which, it will be noted, extends completely about the pin.

It may be noted that the cylinders 196, 198 and 200 are held against reverse movements by pawls 230 spring-pressed into engagement with the ratchet teeth.

Axial movements must be imparted to the pins 226 arranged in series in the adjacent units in order to rock the levers 210 and thereby advance the time cylinders. To accomplish this there is provided an arrangement of the type indicated in Fig. 2. A plunger 232 is guided through a side plate to engage the end of the nearest pin 226. This plunger 232 is pivoted to a lever 234 which is pivoted to the frame as indicated at 236. The lever 234 at its free end is formed as a gear segment 238 meshing with the pinion 240 secured to a shaft which carries a flywheel 242 in the form of a metallic disc. A spring 244 normally urges the lever downwardly as viewed in Fig. 2, urging a cam follower 246 into engagement with a cam 248 secured to a shaft 250 which is driven at a proper slow speed by a clock mechanism 252. In the present instance the cam 248 would be driven so as to make one revolution in five minutes. The lever 234 carries a downwardly extending pin 254 engageable with a lever 256 pivoted at 258 and urged in a clockwise direction as viewed in Fig. 2 by a spring 260.

In the operation of this device the cam 248 rotates clockwise, first moving the lever 234 against the tension of spring 244 until the pin 254 clears the hook of the lever 256. The lever 256 then snaps to the left whereupon the follower 246 is released by the cam 248 with the result that counterclockwise movement of the lever 234 is then prevented only by engagement of the pin 254 with the hook of lever 256. As the cam continues to revolve, it engages lever 256, rocking it counterclockwise and eventually releasing the pin 254 so that the spring 244 will move the lever 234 counterclockwise, thereby imparting a working stroke to the plunger 232. The arrangement indicated provides a rapid movement of the plunger 232 at a predetermined time even though

the interval between the strokes of this plunger may be quite long. The flywheel **242** is provided to supply inertia so that the plunger **232** does not have too rapid a stroke and will accordingly properly operate the pawls **206**. Following this release of the lever **234**, it is again slowly moved to its tensioned position preparatory to a subsequent movement of the plunger.

The arrangement which has been described is particularly adapted for operation by an electrical clockwork mechanism driven by a synchronous motor. The leads to this motor are indicated at **262**. Since, in general, at the present date alternating current is available in most localities at a very closely controlled frequency so that a synchronous motor driven clockwork mechanism will keep extremely accurate time, and since the ticket issuing mechanism would, in case alternating current is available, be driven by an alternating current motor, the wires **262** may be directly connected to the source of current supply of the motor. There is thereby not only obtained great accuracy of timing, but also a convenient arrangement which requires no winding and no care except preliminary setting when the mechanism is placed in operation. If such controlled alternating current is not available there may, of course, be provided a spring operated clockwork mechanism or an electrically driven clockwork mechanism in which a motor is used to automatically wind up a spring. A synchronous clock drive, however, is greatly to be preferred, since smoothness and accuracy are thereby obtained and suitable gearing may be readily provided to insure the proper speed of rotation of a mechanism such as the cam **248**.

In place of the mechanical arrangement shown, numerous other means may be provided to actuate the printing mechanism even though the plungers **226** are used. For example, a plunger of an electromagnet may engage the nearest of the plungers **226**, the electromagnet being energized at suitable intervals. Manual operation may, of course, be used. The plunger operation of the time printing mechanism is very desirable because of its applicability to the synchronous operation of the plurality of ticket issuing units in the manner indicated. It will be obvious that due to the annular construction of the shoulder of the plungers operation will take place irrespective of whether or not a printing roller happens to be rotating.

What I claim and desire to protect by Letters Patent is:

1. A ticket issuing machine including ticket strip guiding means; rotary means for printing the time of issue on a ticket, said printing means making a complete revolution in each operation; and means for changing the time printing means, said last means including a continuously running synchronous motor and connections from the motor to the time printing means, said connections including a spring operated member, and means whereby the motor gradually stores up energy in the spring and causes the spring to quickly operate said member, the connections being effective to operate the printing means during its stationary or rotating condition.

2. A ticket issuing machine including ticket strip guiding means; means for printing the time of issue on a ticket; and means for changing the time-printing means, said last means including a continuously running synchronous motor and connections from the motor to the time printing means, said connections including a lever, a spring urging the lever in a direction in which its movement would change the time printing means, a cam driven by the motor for moving the lever against the effort of the spring, means for holding the lever in position under spring tension following release by the cam, and means for tripping the last named means whereby the spring may move the lever.

3. A ticket issuing machine including ticket strip guiding means; means for printing the time of issue on a ticket; and means for changing the time-printing means, said last means including a continuously running synchronous motor and connections from the motor to the time printing means, said connections including a lever, a spring urging the lever in a direction in which its movement would change the time printing means, a cam driven by the motor for moving the lever against the effort of the spring, means for holding the lever in position under spring tension following release by the cam, means for tripping the last named means whereby the spring may move the lever, and a member having substantial inertia moving with the lever to thereby limit the rapidity of its movement.

4. In combination in a ticket issuing machine, a removable unit including ticket strip guiding means, a rotary cylinder, means carried by the cylinder for printing the time of issue on a ticket, and means including a plunger extending within the cylinder and movable along its axis for changing the time printing means; and a time responsive mechanism relatively fixedly secured in the machine and having a member cooperable with said plunger to change the time printing means, said plunger and member being automatically brought into cooperation with each other when said unit is located in the machine.

5. A ticket issuing machine including ticket strip guiding means; rotary means for printing the time of issue on a ticket, said printing means making a complete revolution in each operation; and means for changing the time printing means, said last means including a continuously running synchronous motor and connections from the motor to the time printing means, said connections including a spring operated member for imparting energy to said changing means for changing the time printing means, and means whereby the motor gradually stores up energy in the spring and causes the spring to quickly operate said member, the connections being effective to operate the printing means during its stationary or rotary condition.

6. Ticket issuing mechanism comprising a plurality of units; each of said units including ticket strip guiding means, a rotary cylinder, means carried by the cylinder for printing the time of issue on a ticket, and means for changing the time printing means, said last named means including a plunger extending through the cylinder and movable along its axis to change the time printing means; said units being arranged side by side with their rotary cylinders axially aligned and with the plunger of one unit arranged to engage and axially move the plunger of an adjacent unit to effect simultaneous changes of the time printing means of both units.

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