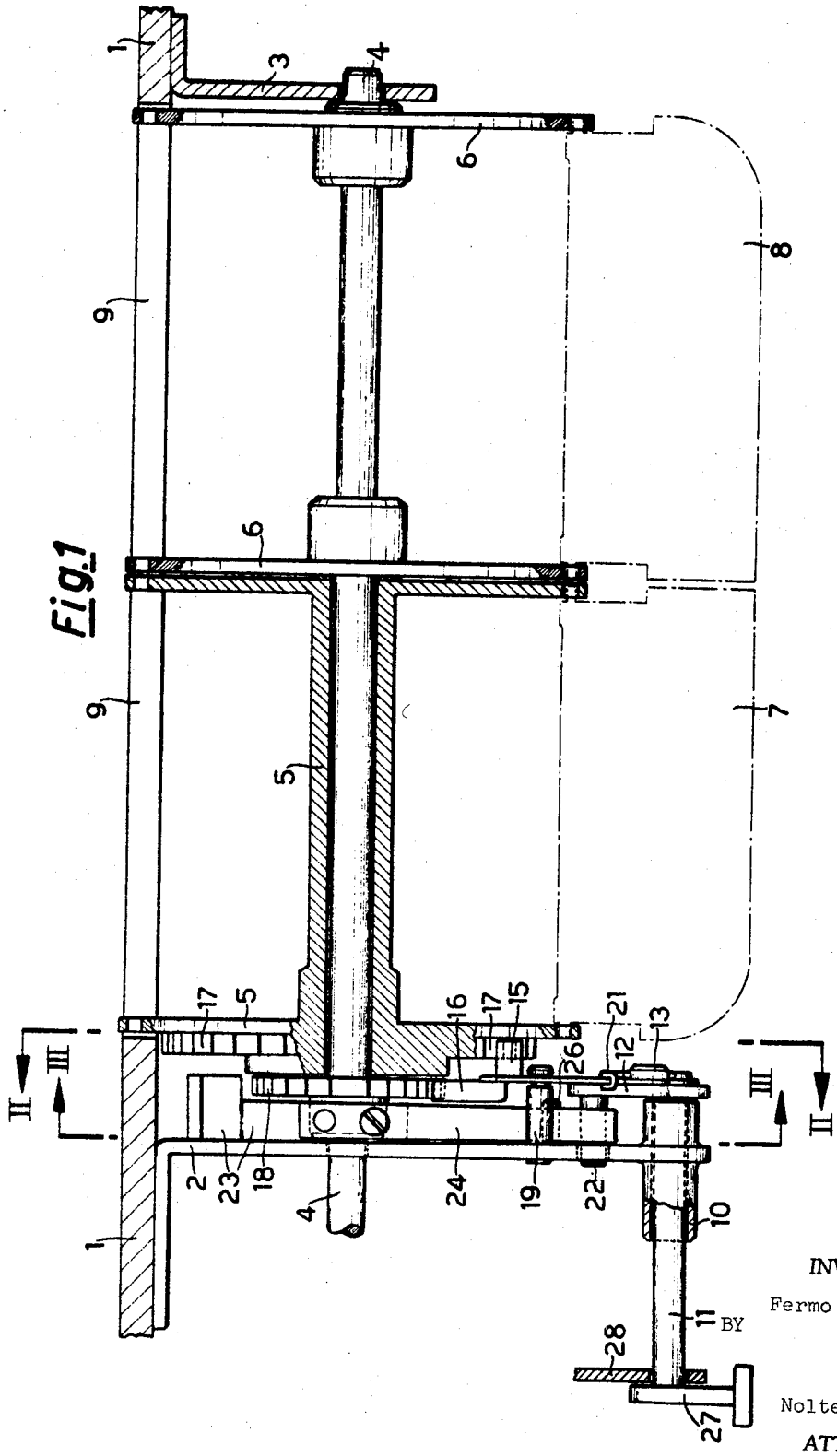
Sept. 10, 1968 F. SOLARI 3,400,598

DEVICE FOR CONTROLLING THE ADVANCE OF DRUMS IN A DISPLAY DRUM APPARATUS

Filed May 24, 1966 3 Sheets-Sheet 1

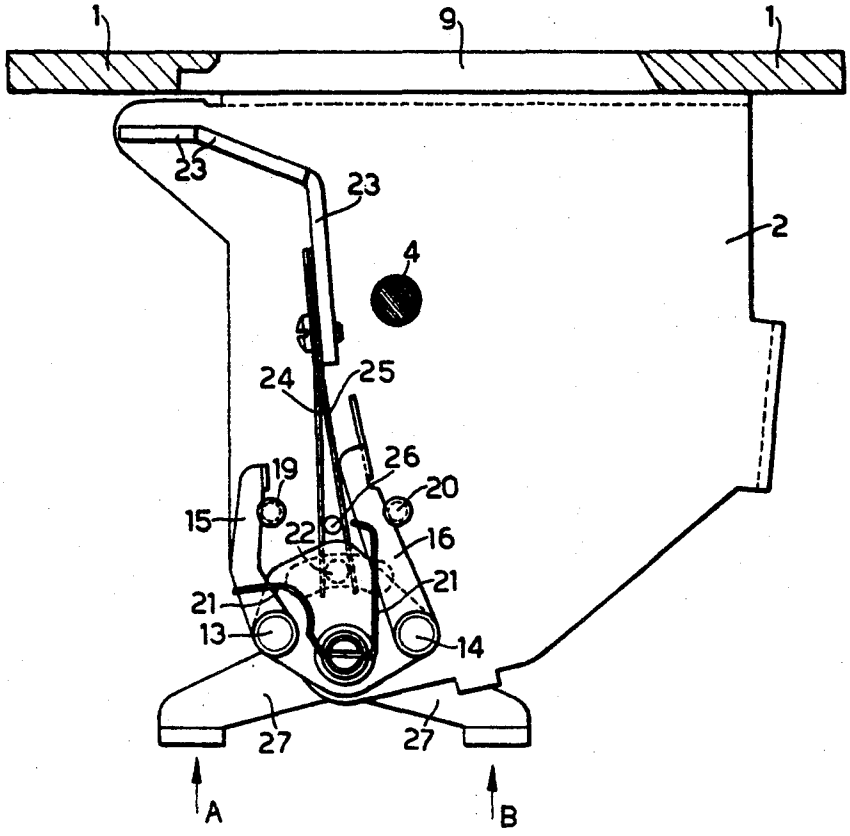
Fig.1



INVENTOR
Fermo Solari
BY
Nolte & Nolte
ATTORNEY

Sept. 10, 1968 F. SOLARI 3,400,598
DEVICE FOR CONTROLLING THE ADVANCE OF DRUMS IN A DISPLAY DRUM APPARATUS
Filed May 24, 1966 3 Sheets-Sheet 2

Fig.2



Sept. 10, 1968 F. SOLARI 3,400,598
DEVICE FOR CONTROLLING THE ADVANCE OF DRUMS IN A DISPLAY DRUM APPARATUS
Filed May 24, 1966 3 Sheets-Sheet 3

Fig.4

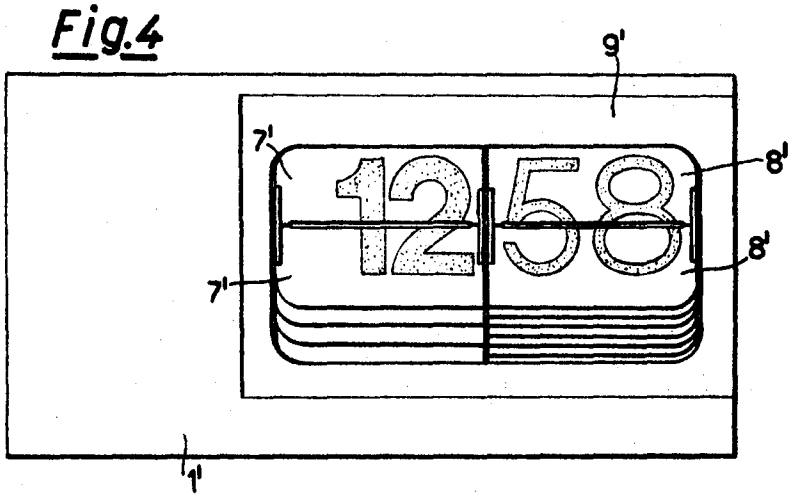


Fig.5

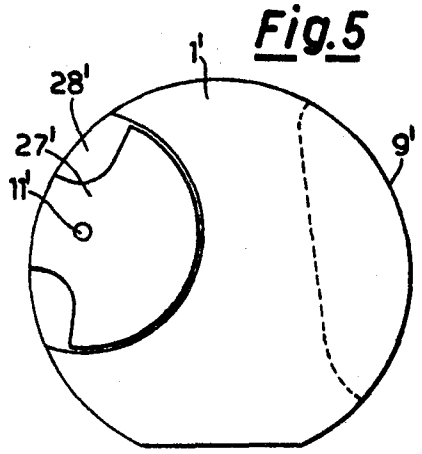
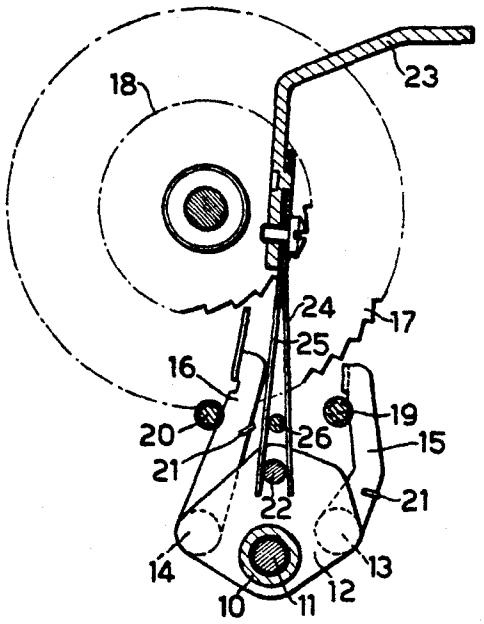


Fig.3



United States Patent Office 3,400,598
Patented Sept. 10, 1968

3,400,598

DEVICE FOR CONTROLLING THE ADVANCE OF DRUMS IN A DISPLAY DRUM APPARATUS

Fermo Solari, Udine, Italy, assignor to Solari & C. Udine, S.p.A., Udine, Italy, a company of Italy

Filed May 24, 1966, Ser. No. 552,607
Claims priority, application Italy, Aug. 9, 1965, 723,779
9 Claims. (Cl. 74—142)

ABSTRACT OF THE DISCLOSURE

A device for controlling the selective advance of either of a pair of drums of a two-drum structure. A pair of gears are respectively fixed to the drums for rotation therewith, and a pair of pawl-members respectively coact with these gears. A rocker is pivotally connected at a pair of distinct points to the pair of pawl members, and a pivot means supports the rocker for oscillation about an axis situated between the points of connection of the rocker with the pawl members. A control means is provided for oscillating the rocker in one direction or the other about the turning axis thereof so as to cause one or the other of the pawl members to contact with one of the other of the gears, thus bringing about rotation of a selected one of the drum with respect to the other drum, depending upon the direction of turning of the rocker. The rocker has a rest position where both pawl members are displaced from the gears so as not to interfere with the latter when the rocker is not oscillated.

This invention relates to a device for controlling the advance of the drums of a display-drum apparatus, and more precisely it relates to a device for controlling the advance of either drum, selectively, of the display drums of an apparatus comprising two indicating drums.

Display devices are known in which two indicating drums are mutually and rotatably connected, either drum receiving the drive from a motor, for example by a tele-control system, by a clockwork mechanism or otherwise.

Clockworks are known, for example, which comprise two indicating drums, one with the indication of the hours and the other with that of the minutes, wherein a watch-work mechanism transfers the drive to the minute-indicating drum which, via a reduction unit transfers, in turn, the drive to the hour-indicating drum. Said reduction unit is usually such that a rotation through 360 degrees of the minute-indicating drum about its own axis (during this rotation a subsequent indication of all the sixty minutes making up one hour can be seen through a window formed in the clockwork framing) gives rise to a rotation of the hour-indicating drum through an angle which is the one necessary for displaying, in lieu of the indication of a certain hour, the indication of the next hour.

The known devices are exposed to the drawback that, of the indicating drums, the one which receives the drive from its companion drum, can be rotated only under the drive of the former drum, a reduction unit being inserted therebetween. To make this fact quite clear, reference should be had to the case of the above mentioned clock, wherein the hour-indicating drum cannot be rotated independently of the minute-indicating drum. The result is that, should the clock give a misleading indication that ought desirably to be corrected, e.g. whenever the clock-work is run-down and stopped, so as to put the clock in a position to give correct indications, it is necessary to rotate, by a hand-actuated mechanism with which said clocks are ordinarily fitted, the minute-indicating drum through as many complete 360 degree revolutions about its own axis as there are hours by which it is desired that

the hour-indicating drum be caused to advance. On bearing moreover in mind that usually the minute-indicating drum cannot be rotated but through sequential individual revolutions of 6 degrees each, corresponding to the angular path which is required so that a certain minute-indication be caused to advance by one minute unit forward, it will be understood that a lengthy operation is required to cause the hour indicating drum to be advanced by a manual operation, that which involves a waste of time that in certain cases is not acceptable.

These shortcomings have been overcome by the device according to the present invention which comprises a first and a second gear, each driven to rotation by either of said indicating drums, connoted herein as the first and second indicating drums, respectively, and a first and a second pawl member counteracting said first and said second gear, respectively, said two pawl members being pivoted at two distinct points of a lever adapted to rock about a pivot intermediate said two points, control means being further provided for controlling the oscillation of said rockable lever about said pivot, to bring said first and second pawl member, respectively, into contact with, so as to act upon the teeth of, said first or said second gear, respectively, so as to cause the rotation thereof, said pawl members not interfering with said gears whenever said rocking lever is not swung.

In order to afford a clear understanding of the structure of the device and of the advantages contributed thereby, a merely exemplary and non-limiting embodiment of said device will be described hereinafter, reference being had to the accompanying drawings, wherein:

FIGURE 1 is a diagrammatical showing, partly in section, of the device as viewed from the top.

FIGURE 2 is a cross-sectional view of said device, taken along line II—II of FIGURE 1.

FIGURE 3 is a cross-sectional view of the device, taken along line III—III of FIGURE 1, and

FIGURES 4 and 5 are a front view and a side view, respectively, of a clock having two indicating drums, equipped with the device shown in FIGURES 1 to 3 inclusive.

Having now particular reference, at the outset, to FIGURE 1, it can be seen that said figure shows in partial and diagrammatical way the framework **1** of an indicating device, to which two brackets **2** and **3** are affixed, to bear a shaft **4** rotatable about its own axis. The shaft **4** carries two drums **5** and **6**.

The drum **6** is fastened to the shaft **4** and carries a set of indicating pallets, only one of which has been shown in dotted lines to simplify the showing and is connoted by the numeral **8** in FIG. 1, the pallet drum being of a configuration known in the art. The drum **5** is wholly similar to the drum **6** and also carries a set of pallets: only one of these has been diagrammatically shown and indicated by the numeral **7** in the drawing.

The drum **5** has been mounted idle on the shaft **4** and receives the drive from the drum **6** or from the shaft **4** by appropriate means, such as for example a mechanical reduction unit, which have not been shown for the sake of simplicity and are also of conventional make.

The drums **5** and **6** can be viewed from the outside of the device through a window **9** formed through the framework **1** which forms the outer shell or box of the device: the pallets of the drum **5** which can be viewed through the window **9** display information, and, in a similar manner, the pallets of the drum **6** display, through the window **9** other information. To change the information displayed by the two indicating drums **5** and **6**, the shaft **4** is rotated in a conventional way by a motor, for example a clockwork mechanism, positioned at the left side of FIGURE 1 and not shown to simplify the drawing. The drive transfer

from the shaft 4, or from the drum 6 to the drum 5 can take place, as aforesaid, in any conventional manner, but there must be a mechanical member permitting the free advance of the drum 5 with respect to the drum 6 by an action to be directly exerted on the drum 5: said mechanical member permitting the free advance of the drum 5 could be, for example, a freewheel mechanism, a pawl and ratchet mechanism or any other equivalent device which is not shown for the sake of simplification since it structure is quite conventional.

A bushing 10, carrying a pivot 11 freely rotatable about its axis, is solid with the bracket 2. To an end of the pivot 11 is rigidly affixed a plate 12 which acts as a lever which can rock about the axis of the pivot 11. To the oscillatable plate or lever 12 are fulcrumed at 13 and 14 (see also FIGS. 2 and 3), a first pawl-member 15, and a second pawl-member 16, respectively. The pawl-member 15 counteracts a gear 17 (FIGS. 1 and 3) solid with the drum 5, and the pawl-member 16 counteracts a gear 18 keyed to the shaft 4 and thus adapted solidly to rotate with the drum 6.

Two dogs 19 and 20 are solid to the bracket 2 and jut therefrom towards the two pawl-members, the latter being urged against said dogs, as can be seen in detail in FIGS. 2 and 3, by a spring 21 housed within a slot formed at the end of the pivot 11. The positions of the dogs and the length of the pawl-members are such that said pawl-members are not allowed to interfere with the gears 17 and 18 whenever the lever 12 is not urged to swing, that is, is in its at rest position (see particularly FIGURE 3).

In the bracket 2 an arcuate slot is formed (shown in dotted lines in FIGS. 1 and 2) wherein a pin 22 is inserted and allowed to travel, said pin being solid with the rocker 12. The length of the slot formed in the bracket 2 is such as to limit the amplitude of swing of the rocker 12 when the pin 22 abuts the ends of said slot.

To the bracket 2 is affixed a rigid member 23 to which are fastened two leaf-springs 24 and 25, which are kept forked-out by a pin 26 affixed to the bracket 2 and extended so as to encompass the pin 22 therebetween.

As can be seen in detail in FIGURE 1, a small lever 27 is solid with the pin 11 and, more precisely, is solid to the end of said pivot 11 which is distant from the one to which the rocking plate or lever 12 is affixed. A wall 28, which is shown only partially and diagrammatically in FIGURE 1, and is an integral part of the framing of the device, prevents axial displacements of the pin 11.

To explain the operation of the device, be it assumed that it is initially in its inoperative or at rest position, that is, in the position shown in FIGURES 1 to 3. Under these conditions, the shaft 4 and the drum 6 are driven by the aforementioned motor and drive to rotation, in turn, at a different speed, the drum 5.

If a thrust is imparted to the lever 27 in the direction of the arrow A (FIG. 2), the pin 11 and the rocker 12 are rotated clockwise if FIGURE 2 is considered, and anticlockwise if FIGURE 3 is considered: the pawl-member 16 is depressed and slides on the pin 20, urged against said pin by the spring 21, whereas the pawl-member 15 is lifted and slides against the pin 19, still under the urge of the spring 21. The upper end of the pawl-member 15 thus reaches, during the rotation of the pin 11, a tooth of the gear 17 and, as the rotation of the pin 11 is continued, acts upon said tooth giving rise to an angular rotation of the gear 17 and thus also of the drum 5 on the shaft 4. The width of the angle of rotation of the gear 17 under the urge of the pawl-member 15 is limited by the maximum stroke allowed to the pin 22 within the arcuate slot formed in the bracket 2: more accurately, the length of said slot is such that, to a maximum stroke therein of the pin 22, corresponds an advance of the pawl-member 15 and thus a rotation of the drum 5, so that an indication can be viewed; through the window 9, which is immediately next to the indication previously reported by the drum 5 and replaces it.

As the thrust imparted in the direction of the arrow A is discontinued, that is by releasing the lever 27, the device is restored to its at rest positions as shown FIGS. 1 to 3. The return to the inoperative positions is caused by the urge imparted to the pin 22 by the leaf spring 25, the latter having been bent by the action exerted thereon by said pin 22 during the rotation of the pin 11 as outlined above. It should be noticed that, as soon as the urge on the lever 27 is discontinued and during the return of the device to its inoperative positions, the pawl-member 15 does not exhibit any undesirable action on the gear 17, since it is kept away thereform by the pin 19.

In a manner quite similar to the one described in the foregoing, whenever a thrust is imparted to the lever 27 in the direction of the arrow B (FIG. 2) a rotation of the pivot 11 is given rise to and, therewith, of the parts connected thereto, in a direction which is the reversal of the one described above, thus causing a rotation of the gear to take place and consequently also of the drum 6, due to the action of the pawl-member 16. The rotation of the two drums 5 and 6, controlled by the actuation of the lever 27, takes place in the same direction and under the same conditions, whereafter, once the action upon the levers 27 is discontinued, the device is brought back in any case to the inoperative condition without giving rise to any undesirable actions.

As can be seen, it is thus possible to cause either drum (5 or 6) to be selectively advanced by directly acting upon the desired drum and without modifying the positioning of the other drum.

In order to have a clearer understanding of the practical use of the device described hereinbefore, reference should be had now to FIGURES 4 and 5 wherein is shown, in front and side view, respectively, a clock comprising a drum whose pallets 8', which can be inspected through a window 9' formed in the framework 1' give the indication of the minutes, and a drum whose pallets 7' give the indication of the hours. By rotating the lever 27', which is near the wall 28', in either direction, about the pin 11' it is possible to rotate in a quite simple and convenient way either indicator drums until the correct indication of the hour and the minutes can be viewed through the window 9', thus dispensing with the lengthy manipulations which were necessary in the display drum clocks made according to the known art.

I claim:

1. A device for controlling the selective advance of either indicating drum of two-drum device, comprising a first and a second gear, respectively fixed for rotation to said indicating drums, and a first and a second pawl-member counteracting said first and second gears, respectively, a rocker, said pawl-members being fulcrumed at two distinct points of said rocker, pivot means supporting said rocker for oscillation about an axis intermediate said two points, control means coacting with said rocker for oscillating the latter about said axis to bring said first or said second pawl member, respectively, into contact with and to act upon the teeth of said first or said second gear, respectively, to cause the rotation thereof, said rocker having a rest position where said pawl members do not interfere with the gears whenever said rocker does not oscillate.

2. A device according to claim 1, wherein resilient holding means are provided for yieldably holding said rocker in said rest position.

3. A device according to claim 2, framing for said device and wherein said resilient holding means comprise a spring member acting between the framing of the two-drum device and said rocker.

4. A device according to claim 1, framing for the device and wherein from the framing of the two-drum device project a first and a second pin which counteract said first and said second pawl-member, respectively, a spring

being provided which urges said first pin and said second pawl-member, respectively, against said second pin, said pins being positioned so that the pawl-members do not interfere with said gears when said rocker is not oscillated.

5. A device according to claim 1, wherein said control means of the oscillation of said rocker comprises a control lever solid with said rocker.

6. A device according to claim 1, wherein means are provided for limiting the oscillation of said rocker.

7. A device according to claim 6, stationary framing and wherein said means for limiting the oscillation of said rocker comprise a pin solid with the rocker and an arcuate slot formed in a member afixed to the framing of said device, the pin being housed and movable in said arcuate slot with a stroke limited by ends of said slot.

8. A device according to claim 1, wherein said indicating drums are coaxial to one another and the gears are solid with said drums.

9. A device for controlling the selective advance of either indicating drum of a two-drum device, designated as the first and the second indicating drum, respectively, comprising a first and a second gear solid with the axis of said first and said second indicating drum, respectively, a first and a second pawl-member counteracting said first and said second gear, respectively, said pawl-members being urged by a spring against a first and a second pin, respectively, which protrude from the framing of the device, said two pawl-members being fulcrumed at two distinct points of a rocker which can oscillate about a pivot solid thereto and intermediate said two points, means being provided to limit the oscillation of said rocker, the device further comprising a lever solid to said pivot intermediate said two points and actuable for bringing said first, or said second pawl-member respectively, to contact, and to act upon, the teeth of said first or said second gear, respectively, to cause the rotation hereof, said pins being positioned so that said pawl-member does not interfere with said gears when said rocker is not oscillated.

References Cited

UNITED STATES PATENTS

257,306	5/1882	Farley	74—141
1,546,771	7/1925	Wood	254—152
1,700,181	1/1929	Russell	254—150
2,157,153	5/1939	Troche	254—150
2,530,961	11/1950	Hansen	74—142
2,886,806	5/1959	Bush	310—21

FOREIGN PATENTS

257,492	3/1913	Germany.

FRED C. MATTERN, JR., *Primary Examiner.*

W. S. RATLIFF, *Assistant Examiner.*