July 4, 1950 C. W. ADSHEAD 2,514,174

TOTALIZATOR REGISTER

Filed March 1, 1948 4 Sheets-Sheet 1

Fig. 1.

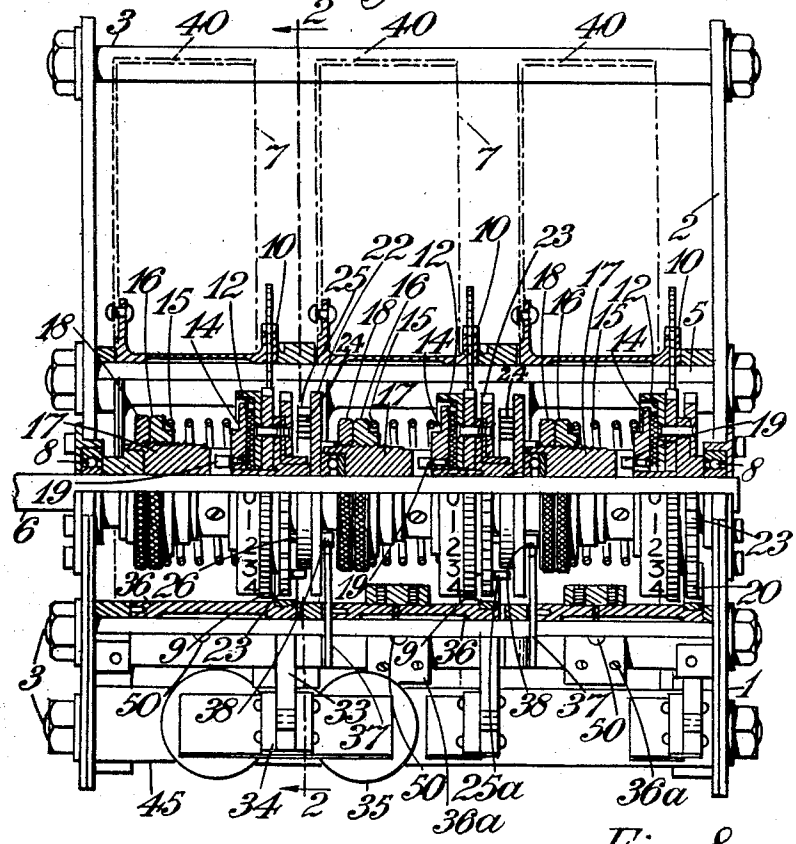


Fig. 7.

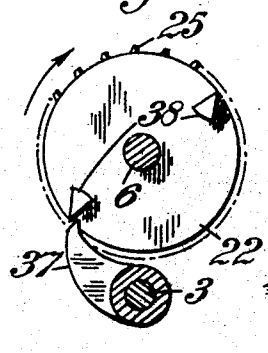
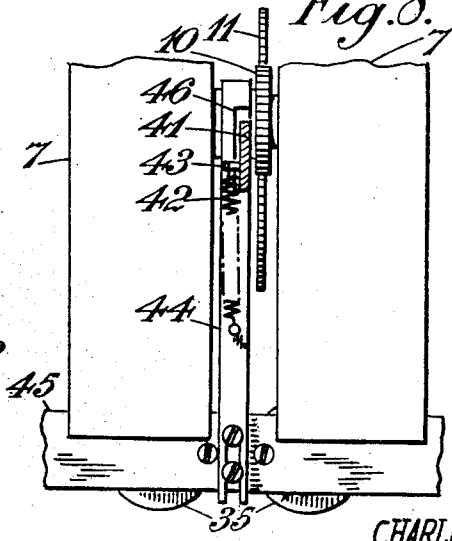


Fig. 8.



INVENTOR
CHARLES W. ADSHEAD
BY Wilkinson & Mawhinney
ATTORNEYS

July 4, 1950 C. W. ADSHEAD 2,514,174

TOTALIZATOR REGISTER

Filed March 1, 1948 4 Sheets-Sheet 2

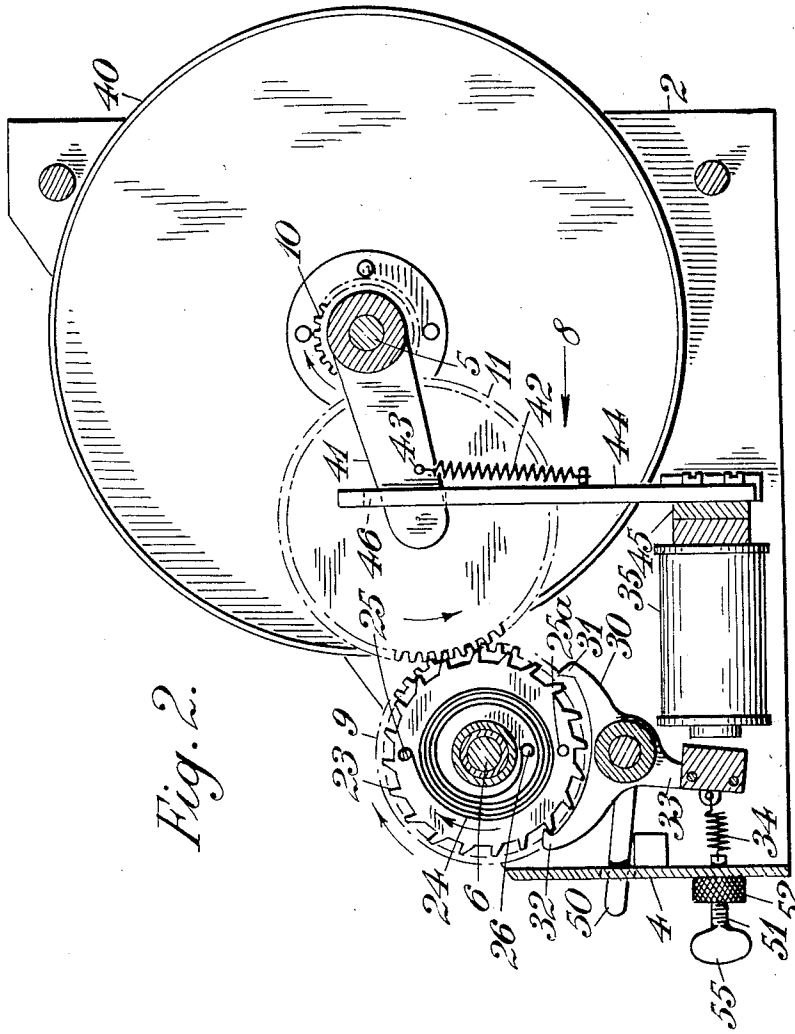


Fig. 2.

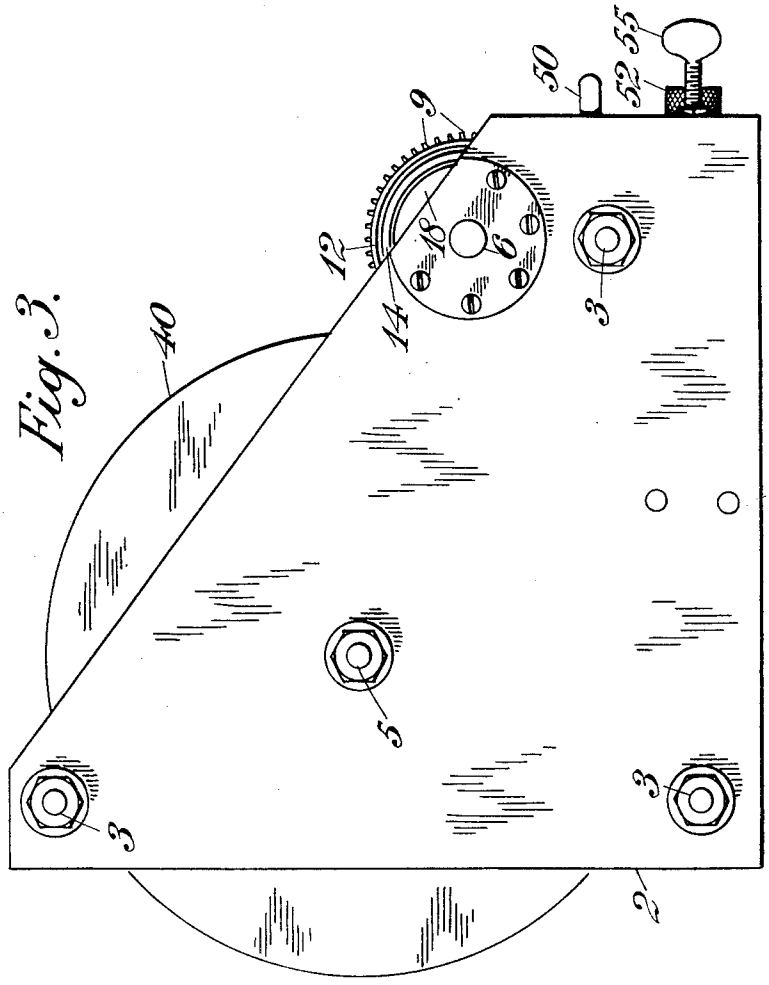
INVENTOR
CHARLES W. ADSHEAD
BY Wilkinson & Mawhinney
ATTORNEYS

July 4, 1950 C. W. ADSHEAD 2,514,174

TOTALIZATOR REGISTER

Filed March 1, 1948 4 Sheets-Sheet 3

Fig. 3.



INVENTOR
CHARLES W. ADSHEAD
BY Wilkinson & Mawhinney
ATTORNEYS

July 4, 1950 C. W. ADSHEAD 2,514,174

TOTALIZATOR REGISTER

Filed March 1, 1948 4 Sheets-Sheet 4

Fig. 4.

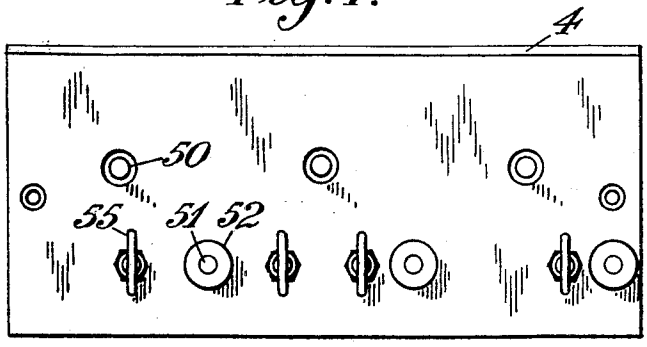


Fig. 5.

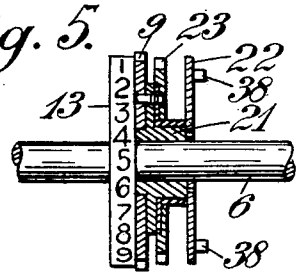
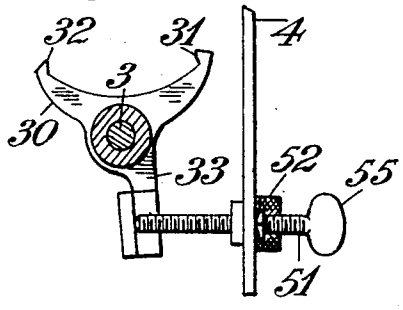


Fig. 6.



INVENTOR
CHARLES W. ADSHEAD
BY Wilkinson & Mawhinney
ATTORNEYS

Patented July 4, 1950 2,514,174

UNITED STATES PATENT OFFICE

2,514,174

TOTALIZATOR REGISTER

Charles William Adshead, Ilford, England, assignor to Setright Registers Limited, London, England, a British company

Application March 1, 1948, Serial No. 12,221
In Great Britain March 7, 1947

5 Claims. (Cl. 235—91)

1

This invention relates to counting or summing units of the type used at present in totalisators, and comprising for each denomination of the total, a rotatable toothed escapement wheel constantly urged for rotation, a pallet lever movable in response to increments in the denomination and arranged to control such rotation of the escapement wheel to permit rotation thereof by one tooth for each increment in the denomination and an indicating drum bearing numbers or other equivalent indicia (e. g. letters) rotatable under the control of the escapement wheel to show, at a viewing position, the number or the equivalent corresponding to the total of the denomination counted or summed.

Counting or summing units of the above type as previously constructed form parts of large totalisators and the indicating drums which are of substantial dimensions and carry figures of large size are rotated under the mechanical or electrical control of the escapement wheel but are not driven thereby. The present invention consists in an improved and simplified unit of the above type suitable for use in smaller installations in which the figures or the equivalent must be readily visible at a distance of a few yards but do not need to be of the considerable size required for large totalisators.

The invention provides in the preferred form, a counting or summing unit of the type described in which the indicating drum is directly driven from the escapement wheel aforesaid through gearing. The movements of the drum have, in practice, to be executed rapidly and it is found that even with a lightly constructed drum there is considerable shock load on the gearing and escapement wheel when the drum is stopped after each movement. With the object of reducing this inertia load the gear drive preferably includes a shock absorbing device. The shock absorbing device may comprise a resiliently mounted intermediate gear in the drive, which intermediate gear may be mounted on a spring controlled arm for rotation about the centre of rotation of one or other of the gears with which it meshes the extent of rotation of the arm being so limited that the intermediate gear remains in mesh with the two gears.

The escapement wheel may be urged for rotation from a constantly rotating driving shaft or other member through a slipping friction clutch, there being one such clutch for each denomination. When the unit is to be used for counting or summing events (e. g. the sale of totalisator tickets) which may on occasion recur

2

in rapid succession, it is preferred to include in at least the drive from the slipping clutch to the escapement wheel of lowest denomination a spring loaded lost motion driving connection so constructed that on release of the escapement wheel by the pallet lever the spring urges the escapement wheel to rotate ahead of the driven clutch member to the limit permitted by the pallet lever and the clutch member is then driven through the clutch and lost motion connection to catch up with the escapement wheel.

The driving member of each friction clutch may carry numbers of other indicia corresponding to those on the drum to constitute an operator's check.

One specific embodiment of a counting or summing unit according to the invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a rear elevation of the unit with the back plate removed;

Figure 2 is a sectional view on the line 2—2 in Figure 1;

Figure 3 is a side view of the unit;

Figure 4 is a view showing the back plate;

Figure 5 shows a detail of construction;

Figure 6 shows a further detail of construction;

Figure 7 shows a still further detail of construction, and

Figure 8 is a part view in the direction of the arrow 8 in Figure 2.

The unit forming the subject of this example is intended for use in a totalisator for counting tickets issued from between six and twelve issuing machines, the total showing three denominations (i. e. units, tens and hundreds). The unit comprises a frame 1 consisting of two side plates 2 held in spaced relationship by three bolts 3 serving as distance pieces. The rear of the frame is provided with a vertical plate 4 (later referred to as the back plate) extending between the side plates. Two shafts 5 and 6 also extend between the side plates. The shaft 5 is fixed, is positioned slightly to the front of the centres of the side plates and carries three drums 7 for rotation on the shaft. The other shaft, 6, is rotatably mounted in bearings 8 positioned between the back plate and the drum shaft. This rotatable shaft is the driving shaft and is constantly rotated (e. g. by an electric motor) at uniform speed during the whole of the period that the unit is in operation. Spaced along the driving shaft there are three slipping friction clutches appropriated to the three denominations respectively

and arranged to tend to transmit the rotary movement of the shaft to three driving gear wheels 9 mounted for rotation on the shaft. Each of these gear-wheels is in driving engagement with a gear 10 attached to one of the three drums 7 respectively through an intermediate gear 11 of substantial diameter. Secured to one side face of each gear 9 is a plate 12 forming the driven member of the associated friction clutch and also having a peripheral flange 13 which bears numbers corresponding to the numbers on the corresponding drum to provide an operator's check of the numbers shown to the public on the drum. The driving member of each clutch consists of a friction plate 14 which is pressed axially of the shaft into engagement with the driven plate 12 within the flange by a helical spring 15 surrounding the shaft and abutting against a ring 16 adjustably screw on to a shoulder 17 fixed on the shaft. A locking ring 18 also screwed to the shoulder serves to retain the abutment ring in its position of adjustment. The driving clutch plate has driving pins 19 fitting into holes in the adjacent end face of the aforesaid shoulder.

In the case of the hundreds denomination there is an escapement wheel 20 which is directly attached to the associated driving gear 9 for positive rotation therewith.

The units and tens denomination driving gears are each positively connected, as shown in detail in Figure 5, by a sleeve 21 on the shaft to a disc 22 spaced from the gear. In the space between the gear and the disc is an escapement wheel 23 rotatably mounted on the sleeve and urged to rotate ahead of the disc and gear (in the direction of rotation of the driving shaft as shown by the arrow in Figure 2) by a spiral spring 24. One end of the spring is attached to the disc 22 by a pin 25 and the other end to the escapement by a pin 26. The escapement wheel carries a further pin 25a which abuts against the pin 25 and the arrangement is such that the abutting pins serve to transmit the drive from the friction clutch and gear to the escapement wheel while permitting the escapement wheel to over-run the drive, to a limited extent, under the action of the spiral spring 24.

One of the aforesaid distance pieces 3 is positioned below the driving shaft 6 (as shown) and serves as a fulcrum for three pallet levers 30 appropriated to the three escapement wheels. Each pallet lever has three radial arms approximately 120° apart. Two of the arms carry the pallets 31, 32 for co-operation with the escapement wheel and the third arm 33, which is directed downwardly, serves as an attachment for a tension return spring for the lever. In the case of the units lever this third arm also carries an armature 34 for co-operation with an electromagnet 35 secured to the cross-bar 45 later described. Each lever is attached to one end of one of three sleeves 36 rotatable on the distance piece, and at the other end of each of the sleeves associated with the tens and hundreds levers there is an upwardly extending arm 37 which co-operates with two sector-shaped pins 38 spaced 180° apart on the side face of the aforesaid disc 22 appropriated to the next lower denomination, the arrangement being such that at each half-revolution of the disc appropriated to the units denomination the arm attached to the tens pallet lever is rocked by one of one of the pins to operate the escapement one tooth and similarly at each half-revolution of the tens disc the hundred pallet lever is rocked to operate the escapement one tooth. The sleeves associated with the tens and hundreds levers are divided in their length and the two portions which are angularly adjustable are held by screws in a collar 36a.

The three drums 7 are of light construction and consist of sheet metal pressings in the form of a disc with a peripheral flange 40 which bears the numbers on its outer circumferential face. The numbers are approximately 2" high. The gear ratio is 2:1 (i. e. the drums rotate twice for each revolution of the driving gears) and in order that the numbers on the driven members 13 of the friction clutches may correspond with those on the drums the former are repeated around the clutch members. The intermediate gears 11 are carried on arms 41 rotatably supported on the drum shaft 5 and urged downwardly by springs 42 extending from pins 43 on the arms to pins on uprights 44 from a cross-bar 45 which extends between the side plates and is secured thereto. The uprights 44 have notches 46 which loosely embrace the arms 41 carrying the gears to limit the freedom of rotation of the arms.

The operation of the device is as follows: The issue of a ticket at any one of the issuing machines causes an electrical impulse to be transmitted through appropriate separating and accumulating devices to the electromagnet to cause it to attract the armature and to rock the units pallet lever. This permits the spiral spring to drive the units escapement wheel one tooth. This movement of the escapement wheel carries the wheel ahead of the friction clutch drive. On completion of the movement the clutch drive continues to rotate the driving gear and through the gear train to rotate the units drum until the movement is stopped by the clutch member catching up with the escapement wheel, the movement of the drum being sufficient to change the numbers visible to the public through a viewing aperture by one unit. The drums are, as already mentioned, of light construction but the inertia load on stopping the drum is substantial. This load may cause bouncing at the escapement unless it is reduced and it is for this purpose that the intermediate gear is resiliently mounted on the rotatable arm. When the driving gear is stopped by the escapement wheel the inertia load of the drums is absorbed, wholly or to an appreciable extent, by the spring controlling the arm which allows the intermediate gear to rise until stopped by the engagement of the arm with the top of the notch in the upright. The degree of movement permitted to the intermediate gear is not sufficient to allow the gear to come out of mesh with the driving gear.

When the tenth ticket is issued one of the pins on the side face of the units disc comes into contact with the arm associated with the tens pallet lever and rocks that lever to cause rotation of the tens drum one unit in manner similar to that in which the unit drum is rotated. The hundreds drum is operated from the tens unit in the same way except that as there is no spiral spring in the hundreds driving connection the escapement wheel is rotated directly from the friction clutch.

In order to facilitate the operation of the device each pallet lever has a resetting lever 50 consisting of a rod attached to the lever near the fulcrum and extending rearwardly through the back plate. When it is desired to reset any drum to zero this rod is depressed by hand the appropriate number of times up to nine to operate the pallet lever to pass the required number of escapement teeth.

Each of the return springs **34** for the pallet levers is attached to a tensioning adjustment screw **51** provided with a knurled adjusting nut **52** on the outside of the back plate. An adjustable stop screw **55** carried by the back plate is provided for each of the pallet levers to limit the return movements of the levers by the springs **34**.

It is to be understood that the invention is not restricted to the application of the unit or the constructional details given in the above example. For instance the unit may be applied to the counting of a crowd passing one at a time through a number of different turnstiles or to the summing of the totals counted on other counting units. Further the unit may be used as an indicator (e. g. of a number required) rather than as a counter, if desired. Again the unit may be arranged to sum or count more than three denominations, there being a correspondingly increased number of drums and associated parts.

I claim:

1. A counting unit of the type used in totalisators and comprising for at least one denomination of the total; a driving member arranged for continuous rotation; a driven member; a frictional clutch driving connection between the two members capable of slip; an escapement mechanism to control rotation of the driven member and comprising a rotatable toothed escapement wheel, rotatable about a common axis with the driving and driven members and the clutch connection, and a pallet lever movable in response to increments in the denomination and arranged to permit rotation of the escapement wheel by one tooth for each increment in the denomination; an indicating drum bearing indicia and rotatable about a second axis parallel to the first mentioned axis; a gear drive from the driven member to the drum; a shock absorbing device in the gear drive; and a spring-loaded lost-motion connection between the driven member and the escapement wheel comprising two abutments on the member and wheel respectively arranged to abut to limit relative movement between the member and wheel and a spring connecting the member and wheel, rotatable therewith, and urging the wheel to rotate ahead of the driven member, the arrangement being such that the friction drive tends to maintain the abutments in abutting relation so that the escapement wheel prevents rotation of the driven member and that on release of the escapement wheel by the pallet lever the spring urges the escapement wheel to rotate ahead of driven member to the limit permitted by the pallet lever and the driven member is then driven through the clutch connection to catch up with the escapement wheel until the abutments re-engage and at the same time to rotate the drum.

2. A counting unit as claimed in claim 1 in which the shock-absorbing device comprises a resiliently mounted intermediate gear in the drive.

3. A counting unit as claimed in claim 2 in which the intermediate gear is mounted on a spring-controlled arm for rotation about the center of rotation of one of the two gears with which it meshes.

4. A counting unit as claimed in claim 3 and including means for so limiting the extent of rotation of the arm that the intermediate gear remains in mesh with the two gears.

5. A counting unit as claimed in claim 1 in which there is more than one denomination and in which each denomination has parts rotatable about parallel axes as defined in claim 1 and in which the axes are common to the several denominations.

CHARLES WILLIAM ADSHEAD.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
48,927	Giroud	July 25, 1865
284,755	Pidgin et al.	Sept. 11, 1883
302,953	Smith	Aug. 5, 1884
1,280,754	Julius	Oct. 8, 1918
1,293,392	Fassa	Feb. 4, 1919
1,403,182	Maturin	Jan. 10, 1922
1,544,860	Reisbach	July 7, 1925
1,744,259	Carlson	Jan. 21, 1930
1,864,348	Given	June 21, 1932
1,947,543	Kellogg	Feb. 20, 1934
2,324,778	Julius et al.	July 20, 1943

FOREIGN PATENTS

Number	Country	Date
307,413	Great Britain	Apr. 4, 1929