Nov. 5, 1963 W. HAUPT 3,109,312

SETTING ARRANGEMENT FOR TAXIMETERS

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FIG. 2

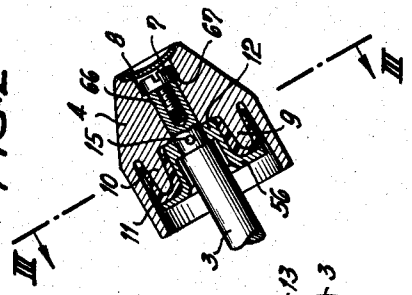


FIG. 3

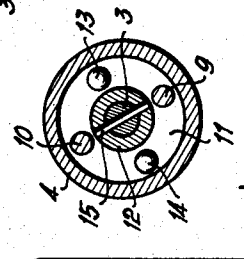


FIG. 4

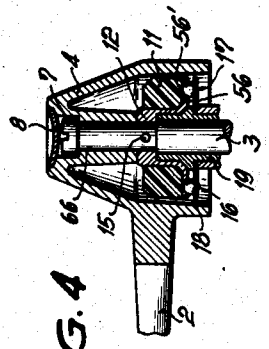
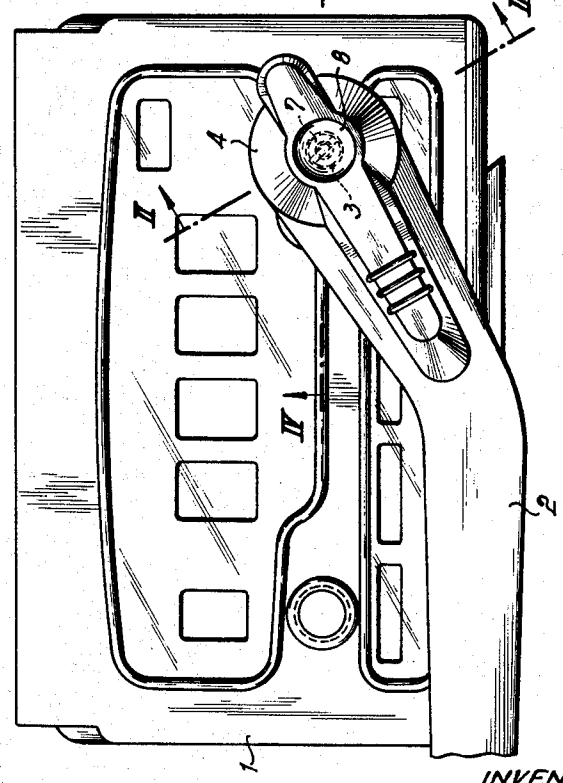


FIG. 1



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FIG. 6

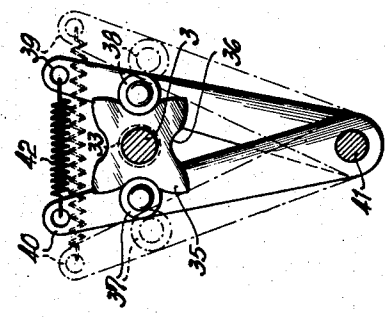


FIG. 7

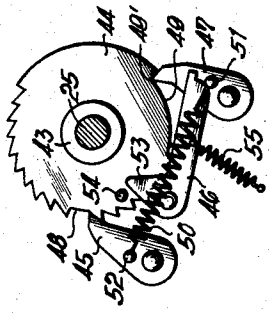


FIG. 8

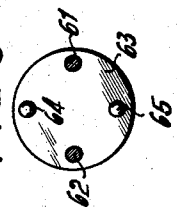
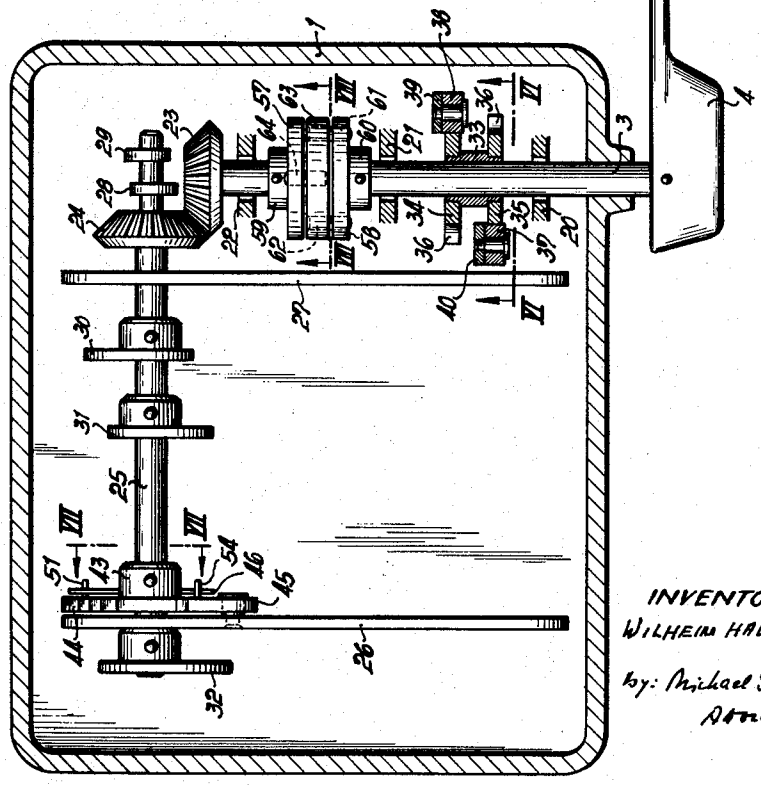


FIG. 5



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United States Patent Office 3,109,312 Patented Nov. 5, 1963

3,109,312

SETTING ARRANGEMENT FOR TAXIMETERS

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Filed Mar. 3, 1958, Ser. No. 718,632
Claims priority, application Germany Mar. 1, 1957
12 Claims. (Cl. 74—1)

The present invention relates to a taximeter setting device, and more particularly to a setting device for a taximeter which is operated by turning a handle between a plurality of positions. Preferably the handle is provided with a flag for indicating the vacant or occupied condition of the taxi.

Taximeters according to the prior art have a rigid handle which is rigidly connected to the control shaft within the taximeter so that the operator is capable of exerting very great forces on the taximeter mechanism when he turns the flag handle.

In order to avoid damage to the delicate mechanism of taximeters, very strong connecting transmissions are provided in the constructions of the prior art. However, in modern small taxis, it is customary to build the meter into the glove compartment, which is comparatively small, and does not permit a very strong and solid construction of the meter mechanism. Consequently, it is of particular importance to prevent the transmission of great manual forces from the operating handle to the meter mechanism.

It is one object of the present invention to overcome the disadvantage of the prior art in which the meter mechanism is sometimes damaged by operation of the taxi flag, and to provide means by which any damage to the mechanism is safely prevented.

Another object of the present invention is to provide an elastic coupling between the manually operated handle, and the meter mechanism.

A further object of the present invention is to provide a handle member consisting of resilient and elastic material so that great forces accidently applied to the outer free end of the handle are not transmitted to the meter mechanism.

A further object of the present invention is to provide means for completely interrupting the connection between the handle and the meter mechanism when the force acting on the handle exceeds a predetermined maximum force.

With these objects in view, the present invention mainly consists in a taximeter which comprises, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; a handle member; and means connecting the handle member with the control shaft and including an elastic coupling whereby transmission of an excessive manual force from said handle member to said control shaft is prevented.

In a preferred embodiment of the present invention, the handle member has a flag at the free end thereof, and consists of an elastic material. This is particularly advantageous if the flag handle is lowered in occupied condition of the taxi, since the force is not transmitted to the meter, when the driver accidentally pushes against the flag handle.

Moreover, the movements of the driver are less constrained by a resilient flag handle.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description

of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a front view of a taximeter according to the present invention with the flag handle in one operational position;

FIG. 2 is a fragmentary sectional view taken on line II—II in FIG. 1;

FIG. 3 is a cross sectional view taken on line III—III in FIG. 2;

FIG. 4 is a fragmentary axial view taken on line IV—IV in FIG. 1;

FIG. 5 is a fragmentary sectional view of a taximeter according to one embodiment of the present invention, illustrating only elements associated with the present invention;

FIG. 6 is a sectional view taken on line VI—VI in FIG. 5;

FIG. 7 is a fragmentary sectional view taken on line VII—VII in FIG. 5; and

FIG. 8 is a sectional view taken on VIII—VIII in FIG. 5.

Referring now to the drawings, and more particularly to FIG. 1, the housing 1 of the meter constitutes the supporting means for the various elements of the meter mechanism. The meter mechanism is preferably of the type disclosed in my copending application Serial No. 510,662, entitled "Switching Device for Taximeters" now Patent No. 3,012,712, issued Dec. 12, 1961. As shown in FIGS. 1 and 5, an end portion of a connecting shaft 3 projects out of the housing 1, and the handle member 2 is mounted on shaft 3. The inner end of the handle member 2 is constructed as a cap member 4, while the outer free end of the arm of the handle member carries a flag 2' which in a known manner is provided with an indication reading "vacant". In the position of member 2 shown in FIG. 1, the taxi is occupied and the meter operates. When the handle member is turned into an upright position, the word "vacant" on the flag is clearly visible to the occupant of the taxi.

The cap portion 4 is loosely attached to a reduced extension 66 of connecting shaft 3, as best seen in FIG. 2, and is secured to shaft 3 by a screw 7 engaging a threaded bore in the extension 66, and abutting with its head portion against a shoulder 67 of the cap member 4. A resilient disk 8 is snapped into a corresponding recess of the cap member 4, and covers the screw 7.

The handle member is connected to the connecting shaft 3 for turning movement so that shaft 3 is turned when the flag handle is turned between a plurality of positions which correspond, for example, to a vacant condition of the taxi, to an occupied condition of the taxi, to a waiting position in which the taxi does not move but a charge is made for waiting time, and possibly also between further positions corresponding to extra fares, charges for trunks, etc.

Connecting shaft 3 is mounted in the housing 1 by means of bearings 20, 21 and 22, as best seen in FIG. 5. A bevel gear 23 on shaft 3 meshes with a bevel gear 24 on a control shaft 25 which is mounted in a pair of walls 26 and 27. The control shaft 25 carries a plurality of cam disks, for example the cam disks 28, 29, 30, 31 and 32. It is evident that the control shaft 25 turns with the handle member 2 between a plurality of positions, and in each position of control shaft 25 a different cam disk is effective to set the meter to a selected operational condition. For example, cam 28 may effect a first fare based on a first basic charge, and the cam 29 may effect another fare based on a different basic charge, as is customary in some cities. The cam 30 effects the clearing of the totalizer to zero position, and also controls shutters covering windows behind which indicating members indicate the condition of the meter by a suitable legend. The cam

31 controls the clock mechanism during the waiting periods and effects the control of the totalizer by the timing device. Cam 32 effects the connection and disconnection of the device by which an extra fare is added in the totalizer.

In order to prevent a fraudulent operation of the device, it must be prevented that the flag is held in intermediate positions in which none of the control cams is effective. A bushing 33 is fixed on shaft 3, and carries two star wheels 34 and 35. Star wheels 34 and 35 have recesses and projections corresponding to the number of positions of shaft 3. For example, in the illustrated embodiment four recesses 36 are provided which correspond to the positions "vacant," "fare I," "fare II," and "cash." The handle member points upwards in the "vacant" position, to the left as shown in FIG. 1 in the "cash" position, and to the right and downward in the positions "fare I" and "fare II." If further operational conditions of the meter are provided, a corresponding greater number of recesses 36 is provided. Star wheels 34, 35 cooperate with rollers 37, 38 which are turnably mounted on levers 39, 40. Levers 39, 40 are mounted on a common stationary shaft 41 and are urged by a connecting spring 42 into a position in which rollers 37 and 38 engage corresponding recesses in the star wheels. Due to the pointed shape of the projections between the recesses 36, the star wheels cannot be held in an intermediate position in which the pointed projections engage the rollers 37, 38, but will snap into an operative position in which the meter is operated so that it becomes impossible to disconnect the meter by holding the handle member in an intermediate position.

It is also desired to prevent turning of the control shaft from the "cash" position through the "vacant" position into the "occupied" position in a rapid turning movement. Such improper operation may have the effect that the meter mechanism is set to a new totalizing operation in the "occupied" position, before the totalizer has had time enough to return to zero position while the handle member was in "vacant" position. In this event, a totalizer would not be completely cleared, and an amount remains in the totalizer which would be added to the following fare charge.

In order to prevent such fraudulent operation, the control shaft 25 is provided with a device which blocks the shaft in the "vacant" position, and permits further turning of the control shaft to the "occupied" position only after control shaft 25 has been turned in opposite direction for a short distance. During such opposite turning, the clearing of the totalizer can safely take place. This device is illustrated in FIGS. 5 and 7. A blocking disk 44 is fixed on cam shaft 25 by a hub portion 43. The blocking disk has two sets of ratchet teeth which are spaced from each other by a smooth peripheral portion 48, and by another smooth peripheral portion 49 which includes a blocking shoulder 49'. In a normal position of shaft 25 corresponding to the "vacant" position of the meter, the blocking disk 44 is in the position of FIG. 7, and a first pawl 45 is located on the peripheral portion 48, and a second pawl 47 engages the blocking shoulder 49'. The pawls 49 and 47 are so located that the disk 44 can turn for a short distance in counterclockwise direction until the pawl 45 engages one of the ratchet teeth which do not permit further turning of the disk in counterclockwise direction, whereas turning in clockwise direction is prevented by pawl 47. A spring 50 is connected to pins 51 and 52 on the pawls 47 and 45, and urges the pawls into engagement with the blocking disk. Pawls 45 and 47 are turnably mounted on the plate 26 which also pivotally supports the releasing lever 46 having a projection 53 cooperating with a projecting pin 54 on the blocking disk 44. A spring 55 urges the releasing lever 46 to turn in clockwise direction, and to engage the pin 51. However, the force of spring 55 is insufficient to release pawl 47 from the shoulder 49'.

The blocking mechanism operates in the following manner: The blocking disk 44 and the pawls 45 and 47 are illustrated in FIG. 7 in the intermediate "vacant" position, and it is assumed that shaft 25 with blocking disc 44 has just been turned from the "cash" position to the illustrated position corresponding to "vacant" in which the totalizer mechanism is cleared. Further rapid turning in clockwise direction is not possible since the shoulder 49' engages pawl 47 and blocks the disk 44 with shaft 25. Therefore, it is necessary to turn the blocking disk 44 in counterclockwise direction through a small angle until the pin 54 engages the projection 53 of the releasing lever 46, and turns the releasing lever into a position in which its end slides on pin 51 and releases pawl 47 from the shoulder 49. Such counterclockwise turning is possible since pawl 45 slides on the smooth peripheral portion 48. Counterclockwise turning is terminated when pawl 45 engages the first ratchet tooth following the peripheral portion 48, but the short delay permits the clearing of the totalizer, whereupon the shaft 25 and blocking disk 44 are further turned in clockwise direction into the desired "occupied" position. When blocking disk 44 has almost finished one revolution, pin 54 engages the other side of the projection 53, and turns the releasing lever 46 in opposite direction so that spring 50 returns pawl 47 to the inner part of the smooth portion 49 whereupon the pawl 47 engages the shoulder 49', and the original position is again established.

It will be appreciated that an operator who tries to rapidly turn the handle 2 through the "vacant' position corresponding to the position of FIG. 7, will be stopped by the shoulder 49' so that a considerable force is exerted by the manually operated handle 2 on the inner mechanism. Such force may cause damage to the mechanism, and consequently the resilient coupling means of the present invention, which will now be described in detail, is of considerable advantage in combination with the blocking device of FIGS. 7 and 5.

In the construction of FIG. 5, the connecting shaft 3 includes two portions respectively connected to the bevel gear 23 and to the handle member 2. Preferably a shear pin is located in bores in the cap portion 4 and in the end portion of shaft 3, and is so dimensioned that an excess force acting on the handle 2 will shear off pin 15 if great resistance is encountered against turning of connecting shaft 3. However, it is desired that even smaller torques are not fully transmitted to the control shaft 25, and consequently a resilient coupling is provided for connecting the two portions of shaft 3. In the embodiment illustrated in FIG. 5 the elastic coupling includes two coupling members 57 and 58 which are fixed by hub portions 59 and 60 to the inner ends of the two portions of shaft 3. Coupling member 58 has two axially projecting coupling pins 61 and 62 which project into corresponding holes of a disk 63 which consists of elastic material. In a similar manner, the coupling member 57 has two coupling pins 64 and 65 which are angularly displaced through 90° with respect to the coupling pins 61 and 62 as best seen in FIG. 8. It is evident that in the event of a blow against handle member 2, the elastic coupling will prevent the transmission of an excess force to the control shaft 25, and to the other parts of the mechanism, since the elastic disk 63 will be elastically deformed, while pins 61, 62, 64 and 65 remain positively interlocked with the elastic disk 63. The handle member 2 also consists of an elastic material so that a strong force acting at the free end of handle member 2 in axial, inwardly radial, or tangential direction during an accidental blow will only partly be transmitted to shaft 3. Such an accidental blow will not be a circular movement, so that the handle member is bent through a small angle. If the blow is in the axial direction of shaft 25, only handle member 2 will be angularly displaced directly outwardly of the thicker cap portion 4. If the blow is in the turning plane of the handle 2, first the handle will be bent a small angle, and then

elastic disc 63 will be deformed for another angle and resiliently absorb the impact of the blow. In this manner, a short straight accidental blow against the handle will be absorbed by the resilient material of the handle and of the coupling, or by the one of these elements which offers lesser elastic resistance and is more easily deformed. The resilient handle member cannot be broken by an accidental blow and also acts as a shock absorber protecting the meter mechanism.

While FIG. 5 shows an embodiment in which the elastic coupling is provided on shaft 3, in accordance with the embodiment shown in FIGS. 2–4, the elastic coupling is located in the cap portion 4 of the handle member 2, and in this construction the shaft 3 is a continuous shaft directly connecting the handle member 2 with the bevel gear 23. Otherwise, the construction of the meter corresponds to the arrangement shown in FIG. 5

Referring now to the embodiment of FIGS. 2, 3 and 4, the cap portion 4 is loosely placed on the extension 66 of shaft 3, and secured by screw 7, as described above. The cap member 4 has two projecting portions 10 and 9 which are shaped as coupling pins, as best seen in FIG. 3. An elastic coupling disk 11 has a pair of corresponding recesses receiving pins 9 and 10. The other part of the coupling is a coupling member 56 which is secured to extension 66 of shaft 3 by a shear pin 15. Coupling member 56 has a central portion 12 formed with the bore into which the shear pin 15 projects. The flange of coupling member 56 has two pins 13 and 14 which are displaced 90° with respect to the coupling pins 9 and 10, and are located in corresponding bores in the elastic coupling disk 11 which preferably consists of rubber. It will be appreciated that the construction of the elastic coupling means shown in FIGS. 2–4 corresponds to the elastic coupling means shown in FIG. 5. However, in the embodiment of FIGS. 2–4, the elastic coupling connects the cap portion of the handle with the shaft 3, whereas in the embodiment of FIG. 5, shaft 3 is divided into two portions connected by the elastic coupling means.

As best seen in FIG. 4, the flange portion of member 12, 56 has two recesses 56′ engaged by a pair of balls 16 and 17 which are urged into the recesses by a spring means 18 secured to a bearing sleeve 19. Bearing sleeve 19 is fixedly mounted on the stationary supporting means of the device, and turnably supports shaft 3. Consequently, the balls 16 and 17 are stationary, and act as catch means for arresting handle member 2 in a plurality of positions corresponding to the several conditions of the meter mechanism. Due to the provision of the catch means 16, 17, 18 and 56′, a shifting of the mechanism cannot be caused by displacement of the handle 2 due to jolts on a rough road.

In accordance with the present invention, turning of the handle 2 with the cap portion 4 will effect turning of the connecting shaft 3 without transmission of great manual forces to the delicate meter mechanism. If the meter mechanism and particularly the control shaft 25 is blocked, the resilient coupling means, and more particularly the elastic disks 63 and 11 will resiliently resist the force, indicating to the operator that he should not turn the handle any further, but since the elastic coupling means are positively interlocked, further turning of the handle is normally not possible. In the event, however, that the handle is further turned, the shear pin 15 will be torn off. The arrangement of the shear pin in the embodiment of FIG. 5 is similar to the showing of FIG. 2, the difference being that the shear pin projects into a bore of the cap member 4, instead of into a bore of the coupling member 12, 56.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of taximeters differing from the types described above.

While the invention has been illustrated and described as embodied in a setting device for taximeters including an elastic coupling, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; an elongated handle member consisting of an elastic material; and means connecting said handle member with said control shaft and including positively interlocked elastic coupling means, said elastic material of said handle member and said elastic coupling means resiliently absorbing the excessive force of a blow against said handle member whereby damage to said control shaft is prevented.

2. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; transmission means connected to said control shaft for turning movement and including a connecting shaft; an elongated elastic handle member having a cap portion mounted on said connecting shaft, said elastic handle member resiliently absorbing the excessive force of a blow against said handle member whereby damage to said control shaft is prevented; and a shear pin connecting said cap portion with said connecting shaft, said shear pin being adapted to be shorn off when the force exerted from said handle member exceeds a predetermined amount.

3. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; transmission means connected to said control shaft for turning movement and including a connecting shaft, and an elastic coupling means having two positively interlocked parts; a shear pin connecting one of said parts with said connecting shaft; and an elongated handle member secured to the other coupling part so that said elastic coupling means and said shear pin prevent transmission of an excessive manual force from said handle member to said control shaft.

4. In a taximeter, in combination, supporting means; a control shaft mounted on said supporting means for turning movement between a plurality of positions for setting the taximeter to different operation conditions; a connecting shaft turnably mounted on said supporting means; gear means connecting one end of said connecting shaft for turning movement with said control shaft; an elastic coupling means including two positively interlocked parts, one of said parts being connected so the other end of said connecting shaft for turning movement; a shear pin connecting said one part of said coupling means with said connecting shaft; an elongated handle member having a cap portion at one end thereof, said cap portion being fixedly connected to the other part of said coupling means, said elastic coupling means resiliently absorbing the excessive force of a blow against said handle member whereby damage to said control shaft is prevented.

5. A device as set forth in claim 4 wherein said elastic coupling means includes a resilient disc having two sets of bores, and wherein each of said parts of said coupling means includes a set of coupling pins respectively projecting into said sets of bores.

6. A device as set forth in claim 4 wherein said handle

member includes a resilient arm portion, and a flag on the other end thereof.

7. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; a blocking disk fixedly connected to said control shaft for turning movement and having on the periphery thereof two groups of ratchet teeth separated by two smooth peripheral portions, one of said portions having a blocking shoulder; a first pawl normally located on the other peripheral portion and cooperating with said ratchet teeth during turning movement of said disk to permit turning movement only in one direction but permitting turning movement in opposite direction while located on said one peripheral portion; a second pawl normally engaging said shoulder and preventing turning of said wheel in said one direction; a projection on said disk; and a releasing lever cooperating with said second pawl, and being actuated by said projection to release said second pawl from said shoulder when said disk is turned in said opposite direction, and to permit return of the second pawl into engagement with said shoulder during following turning of said disk in said one direction; a handle member; and means connecting said handle member with said control shaft and including a positively interlocked elastic coupling means.

8. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; an elongated handle member; and means connecting said handle member with said control shaft and including a shear pin and positively interlocked elastic coupling means for resiliently absorbing the excessive force of a blow against said handle member, said shear pin being adapted to be shorn off when the force transmitted from said handle member to said control shaft exceeds a predetermined amount.

9. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; an elongated handle member; and means connecting said handle member with said control shaft and including a shear pin and positively interlocked elastic coupling means for resiliently absorbing together with said elastic handle member the excessive force of a blow against said handle member, said shear pin being aadpted to be shorn off when the force transmitted from said handle member to said control shaft exceeds a predetermined amount.

10. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; an elongated elastic handle member; and means connecting said handle member with said control shaft and including a shear pin adapted to be shorn off when the force transmitted from said handle member to said control shaft exceeds a predetermined amount, said elastic handle member resiliently absorbing the excessive force of a blow thereon whereby damage to said control shaft is prevented.

11. In a taximeter, in combination, a control shaft turnable between a plurality of positions for setting the taximeter to different operational conditions; and an elongated elastic handle arm having one end secured to said control shaft so that by manual turning of said handle arm said control shaft is turned, said elastic handle arm being made of an elastic material for resiliently absorbing along the length thereof the excessive force of a blow directed in axial, inwardly radial, or tangential direction against the other end thereof whereby damage to said handle arm and to said control shaft is prevented.

12. An arrangement as set forth in claim 11 wherein said handle arm has a flag on said free end thereof for indicating an operational condition of said taximeter.

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