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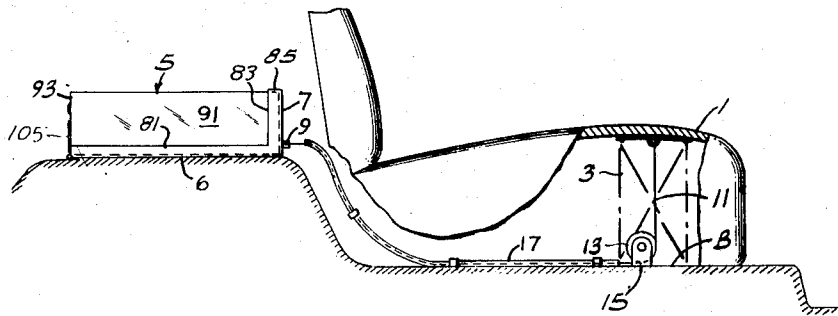
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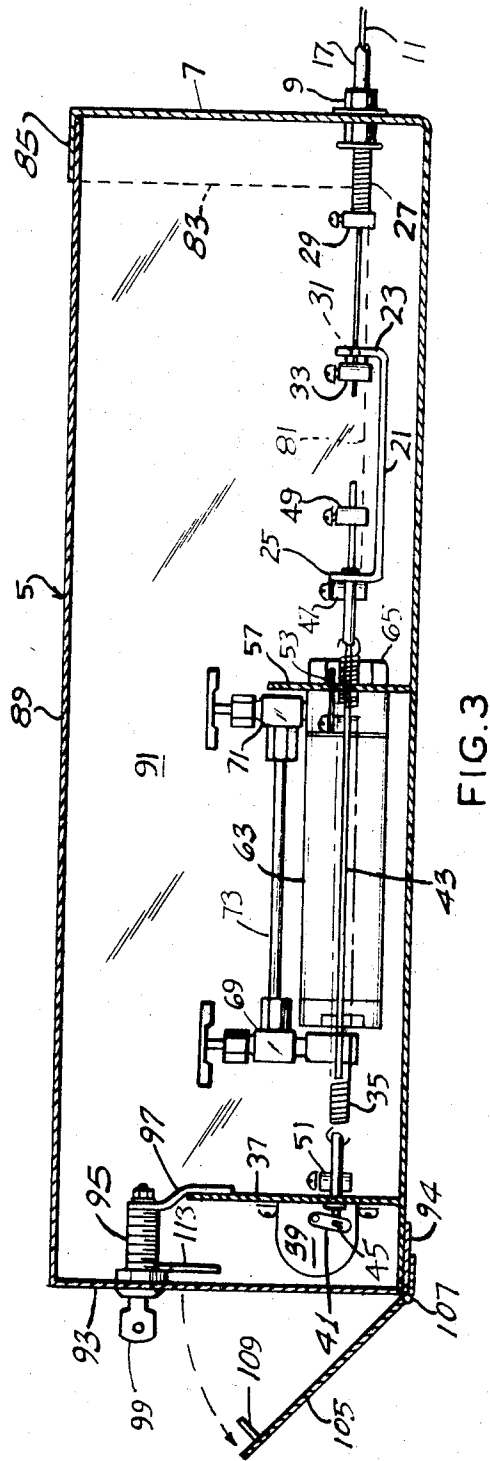
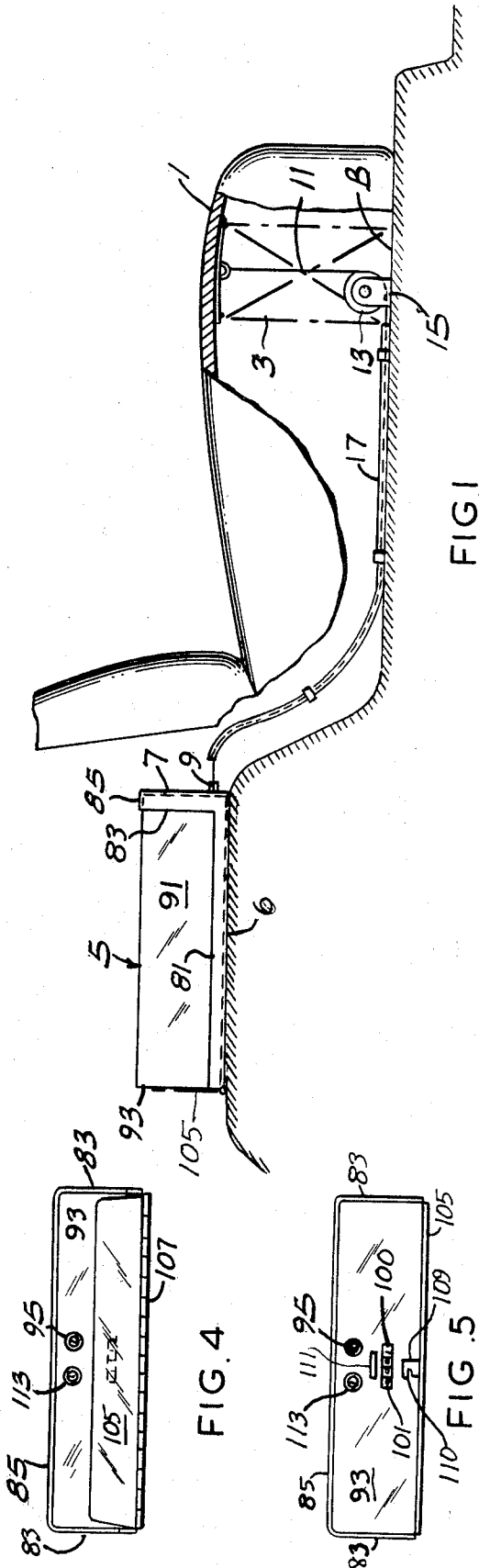
- [54] VEHICLE PASSENGER COUNTER APPARATUS**
16 Claims, 5 Drawing Figs.
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|-------------|------------------------------|---------------------------------------|
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| [50] | Field of Search | 235/30 R,
30 A, 91 R |

[56] **References Cited**
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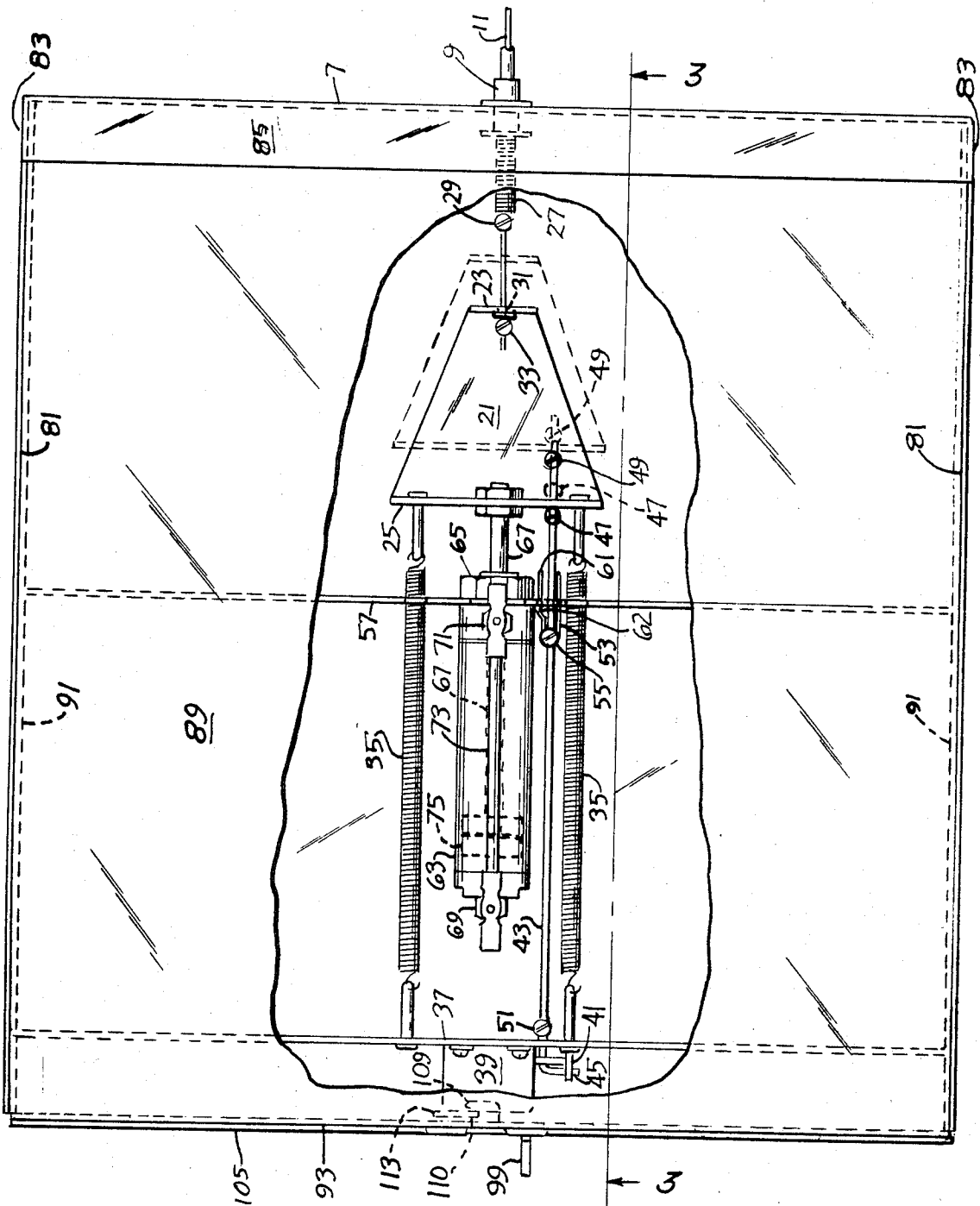
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ABSTRACT: Apparatus for counting the number of passengers occupying a seat, as in a taxicab, includes a tension member having one end vertically movable with a resilient passenger supporting surface, and its other end secured, by means of a lost-motion tension connection to an element resiliently biased in the opposite direction so that the flexible tension member is in tension when the seat is unoccupied and the resiliently biased element is movable away from the seat when the seat is occupied and the tension member is relaxed, the resiliently biased member having a lost-motion connection to the input lever of a counter to move the same in one direction responsive to its biasing means, and in the opposite direction responsive to the application of tension to the tension member, and means for slowing movements of the resiliently biased member irrespective of the rate of movement of the tension member.





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VEHICLE PASSENGER COUNTER APPARATUS

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to automatic counting apparatus and consists particularly in apparatus responsive to seat occupancy, for counting the number of persons occupying a seat, such as that of a taxicab or other public conveyance.

SUMMARY OF THE INVENTION

The invention provides automatic means beyond the control of the driver or operator of a taxicab or the like to count the number of passengers occupying a seat during a given period.

The means provided to this end are relatively inexpensive, compact and tamper proof, and are actuated only by actual occupation of the seat for a substantial period and not by an instantaneous depression of the seat, as for example by a passenger moving across it to another seat.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an environmental side elevational view of the apparatus, with a vehicle seat partially broken away to show the seat responsive actuator.

FIG. 2 is a top view of the counter device, with the housing cover partially broken away to show details of the device.

FIG. 3 is a longitudinal vertical sectional view along line 3—3 of FIG. 2.

FIG. 4 is a rear end elevational view of the housing with the counter dial cover closed.

FIG. 5 is a rear end elevational view of the housing with the counter dial cover open to expose the counter dial.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As best seen in FIG. 1, the invention is applied to an automobile seat cushion 1 containing vertically acting compression springs, as shown at 3, bearing upwardly against the cushion top and biasing the same upwardly, and being substantially compressible when the cushion is occupied by a seated passenger.

The counter apparatus includes a boxlike housing 5, preferably mounted rearwardly of seat cushion 1, and having a bottom wall 6 and forward vertical end wall 7 centrally apertured near its bottom margin, as at 9.

A flexible tension member, preferably wire 11 is connected at its one end to the top of seat cushion 1, and extends downwardly therefrom and under sheave 13, rotatably mounted in a fixed bracket 15 on the seat bottom B, and thence, via a suitably curved tubular casing 17, to and through aperture 9 in housing front wall 7.

The interior arrangement of housing 5 is seen in detail in FIGS. 3 and 4.

A connector plate 21 of isosceles trapezoidal shape in plan, and having its parallel forward and rear margins upturned to form flanges 23 and 25, respectively, is connected by forward flange 23 to the rear end of wire 11 which is maintained taut by a coil spring 27 compressed between the forward wall 7 of housing 5 and screw clamp 29 on wire 11, inwardly of wall 7.

The connection of wire 11 to flange 23 comprises a hole 31 in the center of the flange, through which the wire passes, and a screw clamp 33 or other fixed abutment on the wire rearwardly of the flange, forming a lost-motion connection such that rearward movement of the wire, responsive to a passenger sitting on the seat, will free connector plate 21 to move rearwardly, while forward movement of wire 11, responsive to a passenger rising from the seat, will cause wire 11 to pull plate 21 forwardly.

Plate 21 is biased rearwardly toward the solid line portion of plate 21 in FIGS. 2 and 3 by a pair of transversely spaced, longitudinally extending coil springs 35, secured at their forward ends to rear flange 25 of plate 23 and anchored at their rear

ends to an upstanding transverse wall 37 extending across the rear portion of housing bottom wall 6. Springs 35 have a somewhat lower rate than seat spring 3, so that the latter normally maintains plate 21 in the forward (broken line) position when the seat is unoccupied.

A counter 39 is mounted on the central portion of the rear surface of wall 37, with its face projecting rearwardly, and has an input lever 41 projecting from one side. The counter is of the reciprocating type, i.e., requires movement of the input lever in both directions to advance one count.

For providing the necessary reciprocating actuation to lever 41, a longitudinally extending rod 43 is pivotally connected at its rear end at 45 to lever 41, and its forward end passes through a hole in connector plate rear flange 25. Since the angular movement of counter lever 41 is relatively small compared to the linear movement of connector plate 21, a lost motion connection, comprising a pair of spaced screw clamps 47 and 49 are mounted on rod 43 on opposite sides of connector plate rear flange 25.

From the foregoing it will be evident that, when seat 1 is unoccupied, spring 3 will cause wire 11, acting through clamp 33, to hold connector plate 23 at the forward (broken line) position of FIG. 2, in which flange 25 engages forward clamp 49 on rod 43 and holds counter lever 41 in its forward position, and that when a passenger occupies seat 1, compressing spring 3 and releasing wire 11, spring 27 will urge wire 11 rearwardly, permitting springs 25 to pull connector plate 21 rearwardly so that after some rearward movement, flange 25 will engage clamp 47 on rod 43, pushing rod 43 rearwardly and causing an accompanying rearward movement of lever 41, and thereby registering one-half count on counter 39. When the passenger arises from seat 1, spring 3 pulls wire 11 forward, causing clamp 33 to exert a corresponding pull through flange 23 on plate 21, so that after some forward movement, rear flange 25 engages forward clamp 49, pulling rod 43 forward, causing an accompanying forward movement on counter lever 41, thereby registering the additional half-count on the counter, to complete a full count.

To limit the rearward movement of rod 43, a screw clamp 51 is secured to rod 43 a short distance forward of transverse wall 37, for abutting relation therewith when the rearward limit of counter lever movement is reached, and to hold rod 43, and lever 41, in their extreme forward and rear positions during lost motion of connector plate 21, a generally U-shaped spring wire clip 53 is secured to rod 43 by a screw clamp 55, with the legs of the clip extending generally parallel to rod 43. Intermediate the ends of housing 5 and slightly rearwardly of the rear position of connector plate 21, a second upstanding transverse wall 57 is provided on bottom wall 6, wall 57 being perforated to permit the uninterrupted passage therethrough of springs 35, rod 43 and one straight leg 59 of clip 53. The other leg 61 of clip 53 also passes through a small hole in wall 57 and is formed intermediate its ends with a shallow generally V-shaped offset 62 with its forward slope engageable with wall 57 when lever 41 is in its rear position and with its rear slope engageable with wall 57 when lever 41 is in its forward position.

To prevent the registration of a count on counter 39 when seat cushion 1 is momentarily depressed, as by a passenger sitting on it for an instant while moving to another seat, a time delay device, which may include longitudinally extending hydraulic cylinder 63, mounted on transverse wall 57 between springs 35 by nut 65, and connected by piston rod 67 to rear flange 25 of connector plate 21. At its end cylinder 63 communicates respectively with valves 69 and 71, which are connected to each other by external conduit 73. It will be evident that, as piston 75 is moved lengthwise in cylinder 63 by piston rod 67, it will force fluid through valves 69 and 71 and conduit 73, so that by regulating valves 69 and 71 the rate of flow through them can be controlled and the velocity of piston 75, its rod 67 and connector plate 21 can be maintained at a slow, constant, value, irrespective of the speed at which the seat spring is depressed and released.

Preferably, housing 5 has continuous flanges including upstanding flanges 81 along the side margins of bottom wall 6, rearward flanges 83 along the side margins of forward wall 7 and a rearward flange 85 along the top margin of forward wall 7.

A cover, consisting of horizontal top wall 89, spaced vertical sidewalls 91 and vertical rear wall 93 with a forwardly directed flange 94 along its lower rim is arranged for nesting relation with respect to bottom wall 6, front wall 7 and their marginal flanges 81, 83 and 85, and can be locked in closed position by a key-controlled lock 95 mounted on end wall 93 and having a rotatable latch member 97 selectively lockingly engageable with the forward surface of transverse wall 37 and disengageable therefrom by turning key 99.

Rear wall 93 also has a small aperture 100 in registry with the face 101 of counter 39 to permit reading of the counter without removal of housing cover 89, 91, 93. However, to prevent unauthorized reading of the counter, a flap 105 is connected to bottom wall 6 by hinge 107 along the bottom margin of the rear wall 93 and, when closed, covers counter face aperture 100. For locking it in closed position, flap 105 has an inwardly extending notched tab 109 on its inner surface adjacent its upper margin, and rear wall 93 is slotted at 111 to permit tab 109 to project inwardly therethrough. A second key-actuated lock 113, mounted in wall 93 adjacent lock 95 has a rotatable latch member 113 receivable in notch 110 of tab 109 to lock flap 105 closed, and movable out of notch 110 by rotation of the key to open the flap.

Operation of the apparatus is as follows: When a passenger boards a taxicab equipped with the apparatus, if he temporarily lowers himself onto a first seat enroute to a permanent seat, spring 27 of the apparatus connected to the first seat will cause wire 11 to move rearwardly, freeing connector plate 21 to be pulled rearwardly by springs 35. However, any initial rearward movement of plate 21 is not transmitted to rod 43 and counter lever 41, because of the lost-motion connection (clamps 47) between flange 25 and rod 43, and such initial movement is sufficiently slowed by the delaying action of the time delay device, cylinder 63, piston 75, piston rod 67, valves 69 and 71 and conduit 73, that any such temporary seat occupancy will not register on the counter, and when the passenger rises to move to his permanent seat, seat spring 3 will return wire 11 to its forward position.

When the passenger moves to his permanent seat, compressing spring 3 thereunder, the associated spring 27 will pull wire 11 rearwardly, causing clamp 33 to free connector plate 21 for rearward movement. Because of the slowing action of the time delay device on connector plate 21, a predetermined period will elapse before flange 25 engages clamp 47 on rod 43 to move rod 43, yieldingly held in forward position by clip 53, and counter lever 41 toward rear position, thus effecting a half-count on the counter. If the passenger temporarily rises from the seat for an instant, even though spring 27 will pull forwardly on wire 11, such movement will be resisted by the time delay device and when the passenger reseats himself, the cycle will continue. When the passenger finally arises from the seat to disembark from the taxicab, leaving the seat vacated, and spring 3 exerts a forward pull on wire 11, the latter will eventually overcome the retarding effect of the time-delay means, causing flange 25 to engage clamp 49 on rod 43 and move the latter and with it counter lever 41 forwardly to complete the count.

The details of the apparatus described herein may be varied without departing from the spirit of the invention and the exclusive use of such modifications as come within the scope of the appended claims is contemplated.

We claim:

1. Apparatus for counting successive occupants of a seat comprising a tension member relieved of tension responsive to occupancy of the seat and placed in tension responsive to vacating of the seat, a connector element, a lost-motion tension connection between said member and said element, a counter device, input means on said counter device causing

one-half count per input movement in each direction, a further connection between said input means and said connector element, spring means biasing said connector element into tensile relation with said first named lost-motion connection, but being of insufficient strength to overcome tension applied to said tension element by the seat, whereby when the seat becomes occupied, said spring means moves said connector element, which causes movement of said further connection to move said counter device input means in the same direction to register one-half count on said counter device, and when the seat becomes vacated said tension element is placed in tension, causing said tension lost motion connection to become operative to move said connector element in the opposite direction, which causes movement of said device input means in the same opposite direction and thereby register another one-half count on said counter device.

2. Apparatus according to claim 1 including means for slowing operation of said connector element in both directions whereby to make its movements nonresponsive to the application of tension to and removal of tension from said tension member when said seat is occupied only temporarily.

3. Apparatus according to claim 2 wherein said slowing means comprises a cylinder, a piston therein, means connecting said piston to said connector element, fluid in said cylinder on both sides of said piston, and reduced diameter passage means connecting the portions of said cylinder on opposite sides of said piston.

4. Apparatus according to claim 3 wherein said passage means contains valve means for manually regulating its size whereby to control precisely the rate of movement of said piston.

5. Apparatus according to claim 2 wherein said further connection between said connector element and said counter device input means includes a double-acting lost-motion connection whereby only the end portions of movements of said connector element are transmitted by said further connection to said input means.

6. Apparatus according to claim 5 wherein said further connection is a rodlike member elongated in the same direction as that of the movement of said connector element and said connector element has a portion transverse of said rodlike member, said portion being apertured, said rodlike member passing through said aperture, said double-acting lost-motion connection comprising a pair of spaced abutments on said rodlike member on opposite sides of said transverse portion.

7. Apparatus according to claim 1 wherein the seat has an upwardly acting spring and said tension member is connected to the upper end of said spring.

8. Apparatus according to claim 7 wherein said tension member is a cable.

9. Apparatus according to claim 8 wherein said tension lost-motion connection comprises a portion of said connector element transverse of said tension member, an aperture in said portion, said tension member extending through said aperture and having abutment means engaging the side of said transverse portion remote from the seat.

10. Apparatus according to claim 1 including a housing enclosing said connector element, said tension lost-motion connection, said counter and its input means, and said further connection.

11. Apparatus according to claim 10 wherein said counter device has a dial and the housing is formed with an aperture in registry with said counter device dial, there being a cover for said dial aperture hinged to said housing, and means for releasably locking said cover in closed position.

12. Apparatus according to claim 10 wherein said housing includes a bottom portion and a cover portion, said dial aperture being formed in said cover portion, and separate locking means for securing said cover portion to said bottom portion.

13. Apparatus according to claim 12 wherein said bottom portion includes a bottom wall and an upstanding transverse end wall, said end wall being apertured to permit the passage therethrough of said tension member, structure secured to

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said bottom wall anchoring said spring means thereto, and means supporting said counter device from said bottom wall near the end of said bottom wall remote from said end wall.

14. Apparatus according to claim 13 wherein said cover portion includes a top wall and an end wall remote from said bottom portion end wall, said dial aperture being formed in said cover portion end wall.

15. Apparatus according to claim 14 wherein said cover portion lock is mounted in said cover portion end wall and

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comprises a tab rotatable in a transverse plane inwardly of said cover portion end wall, said bottom portion having a transverse surface between said tab and said cover portion end wall selectively engageable with said tab by manual actuation of said lock.

16. Apparatus according to claim 15 wherein said dial aperture cover comprises a flap on said cover portion end wall.

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