

[54] APPARATUS FOR ATTACHING A TYPE HEAD

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p. 214 article by R. D. Matthews " Spherical Type Element
Holding Device"**

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[30] Foreign Application Priority Data

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[51] **Int. Cl.** B41j 1/60

[58] **Field of Search**.....197/52. 16

[56] **References Cited**

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[57] ABSTRACT

Holding portions of a carrier shaft pass through a type head and have slots above the same located in a cap on the type head. An arresting slide is mounted in the cap and has an arresting end position located in the slots so that the cap retains the type head, and an inoperative end position in which the type head can be detached. A handle lever is mounted on the cap and connected by a spring with the arresting slide in such a manner that the spring is more tensioned in an intermediate dead center position than in the arresting and inoperative positions, and the arresting slide tends to remain in either end position.

10 Claims, 7 Drawing Figures

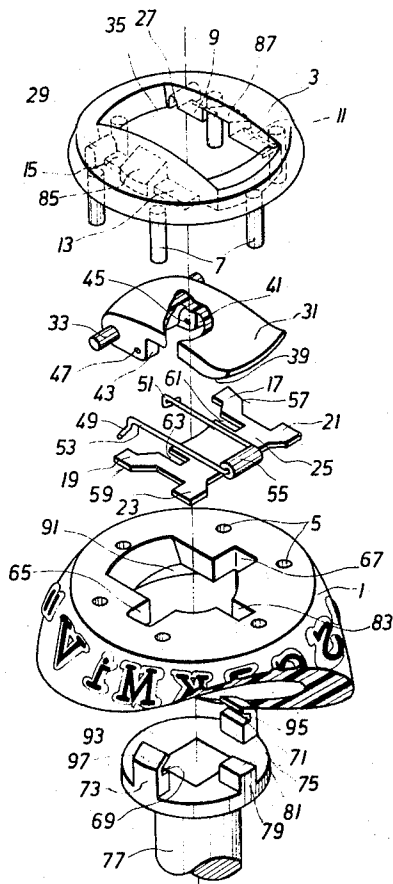


FIG. 2

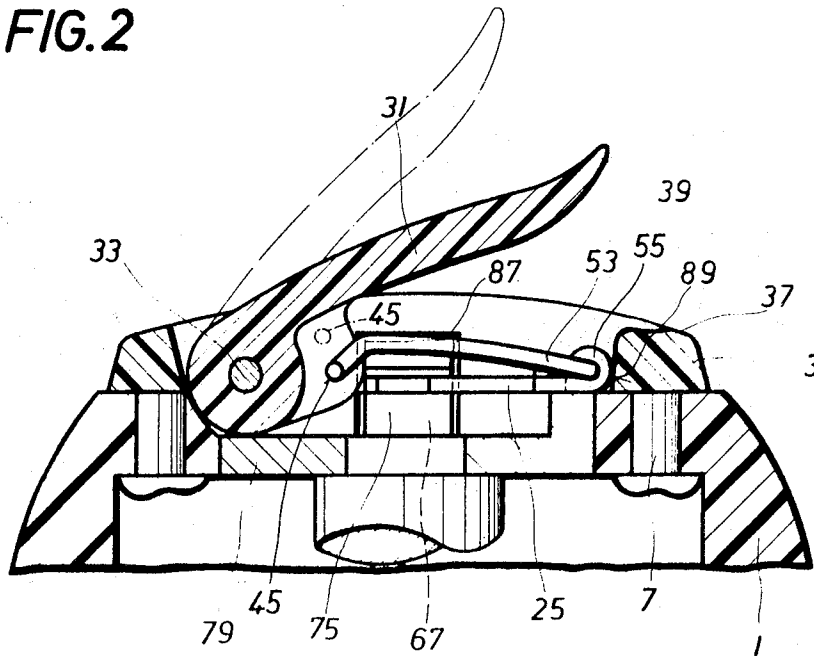
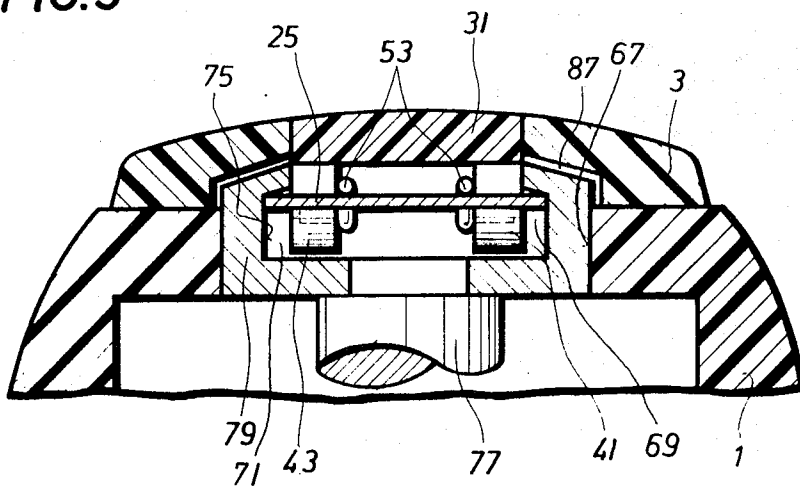


FIG. 3



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Fig. 2a

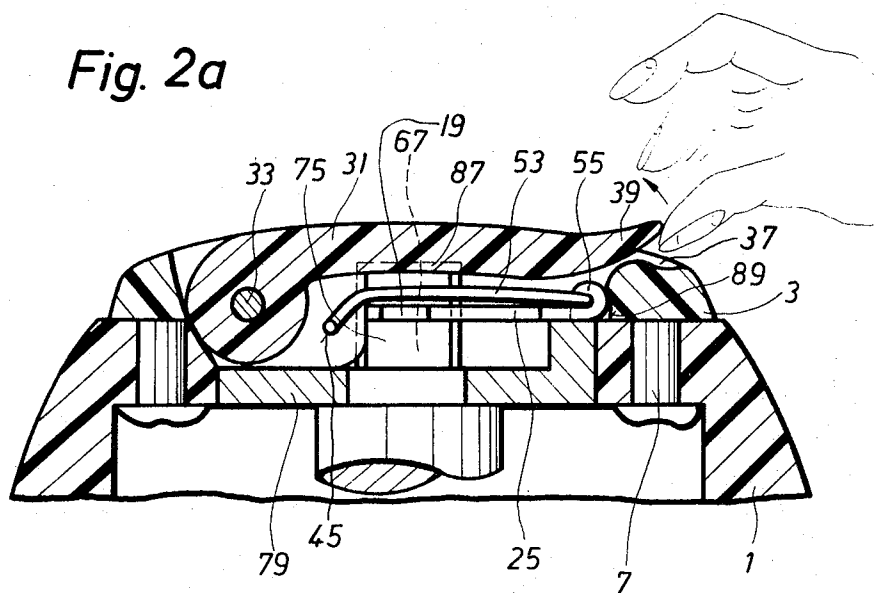
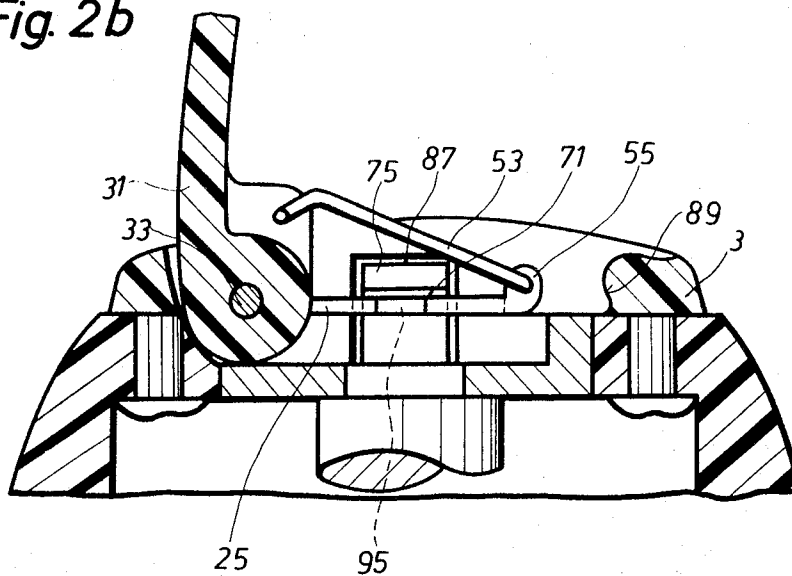


Fig. 2b



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FIG. 4

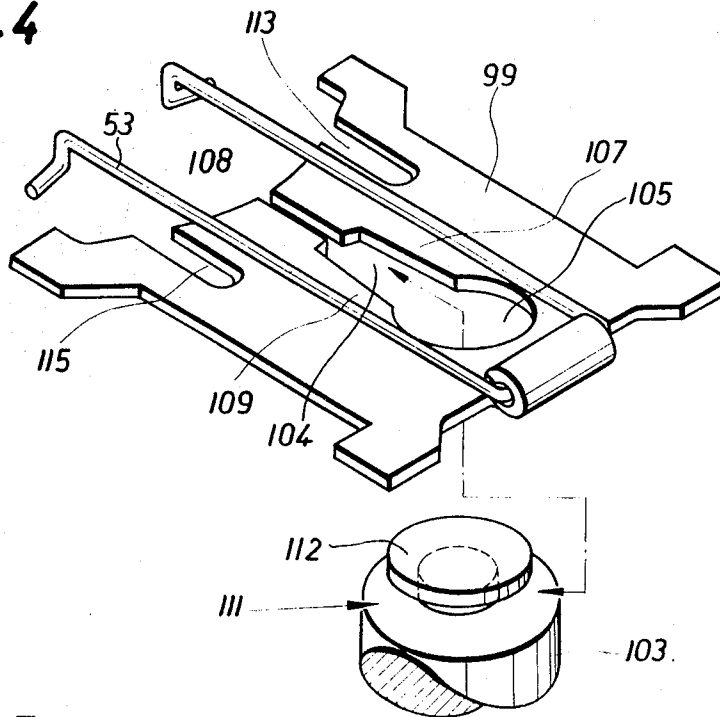
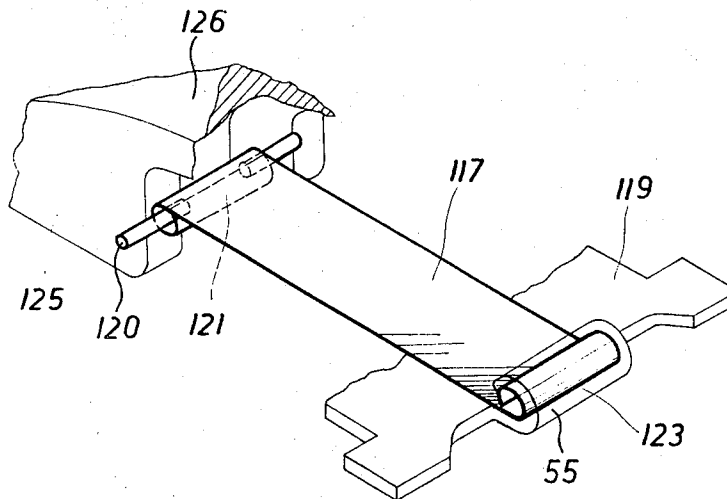


FIG. 5



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APPARATUS FOR ATTACHING A TYPE HEAD

BACKGROUND OF THE INVENTION

The present invention is concerned with an apparatus for detachably attaching a type head to the top end portion of a carrier shaft by means of a handle lever and an arresting member connected with the same and engaging the carrier shaft.

Typewriters and similar office machines are provided with type heads carrying circular rows and columns of types. It is necessary to exchange the type head when different languages using different characters are used, or when specific symbols are required. It is desirable that the type head can be easily detached, and that a new type head can be attached without soiling the hands, or dropping of the type head.

The U.S. Pat. No. 3,307,677 discloses an apparatus in which the retaining cap on the type head is provided with a pivotably mounted handle lever which acts through cam surfaces on a wire spring, also located in the cap and engaging a slot in a portion of the carrier shaft. The operation of this device required a certain dexterity, and the handle lever must be operated against the continuously rising force of the spring, and must be carefully handled so that the operating finger does not slip off the handle lever which would cause the snapping back of the handle lever to its initial position. Furthermore, arresting means are provided to arrest the arresting member in two end positions.

The arresting means serving this purpose, and the cam surfaces cooperating with the ends of the wire spring are subject great wear when the type head is frequently exchanged. Consequently, it is required to make the cam surfaces of a hardenable material, which increases the cost. Several operations, such as turning, hardening, testing and injection molding are required for manufacturing the apparatus of the prior art.

SUMMARY OF THE INVENTION

It is one object of the invention to overcome the disadvantages of the known attaching apparatus for type heads, and to provide an attaching apparatus which permits easy attachment and detachment of a type head to a carrier shaft.

Another object of the invention is to provide an inexpensive apparatus serving this purpose.

Another object of the invention is to retain the type head by means which have a dead center position so that the arresting member tends to remain either in the arresting position or in the inoperative position in which the type head can be removed.

With these objects in view, the present invention provides an arresting slide which is connected by a spring with a handle in such a manner that the handle and the arresting slide are movable between two end positions through a dead center position in which the spring is more tensioned than in the end positions in which the arresting slide is either the arresting position, or in an inoperative position. This arrangement has the advantage that the handle is arrested in both end positions in a simple manner by the spring, so that additional arresting means for arresting the arresting slide in the end positions can be omitted, as compared with the prior art. The spring is preferably arranged in such a manner that for moving the handle lever to a position releasing the type head, a greater force is required than for moving the handle lever back to the position in which the type head is arrested on the carrier shaft.

The apparatus can be constructed of simple and inexpensive parts, and the handle lever is not subject to wear and can be manufactured in one operation.

One embodiment of the invention comprises a carrier shaft including a top end portion having holding means, such as slotted portions; means for mounting a type head on the top end portion for detaching movement in axial direction, and also for rotation with the carrier shaft in a position in which the holding means are located above the type head; retaining means including a cap secured to the type head, and an arrest-

ing slide mounted in the cap for movement between an inoperative position, and an arresting position engaging the cap and the holding means for holding the type head on the top end portion; and operating means including a handle mounted on the cap for angular movement about a first axis, and spring means connected with the handle for angular movement about a second axis, and being connected with the arresting slide for angular movement about a third axis.

In this manner, the operating means can be moved between two end positions in which the arresting slide is in the inoperative and arresting positions, respectively, but has an intermediate dead center position in which the first, second, and third axes are located in the same plane. As a result, the spring means is more stressed in the dead center position than in the end positions, and the arresting slide tends to remain in any one of the inoperative and arresting positions into which it is urged by the spring means.

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 drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an exploded perspective view illustrating an embodiment of the invention;

FIG. 2a is a fragmentary sectional view illustrating the embodiment of FIG. 1 in the attached and locked position of the type head;

FIG. 2 is a fragmentary sectional view corresponding to FIG. 2a, but illustrating the dead center position of the apparatus;

FIG. 2b is a fragmentary sectional view corresponding to FIG. 2a, but illustrating the apparatus in an inoperative position in which the type head can be detached;

FIG. 3 is a fragmentary cross sectional view illustrating the apparatus of FIG. 2a in the locked position;

FIG. 4 is a fragmentary perspective exploded view illustrating a modification of the apparatus; and

FIG. 5 is a fragmentary perspective view illustrating another modification of the apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawing, and particularly to FIGS. 1 to 3, a cap 3 has downwardly projecting pins 7 located in corresponding bores 5 of a type head 1, the ends of the pins being spread as best seen in FIG. 2 so that cap 3 is fixedly secured to the type head 1. Cap 3 has recesses 9, 15, 11, 13, in which arresting arms 17, 19, and guide arms 21, 23 of an arresting slide 25 are located.

The bottom of cap 3 has recesses 27, 29 in which a shaft 33 fixedly secured to a handle lever 31, is mounted for rotation in the assembled condition of cap 3.

Cap 3 has also a large cutout 35 whose contour corresponds to the outline of the handle lever 31.

Handle lever 31 has a reduced end portion 39, which abuts in the closed position of FIG. 2a on a slightly recessed portion 37 of cap 3 so that manual engagement is facilitated.

Handle lever 31 has two projecting portions 41, 43 with bores 45, 47 into which transversely projecting end portions 49, 51 of a U-shaped wire spring 53 project. Wire spring 53 has a yoke portion which is located in a tubular portion of the arresting slide 25 and is turnable in the same.

Arresting arms 17, 19 of the plate-shaped arresting slide 25 have conical or slanted arresting edges 57, 59 whose spring action is improved by slits 61, 63 in arresting slide 25.

Type head 1 has cutouts 65, 67 for receiving upwardly projecting holding portions 73, 75 of a coupling end portion of carrier shaft 77. The coupling end portion further includes an upwardly projecting coupling portion 79 which precisely fits

into a corresponding recess 83 of type head 1 so that the same is connected for rotation with the carrier shaft 77, but can be moved in axial direction to a detached position, substantially as illustrated in FIG. 1. The holding portions 73 and 75 have confronting holding slots 69,71 which, in the assembled condition of the apparatus, are located above the top face of type head 1 and in recesses 85,87 of cap 3. Slots 69, 71 have conical or slanted faces 95,97 cooperating with corresponding conical or slanted arresting edges 57,59 of arresting arms 17,19 of arresting slide 25. In this manner, tight engagement between the arresting slide 25 and the holding portions 73,75 is assured in the arrested condition of the type head.

FIGS. 2a and 3 illustrate the apparatus in the position in which the type head is arrested, and can be used. The arresting slide 25, and more particularly the arresting arms 17 and 19 are located in the corresponding slots 69 and 71, and the end portion 39 of handle lever 31 abuts portion 37 of cap 3. The arresting slide 25 is in a position in which its tubular bearing portion 55 abuts an inner face portion 89 of cap 3. For detaching the type head, the operator engages with a finger, the end portion 39 and turns handle lever 31 in counter-clockwise direction to the position shown in FIG. 2. In this position, the axis of pin 33, the axis defined by bores 45,47, and the axis defined by the tubular bearing portion 55 are located in the same plane so that the legs of spring 53 are stressed. Consequently, the turning of the handle lever 31 from the position of FIG. 2a to the position of FIG. 2, requires some force to overcome the increasing force of spring 53 until the dead center position of FIG. 2 is reached. In the position of FIG. 2, the spring 53 is substantially curved, but since the vector of the force passes through the axis of pin 33, no turning moment is exerted by the spring on handle lever 31.

When handle lever 31 is moved slightly beyond the dead center position shown in solid lines in FIG. 2, the spring 53 acts on handle lever 31 to move the same quickly to the position shown in chain lines in FIG. 2.

In the positions of FIGS. 2a and 2, the tubular bearing portion 55 of the arresting slide 25 abuts the face 89 of cap 3, but when handle lever 31 is now moved further from the position shown in chain lines in FIG. 2 to the position of FIG. 2b, the arresting slide 25 is moved out of its arresting position located in slots 69,71, to an inoperative position in which head 1 and cap 3 can be moved upward along the holding projections 73 and 75 to a detached position. During the detaching movement, handle lever 31 can be held by the operator together with the removed type head.

When the type head 1 is to be mounted on the carrier shaft 77, it is turned until its cutout 83 is located above the coupling projection 81 axially aligned with the same so that the type head can be placed on projections 79,73,75. The downward movement of the type head 1 is terminated when the bottom plate 91 of type head 1 rests on the top surface of the flange 93 of the end portion 79 of carrier shaft 77.

During this operation, the apparatus is in the open position as shown in FIG. 2b so that the arresting slide 25 does not interfere with the placing of the type head on the carrier shaft 77. Handle lever 31 is then moved by applying a small manual force to the position shown in broken lines in FIG. 2, in which the tubular end portion 55 of arresting slide 25 abuts the inner face 37 of cap 3, and arresting arms 17,19 are located in the corresponding slots 71 and 69. Consequently, the type head 1 is already arrested, but during further movement of handle lever 31 in clockwise direction, the parts assume the dead center position shown in FIG. 2 in which spring 53 is stressed without any further displacement of arresting slide 25.

When handle lever 31 is moved beyond the dead center position to the position shown in FIG. 2a, the stress of spring 53 is reduced, and only a small spring force is effected, as indicated by the slight curvature of spring 53 shown in FIG. 2a. Since the dead center position is intermediate the two end portions of the apparatus in which the arresting slide 25 is operative and inoperative, respectively, the apparatus tends to remain in either end position, and a force is required for mov-

ing the apparatus out of either end position and through the dead center position toward the other end position.

The slanted arresting edges 57,59, and the faces 95,97 of slots 69,71 assure the elimination of any play so that type head 1 precisely abuts the corresponding top face 93 of end portion 79 of carrier shaft 77.

FIG. 4 illustrates a modification in which an arresting slide 99 provided with a spring 53 cooperates with an annular peripheral slot 111 forming a flange 112 on a carrier shaft 103. A slit 108 in the arresting slide 99 forms two arresting arms 107,109 on opposite sides of an opening which has a larger substantially circular portion 105 and a narrower portion 104 communicating with slit 108. Flange 112 can be inserted through the larger portion of the opening 105, and when the slide 99 is shifted, as explained with reference to FIGS. 1 to 3, the narrower portion 104 is placed in the region of the annular peripheral slot 111 so that the arresting arms 107,109 engage the conical surface of the slot 111 and secure the arresting slide 99, and thereby the type head to the carrier shaft 103. Slots 113 and 115 improve the resiliency of the arresting arms 107,109.

In the modified embodiment of FIG. 4, the spring has the form of a leaf spring 117 with a tubular end portion 121 surrounding a pin 120 passing through bores in projecting portions 125 of the handle lever 126. The other end of the leaf spring 117 is also rolled in to form a journal 123 located in the tubular end portion 55 of the slide 119. The springs 53 or 117 are arranged in such a manner that the handle lever 31,126 is slightly pre-tensioned by spring 53,117 in both end positions of the arresting slide 95,119. This has the advantage that additional arresting means for holding the handle lever 31 in its end position, are not required. The dead center position of the apparatus is preferably arranged in such a manner that in the arresting end position, the handle lever 31,126 is more pre-tensioned than in the opened end position. The apparatus of the invention can be used not only for attaching a type head, but also for performing similar tasks in other machines, for example for detachably arresting the shuttle of a sewing machine.

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 apparatus for attaching a type head differing from the types described above.

While the invention has been illustrated and described as embodied in arresting apparatus for a type head including arresting means having a dead center position, 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 protected by Letters Patent is set forth in the appended claims.

I claim:

1. Apparatus for attaching a type head, comprising a carrier shaft including a top end portion having holding means; a type head; means mounting said type head on said top end portion for detaching movement in axial direction, and also for rotation with said carrier shaft in a position in which said holding means are located above said type head; retaining means including a cap secured to said type head, and an arresting slide mounted in said cap for movement between an inoperative position, and an arresting position engaging said cap and said holding means for holding said cap and thereby said type head on said top end portion; and operating means including a handle mounted on said cap for angular movement about a first axis, and spring means connected with said handle for angular

movement about a second axis, and being connected with said arresting slide for angular movement about a third axis whereby said handle can be moved between two end positions in which said arresting slide is in said inoperative and arresting positions, respectively, and through an intermediate dead center position in which said first, second, and third axes are located in the same plane and said arresting slide abuts said cap so that said spring means is more stressed in said dead center position than in said end positions whereby said operating means is biased to any one of said end positions when moved from the respective other end position through said dead center position and said arresting slide tends to remain in any one of said inoperative and arresting positions.

2. Apparatus as claimed in claim 1 wherein said holding means include open slot means; and wherein said arresting slide is a plate including arresting arms located in said slot means in said arresting position, and located outside of said slot means in said inoperative position.

3. Apparatus as claimed in claim 2 wherein said slot means include confronting open slots in which said arresting arms are located in said arresting position.

4. Apparatus as claimed in claim 3 wherein said slots have slanted faces; and wherein said arresting arms have slanted lateral edges engaging said slanted faces wedged against the same in said arresting position of said arresting slide.

5. Apparatus as claimed in claim 3 wherein said open slots have a trapezoid cross section.

6. Apparatus as claimed in claim 3 wherein said slide has slits bounding said arresting arms.

7. Apparatus as claimed in claim 1 wherein said top end portion of said carrier shaft has an annular peripheral slot forming a flange; and wherein said arresting slide is a plate having arresting arms located in said annular peripheral slot in said arresting position, and located outside of the same in said inoperative position.

8. Apparatus as claimed in claim 7 wherein a pair of said arresting arms forms an opening for said top end position having a wide portion for the axial passage of said flange in said inoperative position, and a narrow portion into which said annular peripheral slot fits in said arresting position.

9. Apparatus as claimed in claim 1 wherein said handle is a lever having a pair of projecting portions formed with aligned bores; wherein said spring means includes a substantially U-shaped wire spring having legs, and transverse projecting portions at the ends of said legs projecting into said bores, respectively, and a yoke portion forming a journal mounted at one end of said arresting slide for angular movement about said third axis.

10. Apparatus as claimed in claim 1 wherein said handle is a lever having a pair of projecting portions having aligned bores, and a pin located in said bores; and wherein said spring means include a leaf spring having a tubular end portion forming a bearing for said pin, and a second end portion forming a journal; and wherein said arresting slide has an end portion formed as a tubular bearing supporting said second end portion for movement about said third axis.

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