Sept. 28, 1937. B. ROBERTS 2,094,468

QUICK ACTING INDEX

Filed April 11, 1936

Fig. 1

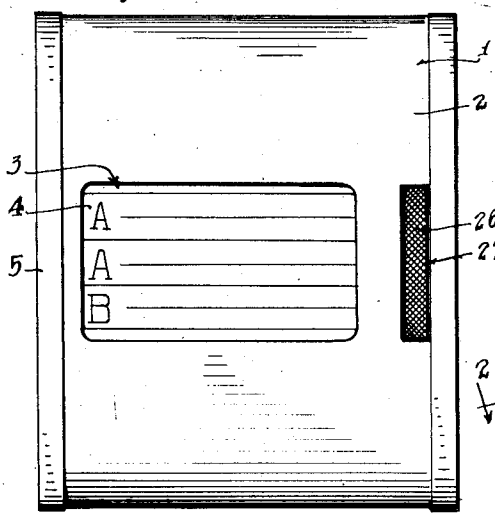


Fig. 3

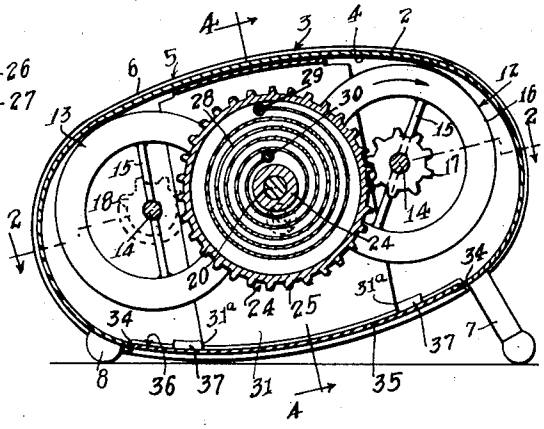


Fig. 2

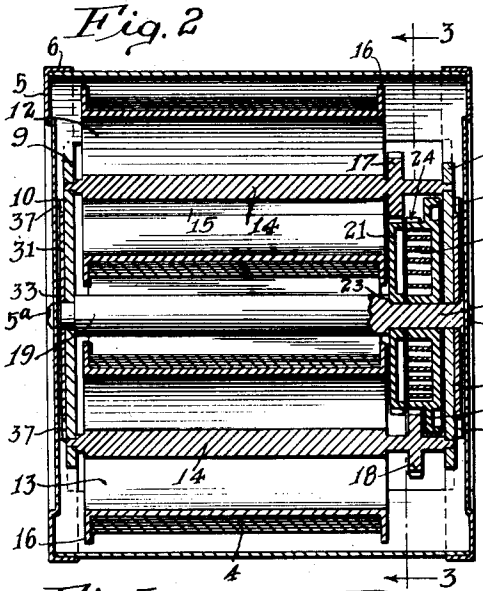


Fig. 4

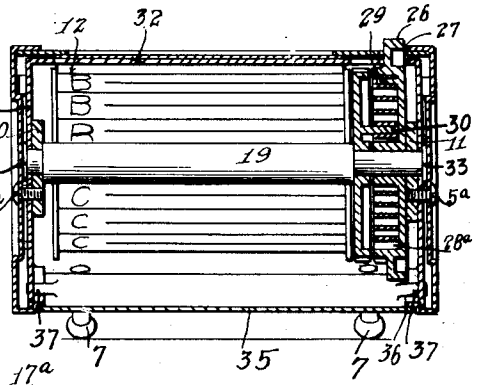


Fig. 5

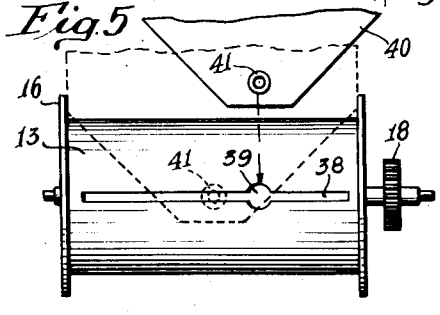
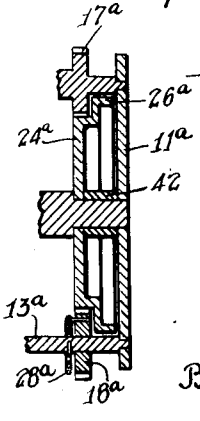


Fig. 6



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QUICK ACTING INDEX

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Application April 11, 1936, Serial No. 73,943

6 Claims. (Cl. 40—95)

This invention relates to a mechanically-controlled index. Indexes of this type are very useful for telephone indexes, and in their construction they usually embody a pair of opposed drums carrying a web that is wrapped on the drums. The web carries an index, and the construction usually involves the use of a rim projecting out of the case so as to be operated by one's hand; and this rim actuates "step-up" gearing that operates to rotate the drums at a relatively high speed. In this way a person using the index can very quickly bring any desired point of the index to the window of the casing.

The general object of this invention is to produce a quick-acting, or mechanically-controlled, index of this general type, having a very simple construction, which will enable it to be manufactured at a very low cost.

By reason of the fact that the virtual diameter of the drums is constantly changing, it is not feasible to provide a positive drive for the drums.

One of the objects of this invention is to provide an improved driving means for the drums, which will provide accommodation for the changing virtual diameters of the drums, and which will operate at all times to maintain the web taut while the web is being driven, and also when the mechanism is at rest.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient quick acting index.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Fig. 1 is a plan of a mechanically-controlled index embodying my invention.

Fig. 2 is a section taken through the device in a nearly horizontal plane, and illustrating details of the mechanism. This view is taken about on the line 2—2 of Fig. 3.

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2, and further illustrating details of the device.

Fig. 4 is a section on Fig. 3, taken in the plane of the line 4—4, and further illustrating details of the device.

Fig. 5 is a side elevation of one of the drums on which the index web is carried, and also illustrating a portion of the end of the web in the act of being secured to the drum.

Fig. 6 is a fragmentary horizontal section showing parts corresponding to the right end of Fig. 2, and illustrating another embodiment of the invention, certain parts being broken away.

Before proceeding to a more detailed description of the invention, it should be stated that in this type of index employing a web, the ends of which wrap on oppositely disposed drums, it is not possible to provide a positive drive for both drums at a uniform speed because as the web accumulates on one of the drums, the virtual diameter of this drum increases, and this will tend to take the web from the other drum at a faster speed than the drum is rotated by its positive drive. For this reason it is necessary to provide a driving mechanism that will accommodate itself to the changing virtual diameters of the drums by reason of the accumulation, or depletion of the layers of the web wrapped on the drums.

In accordance with my invention, I provide a pair of opposed drums carrying the ends of the webs wrapped upon the same. I also provide a driving member with means for driving the same by hand, or by other suitable means. This driving member drives mechanism that positively drives one of the drums, and this driving mechanism also operates to drive the other drum. In this way, both drums are driven simultaneously in the same direction. This mechanism includes a coil spring through which the rotating force is imparted to one of the drums. This spring is mounted in such a way that it exerts its force when the web is at rest to maintain the web substantially taut between the drums; and this spring is mounted in such a way that tension is always maintained in the spring, and the driving force for the drum driven through the spring is imparted by a tensile force exerted in the spring.

Referring more particularly to the parts, 1 indicates the casing of the device, which preferably includes a shell 2 having a window 3 at which the web 4 is exposed to view. The casing is completed at its ends by heads 5 with flanges 6 that slip over the ends of the shell 2.

The casing in cross-section presents the general shape of an oval, as indicated in Fig. 3, and may be supported on a pair of long legs 7, and short fore legs 8. In this way the device is supported in a somewhat tilted position, which facilitates the reading of the index when the device is used on the top of a desk.

Within the casing I provide a frame 9 of any suitable construction, said frame preferably including a pair of oppositely disposed end plates 10 and 11 (see Fig. 2). Between these end plates two opposed drums 12 and 13 are rotatably mounted. Each drum preferably consists of a die casting having a central arbor 14 cast integral with radial webs 15 that connect the same to the cylindrical shell of the drum (see Fig. 3). The drums are preferably provided with end flanges 16 that assist in retaining the layers of the web 4 that wrap upon the drums.

The drum 12 is preferably formed with an integral pinion 17. The drum 13 is formed with a similar integral pinion 18, which is located out of line with the pinion 17 (see Fig. 2). The frame preferably includes a fixed arbor 19 having a reduced neck 20 at the right end of the casing, and on this neck a driven gear wheel 21 is loosely mounted to mesh with the pinion 17. This gear wheel preferably seats against a small shoulder 23, formed at the end of the neck 20. On the neck 20 is also mounted a driving gear wheel 24, which has gear teeth 25 meshing with the pinion 18. Both of these gear wheels 21 and 24 are preferably of a very light or skeleton form, so that their inertia or momentum is negligible.

Means is provided for rotating the driving gear wheel 24, and this is preferably accomplished by providing this gear wheel with a rim 26, which rim is of sufficient diameter to enable its upper edge to project through an opening 27 formed in the shell 2 near the right end of the casing (see Fig. 1). Between the gear wheels 24 and 21 I provide a flexible connection in the form of a spring 28, preferably a coil spring of watch spring type. This spring is connected at one end to the driving gear wheel 24 and at the other end to the driven gear wheel 21, and it is coiled in such a way with respect to its points of attachment that the driving force exerted through the spring 26 on the driven gear wheel 21 that drives the drum 12 in a direction to wind up the web upon it, will be imparted by exerting tension in this spring. One of the reasons for this is that, while the spring presents a flexible drive enabling the drum to accommodate itself to the virtual diameter of the wrapped web, it also insures that when the mechanism is at rest the spring will exert a pull upon the gear wheels in a direction that will maintain the web taut; that is to say, it will tend to rotate both drums in a direction to wind up the web upon them. In the present instance the coil spring is attached at its outer end to a pin 29 near the outer portion of the driving gear wheel 24, and at its other end to a pin 30 located near the hub or axis of the driven gear wheel 21; and the spring, as illustrated in Fig. 3, extends in a clockwise direction around the axis of rotation of the gear wheels from its outer end to its inner end.

With this organization of parts, it will be evident that if the rim 26 is moved downwardly as viewed in Fig. 1, the teeth 25 of the gear wheel 24 will rotate the drum 13 in a clockwise direction, thereby paying out the web toward the drum 12; and the driven gear wheel 21 will be driven by tension of the spring in an anti-clockwise direction. The gear wheel 21, therefore, will rotate the drum 12 in a clockwise direction, and take up the web as fast as it is paid out by the drum 13. The spring should be mounted in position in a condition of tension, and should always be in this condition. If this is done, it will follow that at all times when the mechanism is at rest the force of the spring will tend to rotate the drums in opposite directions, thereby maintaining the web 4 in a taut condition.

The frame 9 preferably includes header plates 31 of substantially rectangular form (see Fig. 3), which extend in a general up-and-down direction, said header plates being integral with, and forming a support for, a bridge or "table" 32, which forms a support for the under side of the web at the window 3 (see Fig. 3). These header plates 31 and also the end plates 10 and 11, are formed with openings through which the ends of the arbor 19 pass, so that the ends of the arbor can be riveted over to form heads 33 to secure these parts together.

The plates 31 may extend down to the under side of the casing, as indicated in Fig. 3. The shell 2 of the casing preferably does not extend throughout the under side of the device, but terminates at edges 34, leaving an opening between these edges. This opening may be closed by a removable concavo-convex door 35, which is received in a recess 36 formed by offsetting the flanges 6 upwardly at this point. In order to hold this door in place, and also use it to assist in holding the header plates 31 in position, I provide the ends of the door with spring catches 37 that snap back of the inset flanges 6 when the door is slipped into position, and the edges of these spring catches 37 abut against the side edges of the header plates 31, as indicated at 31*a*, to hold them fixed.

Referring again to Fig. 2, it will be noted that the spring 28 is carried in the space between the gear wheel 24 and the driven gear wheel 21. The adjacent faces of these gear wheels are recessed so as to form a spring chamber 28*a* between the two gear wheels. As illustrated in Fig. 2, the spring 28 is completely carried in a recess of the driven gear wheel 24, but it is obvious that if desired, this spring could be carried partly in the recess of one of the gear wheels, and partly in the other.

Any suitable means may be employed for attaching the ends of the web to the drums. A simple means for this purpose is illustrated in Fig. 5, which illustrates the drum 13 provided with a longitudinal slot 38 with an enlargement or opening 39 located toward one side of the middle plane of the drum. The end 40 of the web is formed with an under-cut button 41 on its under side, which is slipped down through the opening 39, and the web is then shifted longitudinally to bring it to the middle plane of the drum.

Each head 5 may be secured in place by a small screw 5*a* that is threaded into its corresponding end plate 10 or 11.

By applying one's thumb or fingers to the projecting portion of the rim 26, the web can be quickly moved to bring any lettered division of the index to the window.

In Fig. 6 I illustrate another embodiment of the invention, in which I eliminate the gear wheel 21 and employ a spring associated with one of the drums, for example, the drum 13. Referring to this figure, 24*a* indicates a gear wheel having the same construction as the gear 24, and having a rim 26*a* that projects up through the upper side of the casing in the manner illustrated in Fig. 1. This gear wheel 24*a* meshes with a pinion 17*a* corresponding to the pinion 17 for positively driving its corresponding drum. At the other side this gear wheel 24*a* meshes with a pinion 18*a* that is loose on the shaft 13*a* of the drum

corresponding to the drum 13, and this pinion 18a is connected by a spring 28a to the shaft 13a, and this spring is coiled in a direction such that the winding force imparted to the drum shaft 13a to wind the web onto this drum will be imparted by tensile force exerted in the spring 28a. In using this construction a short sleeve 42 is placed between the gear wheel 24a and its adjacent end plate 11a. In this embodiment of the invention it will be evident that this spring 28a must be applied in such a way that it is always in tension, so that when the mechanism is at rest, the tension of the spring will be exerted in a direction to maintain the web taut.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:

1. In a mechanically-controlled index, the combination of a pair of opposed drums, a web with its ends wrapped about said drums and freely movable at all times in either direction, a hand actuated driving member, and mechanism driven by the driving member for positively driving one of the drums, operating to drive both the drums simultaneously in either direction, said mechanism including a coiled spring for imparting the rotating force to one of the drums and exerting its force when the web is at rest to maintain the web substantially taut between the drums.

2. In a mechanically-controlled index, the combination of a pair of opposed drums, a web with its ends wrapped about said drums, a pinion rigid with one of the drums, a pinion rigid with the other drum, a driving gear wheel meshing with one of said pinions, with hand-actuated means for rotating the same in either direction at all times, a driven gear wheel meshing with the other of said pinions, a spring connecting said gear wheels, said spring being mounted so that it exerts its tension in a direction to maintain the web taut when the drums are at rest, and all of said parts cooperating to enable the web to be freely movable at all times in either direction.

3. In a mechanically-controlled index, the combination of a pair of opposed drums, a web with its ends wrapped about said drums, a pinion rigid with one of the drums, a pinion rigid with the other drum, a driving gear wheel meshing with one of said pinions, with means for rotating the same, a driven gear wheel meshing with the other of said pinions, a spring connecting said gear wheels, said spring being in the form of a coil spring connected at one end to the said driving gear wheel and connected at its other end to the driven gear wheel and coiled in a direction such that the gear wheel that is driven by the spring is actuated by tensile force exerted in the spring, said spring operating when the mechanism is at rest, to exert its tension in a direction to maintain the web taut.

4. In a mechanically-controlled index, the combination of a frame, a pair of opposed drums rotatably mounted in the frame, one of said drums having an integral driving pinion for the same, the other drum having an integral driving pinion for the same located out of line with the first-named pinion, a web wrapped on said drums, an arbor mounted in said frame, a driving gear wheel loosely mounted on the arbor meshing with the last-named pinion and having a rim for rotating the same by hand, a driven gear wheel meshing with the other pinion, a coil spring mounted between the gear wheels connected at one end to the driving gear wheel and at its other end to the driven gear wheel and wrapped in a direction such that winding force transmitted to the first-named pinion is transmitted by tension in the spring to the driven gear wheel, said spring operating when the mechanism is at rest to maintain the web taut.

5. In a mechanically-controlled index, the combination of a frame, a drum rotatably mounted in the frame and having a pinion rigid therewith, a second drum rotatably mounted in the frame and having a pinion integral therewith and located out of line with the first-named pinion, a web wrapped on said drums, a driving gear mounted for rotation on the frame meshing with the second-named pinion, said driving gear having means for rotating the same by hand, a driven gear coaxial with the driving gear and meshing with the first-named pinion, and a coil spring located between the said gear wheels and connecting the same, said spring being wrapped in a direction such that when the first-named drum is winding up the web the winding force is transmitted to the same by tension in the said spring.

6. In a mechanically-controlled index, the combination of a frame, a drum rotatably mounted in the said frame, a pinion rigid with the said drum, a second drum rotatably mounted in the frame, a pinion rigid with the same and located out of line with the first-named pinion, a web connecting the said drums and wrapped upon the same, said frame including a fixed arbor located between the drums with a shoulder at one end with a frame plate seating against the said shoulder, said arbor having a shoulder toward its other end, a driven gear wheel seating against the last-named shoulder and meshing with the first-named pinion for driving the same, a driving gear wheel coaxial with the driven gear wheel rotatable on the arbor, said frame including a frame plate located on the outer side of the driving gear wheel, said driving gear wheel having a rim to be operated by hand for rotating the same, said gear wheels having a spring member between the same, a coil spring located in the spring chamber connected at one end to the driving gear wheel and at the other end to the driven gear wheel and coiled in a direction such that the actuating force for winding the web on the first-named drum is imparted by tension through the said spring, said spring operating to maintain the web taut when the mechanism is at rest.

BRUCE ROBERTS.