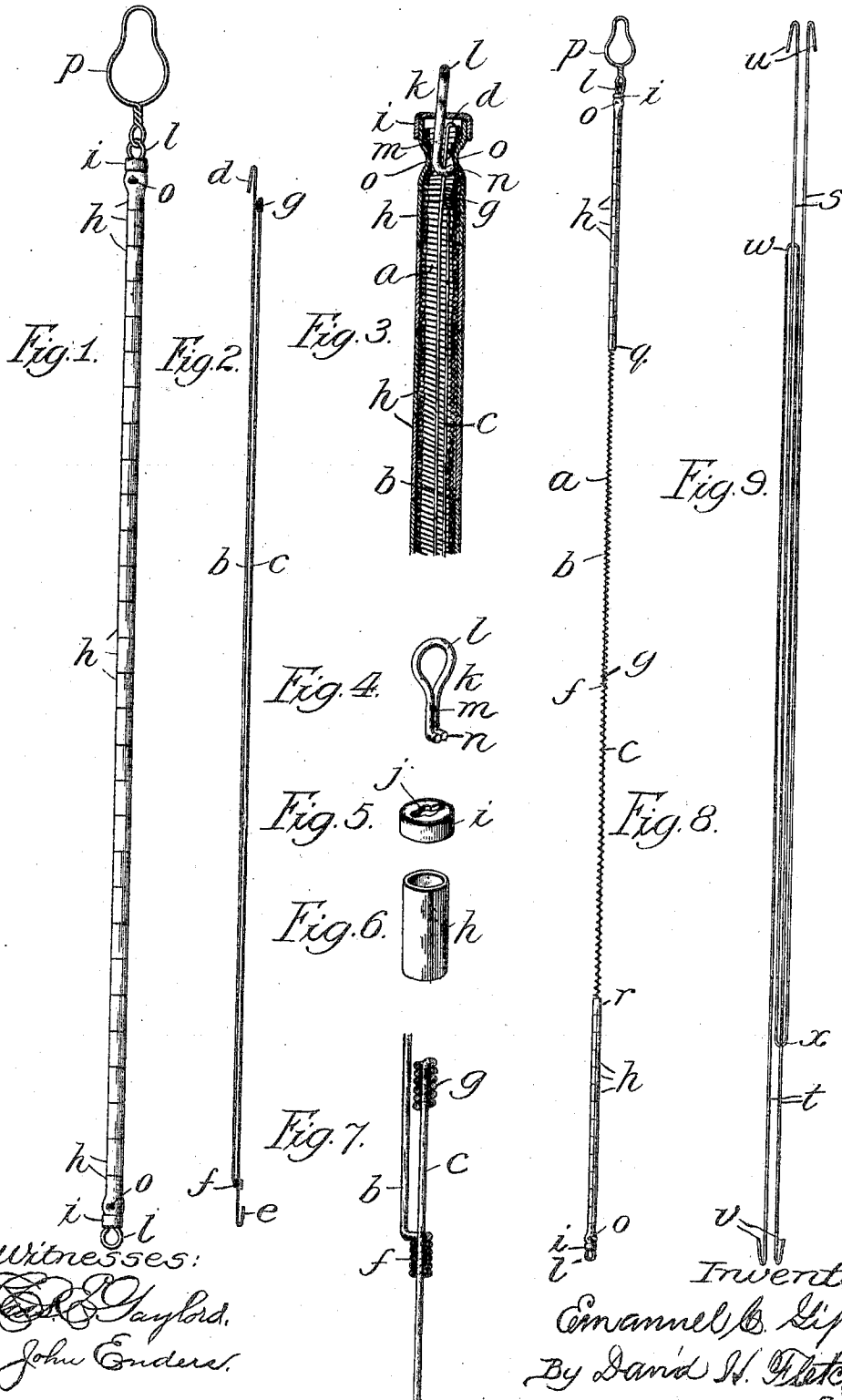


No. 811,054.

PATENTED JAN. 30, 1906.

E. C. GIPE.
EXTENSIBLE CHAIN.

APPLICATION FILED APR. 24, 1905.



Witnesses:
Edw. J. Paylor,
John Enders.

Inventor:
Emmanuel C. Gipe,
By David H. Fletcher,
Att'y.

UNITED STATES PATENT OFFICE.

EMANUEL C. GIPE, OF CHICAGO, ILLINOIS.

EXTENSIBLE CHAIN.

No. 811,054.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed April 24, 1905. Serial No. 257,183.

To all whom it may concern:

Be it known that I, EMANUEL C. GIPE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Extensible Chains, of which the following is a description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding letters of reference in the different figures indicate like parts.

The object of my invention is to provide an elastic or extensible chain formed from a spirally-coiled wire, which shall be so constructed that the extension thereof may be positively limited by means of inclosed wires adapted to slide or telescope upon each other.

A further object is to provide means for preventing the convolutions of the chain from becoming overstrained, so that if grasped at any two points between the ends and pulled in opposite directions the strain upon the coil will be from the ends only, thereby causing it to be transmitted to the limiting-wires, all of which is hereinafter more particularly described and definitely claimed.

In the drawings, Figure 1 is a view of a key-chain as it would appear normally. Fig. 2 is a view of the limiting-wires adapted to be located within the wire-coil. Fig. 3 is an enlarged longitudinal sectional view of a portion of said chain, showing the manner of assembling and connecting the parts. Fig. 4 is a view of one of the end loops; Fig. 5, a perspective view of one of the end caps. Fig. 6 is a like view of one of the tubular sections. Fig. 7 is an enlarged view in detail of portions of the stop or limiting wires. Fig. 8 is a view of the chain when stretched to its full limit, and Fig. 9 is a view of a modified form of limiting or guard wires.

Referring to the drawings, *a*, Figs. 3 and 8, represents a coil of spring-tempered wire, the convolutions of which rest normally against each other, as shown in Fig. 3. Inclosed within said coil are two wires *b* *c*, Figs. 2, 3, 7, and 8, which I term the "limiting-wires," each of which is preferably about the normal length of the coil. The wire *b* is bent at one end, as shown at *d*, Figs. 2 and 3, to form a hook, adapted to extend over and engage the last convolution at one end of the coil, as shown in said last-named figure, while the wire *c* is provided with a like hook *e*, Fig. 2, upon its end, which is hooked over the opposite end of the coil in like manner. The opposite end

of the wire *b* from the loop *d* is provided with a coil or loop *f*, also shown in Fig. 7, which surrounds the body of the wire *c*. A coil or knot *g* is also formed upon the opposite end of the wire *c* from the hook *e*, said knob being of sufficient size to prevent it from passing through the loop *f*. The wires *b* *c* are loosely connected together, as shown in Fig. 2, and then inserted within the coil *a* with the hook *d* connected to one and the hook *e* to the opposite end of said coil in the manner described. In order to protect the convolutions of the coil from being overstrained, so as to remain in a stretched or distorted condition, I inclose said coil by means of a series of short tubes or cylinders *h*, which extend throughout its length when in an unstretched condition and are placed loosely thereon. A cap *i* having a slot *j*, Fig. 5, in its end is placed over the last tube *h* at each end of the coil, and a wire end fastening, generally designated by *k*, consisting of a loop *l*, a straight portion *m*, and a bent portion *n* at the end, is inserted within the opening *j* and extended into the coil, as shown in Fig. 3, with the loop *l* protruding. The two end tubes are then compressed or dented by means of a suitable die, as shown at *o*, which serves to fasten the end loops, as well as the limiting-wires, securely in place. Any kind of hook, loop, or swivel may be connected with said end loops. In the illustration I have shown a loop *p* jointly connected with one of them, which may be attached to a garment-button when the chain in question is used as a key-chain, to which use it is especially adapted. If desired, the end caps may be increased in length, in which case the caps themselves may be crimped to form the fastening.

In Fig. 8 is illustrated the manner in which both the limiting-wires and tubes serve to protect the convolutions of the coil from undue strain. For example, if the extreme ends of the chain are grasped and pulled apart the coil will be stretched until the parts *f* *g* of the wires *b* *c* are brought into contact, when the coil cannot be stretched farther. By passing the wire *c* loosely through the coil *f* and leaving the knob *g* free provision is made for any twist which may be imparted to the chain or coil in use.

As illustrating the manner in which the loose tubes *h* serve to protect the coil from undue strain it will readily be seen that one cannot grasp the coil itself when unstretched, but only the loose tubes. If, therefore, one

should grasp two tubes—such, for example, as the tubes *q r*, Fig. 8—and separate them they would in turn press against the adjacent tubes in the series until the opposing forces would be applied to the ends of the coil, which could only be separated to the extent permitted by the limiting-wires.

In Fig. 9 I have shown the stop or limiting wires constructed in a different way. Two wires *s t*, each bent upon itself and provided with two end hooks *u v*, are interlinked with each other and the hooks secured to the coil in the same manner as the hooks upon the wires *b c*. When the coil is stretched, one link slides upon the other within the coil and permits the coil to lengthen until the bends *w x* are brought together.

It is obvious that the end fastenings instead of being crimped, as described, may be soldered or riveted or otherwise fastened without affecting the principle of my invention. The extent to which the chain may be stretched depends, of course, upon the length of the limiting-wires, each of which may correspond to the normal length of the coil, in which case the maximum length of the chain when extended would be about twice that of its normal length.

Having thus described my invention, I claim—

1. The combination in a device of the class described, of a spirally-coiled spring-wire, means within the coil thereof for limiting its extension, end tubes, one of which is rigidly attached to one and the other to the opposite end of said coil, and a series of non-telescoping disconnected tubes slidably mounted upon said coil between said end tubes, whereby when any two of said tubes are grasped and pulled apart, the members of each separated group may be caused to abut successively against each other and in turn against the end tube, thus transferring the pull to the ends of the coil and insuring uniformity of stretch throughout the length of the latter.

2. The combination with a spiral coil of spring-wire, of overlapping limiting-wires inclosed therein, said wires being provided with

end hooks whereby one wire may be attached to one and the other to the opposite end of said coil, means for locking said hooks in position, and means for slidably connecting the overlapping portions of said wires whereby they may slide upon each other within predetermined limits.

3. The combination with a spiral coil of spring-wire, of overlapping limiting-wires inclosed therein, said wires being provided with end hooks whereby one wire may be attached to one and the other to the opposite end of said coil, caps for securing said hooks in position, means for permanently securing said caps to said coil, and means for slidably connecting said wires to limit the movement thereof in opposite directions.

4. The combination with a spiral coil of spring-wire, of overlapping limiting-wires provided with end hooks whereby one wire may be attached to one and the other to the opposite end of said coil, caps for securing said hooks in position, means for permanently securing said caps to said coil, means for slidably connecting the overlapping portions of said wires to limit their opposite movement, and a series of disconnected tubes surrounding said coil between said caps.

5. The combination with a spiral coil of spring-wire, of overlapping limiting-wires inclosed therein, said wires being provided with end hooks whereby one wire may be attached to one and the other to the opposite end of said coil, means for slidably connecting the overlapping portions of said wires to limit their endwise movement, end loops having their bodies projected within the ends of said coil, offsets upon said bodies and tubes surrounding said ends, said tubes being crimped upon said coil and offsets for locking said end loops in position.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 22d day of April, 1905.

EMANUEL C. GIPE.

Witnesses:

D. H. FLETCHER,
CARRIE E. JORDAN.