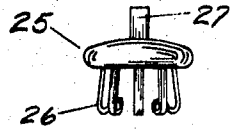
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COLLAPSIBLE POLES

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FIG. 3



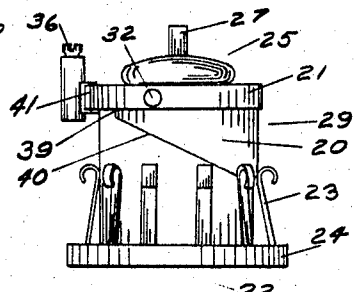
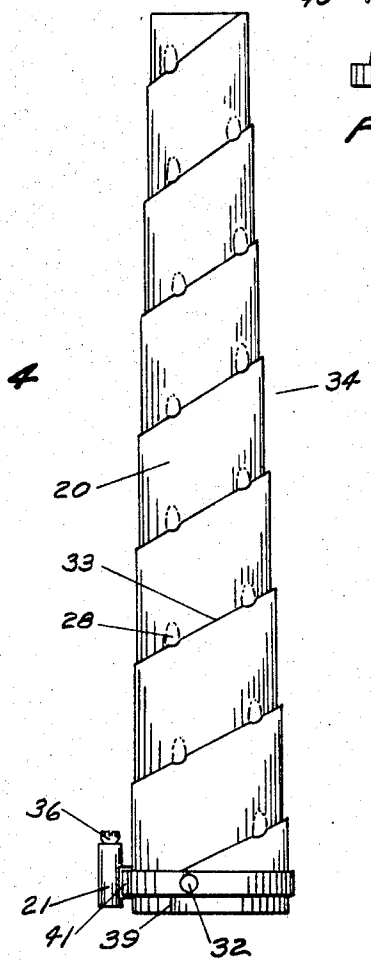


FIG. 2

FIG. 4



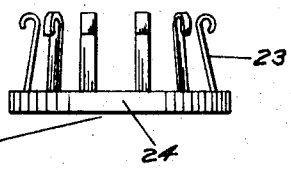


FIG. 5

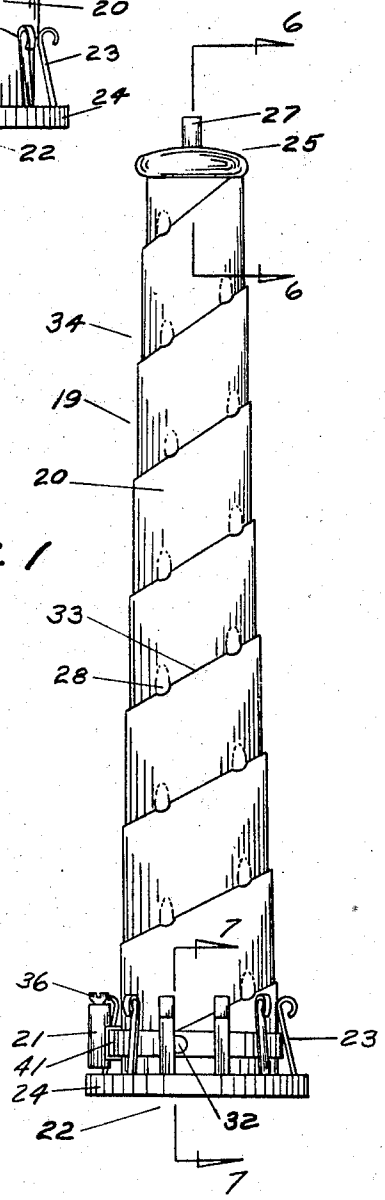


FIG. 1

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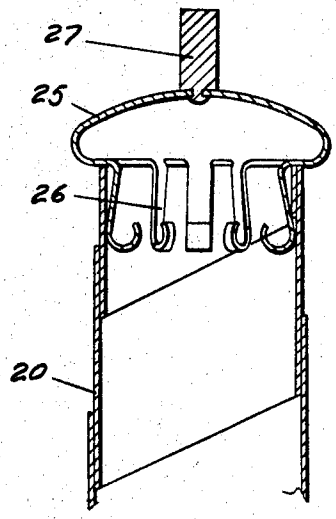


FIG. 6

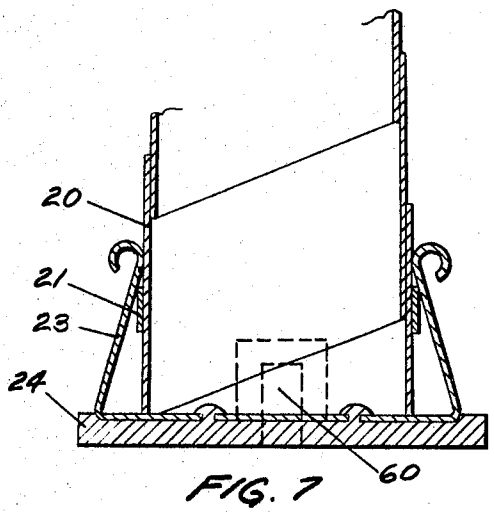


FIG. 7

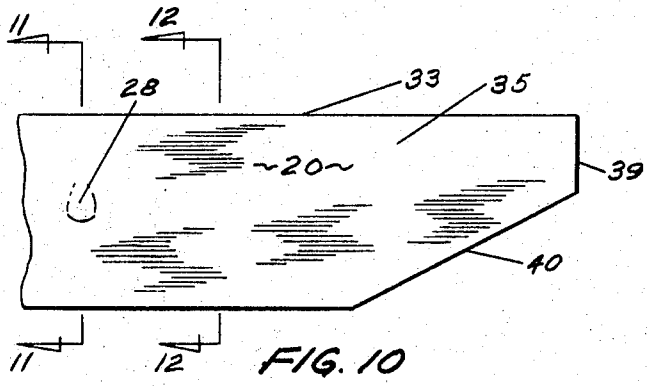


FIG. 10

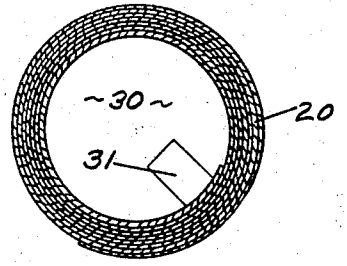


FIG 8

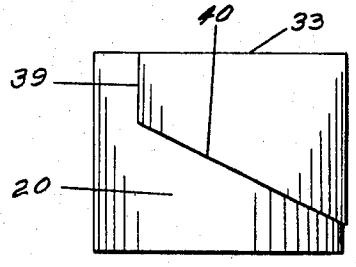


FIG. 9

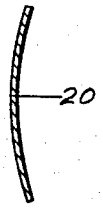


FIG. 12

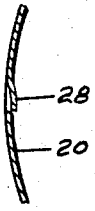


FIG. 11

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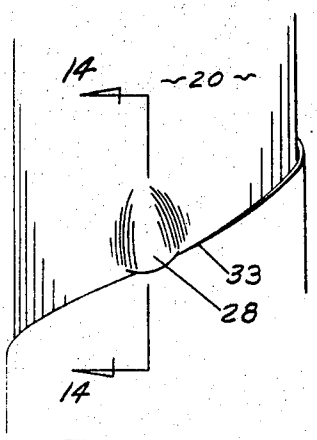


FIG. 13

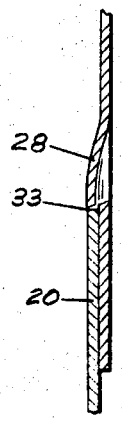


FIG. 14

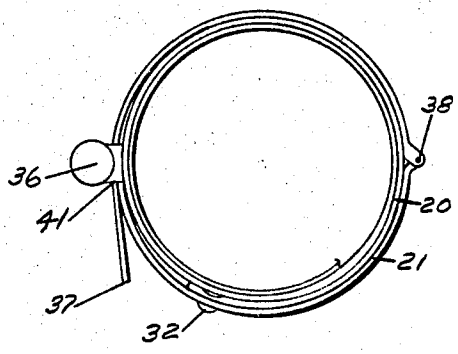


FIG. 15

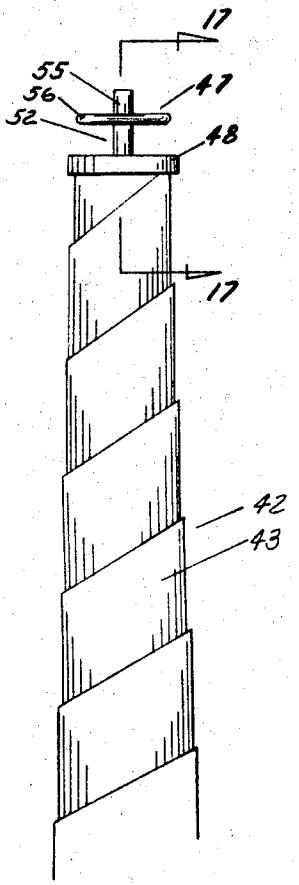


FIG. 16

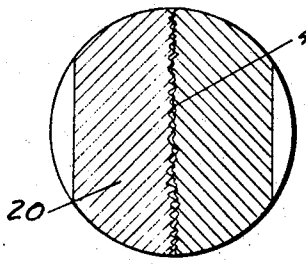


FIG. 18

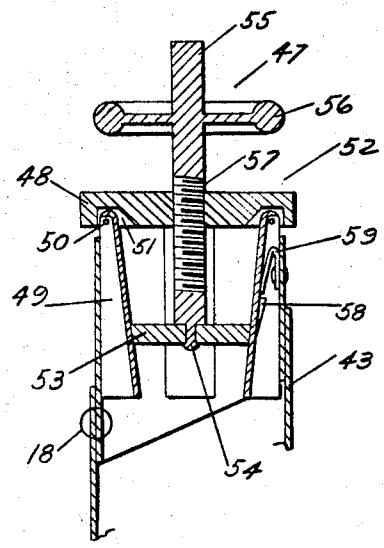


FIG. 17

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Patented June 24, 1969

3,451,182

COLLAPSIBLE POLES

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Filed Oct. 4, 1965, Ser. No. 492,785
Int. Cl. E04h 12/18; E04g 25/08; H01q 1/10
U.S. Cl. 52—632 3 Claims

ABSTRACT OF THE DISCLOSURE

A collapsible pole comprises a spirally wound element which collapses by telescoping action into a compact package for storage, and which may be readily erected. The pole may be locked in its extended positon by a series of protrusions spaced along the element which bear against the upper edge of the next lower and outer loop. Alternatively, a lock can be achieved by a threaded element at the top of the pole which exerts an outward and an unwinding force against the inside of the top innermost loop to thereby enhance the frictional force between adjacent loops of the pole.

The invention pertains to poles in general and more specifically to telescopic collapsible poles.

The present invention relates to a novel means or method of construction of a telescopic collapsible pole which is composed of metal, plastic or the like consisting primarily of a spirally wound element. Poles of this nature would be most advantageous where a minimum of space or weight is desirable and where ease of erection is of consideration.

A broad object of the invention is to provide a telescopic collapsible pole which has cerain novel features of construction and operation that enhances the ease and efficiency of utilization.

A more specific object of the invention is to provide a telescopic collapsible pole of spiral construction.

A still further object of the invention is to provide a simple yet efficient means to assemble or erect said telescopic collapsible pole.

A still further object of the invention is to provide a pole which will operate with the minimum effort by utilizing the attributes of said coiled element of said collapsible pole.

Yet a further object of the invention is to provide a telescopic collapsible pole that will have inherent manufacturing simplicity.

A still further object of the invention is to provide a telescopic collapsible pole of the character described possessing various novel features of construction, appearance and use which result in a pole having greatly increased simplicity of design, construction and utilization. Other objects, advantages and features of the invention will become readily apparent as the description proceeds.

Briefly stated the objects of the invention are attained by the provision of a telescopic collapsible pole equipped with a coiled element and means for adapting said coiled element to perform as said telescopic collapsible pole. The provision of an upper portion or cap and a lower portion or base adapted to said coiled element facilitate to construct the pole or said coiled element itself may be formed or so constructed to act as top and base for said telescopic collapsible pole.

Also the use of said coiled element for said telescopic collapsible pole lessens manufacturing costs of certain collapsible poles.

The pole possesses various other novel features of design and use which will become readily apparent as the description proceeds.

The invention may be best understood from the following detailed description thereof, taken in connection with the annexed drawings wherein:

FIG. 1 is a front elevational view of the present telescopic collapsible pole in extended position.

FIG. 2 is a front elevational view of the present telescopic collapsible pole in collapsed position.

FIG. 3 is an elevational view of the upper portion or cap of the present telescopic collapsible pole.

FIG. 4 is an elevational view of the coiled element of the present telescopic collapsible pole.

FIG. 5 is an elevational view of the lower portion or base of the present telescopic collapsible pole.

FIG. 6 is an enlarged section along line 6—6 of FIG. 1.

FIG. 7 is an enlarged section along line 7—7 of FIG. 1.

FIG. 8 is a top view of the collapsed coiled element.

FIG. 9 is a front elevational view of the collapsed coiled element.

FIG. 10 is a partial view of the unrolled coil element.

FIG. 11 is a section along line 11—11 of FIG. 10.

FIG. 12 is a section along line 12—12 of FIG. 10.

FIG. 13 is an enlarged view of the protrusions on the coiled element.

FIG. 14 is a section along line 14—14 of FIG. 13.

FIG. 15 is an enlarged bottom view of the coiled element of the present telescopic collapsible pole.

FIG. 16 is a partial front elevational view of the second embodiment of the present telescopic collapsible pole.

FIG. 17 is an enlarged section along line 17—17 of FIG. 16.

FIG. 18 is an enlarged view in the circle of FIG. 17.

Referring now to these drawings the present telescopic collapsible pole **19** will be seen to comprise a spirally wound center coiled element **20**, with clamp **21** fastened around the lower end of said center element, supported on base **22** comprising pressure fingers **23** and platform **24**. Mounted on top of said coiled element **20** is a cap **25** which is comprised of pressure fingers **26** and mounting post **27**.

Intermittently spaced around the spiral element are protrusion or catches **28** which serve to secure said element in the extended position **34** shown in FIGS. 1 and 4. The entire telescopic collapsible pole **19** can be seen in its collapsed position **29** in FIG. 2 with the change being in said coiled element **20** no longer having longitudinal extension.

A novel feature of the invention resides in the center coiled element **20**, clamp **21**, protrusions **28** and their correlation and operation in connection with base **22** and cap **25** thereof.

A concise and efficient explanation will best be undertaken through the description of the operation of said telescopic collapsible pole and its component parts as shown in FIG. 1 through FIG. 15. The pole in collapsed position **29**, FIG. 2 is set with camp **21** closed loosely or unrestrained around the outermost winding of coil **20** with base **22** in position having coil **20** lodged between pressure fingers **23** of base **22** said pressure fingers **23** exerting inward pressure around the entire outer periphery of coil **20**, and cap **25** positioned on top of coil **20** with said cap's pressure fingers **26** holding it in place over opening **30** by exerting outward pressure around the entire periphery of said opening **30**.

Cap **25** is removed to expose opening **30** and pulling tab **31**, seen in FIG. 8. When tab **31** is grasped and pulled upward coil **20** begins to lengthen in a longitudinal direction with the lower end being contained by the operator around pivot point **32** of clamp **21**. Due to the action of said coil **20**, as tab **31** is pulled upward, leading edge **39** of the outermost winding of said coil **20**, moves figuratively downward until edge **40** (FIG. 10) rests on base **22** and clamp **21** is parallel to edge **40** and base **22**. This action necessitates a rotation of clamp **21** around pivot point **32**. As the coil lengthens said protrusions or catches

28 become exposed and due to the action of the coil 20, which will be discussed forthwith, said protrusions are forced outward and over the edge 33 of said coil 20. The tab 31 must be released at this point to prevent the lower edge of the inner winding from disengaging above the upper edge of the previous winding. Upon release of tab 31, coil 20 settles into its extended position 34. Clamp 21 is tightened to assist said base's pressure fingers 23 in holding coil 20 together at the lower end and cap 25 is secured over opening 30, and the pressure fingers 26 assist the expansion of said coil 20 to insure the engagement and holding of protrusions or catches 28. The telescopic collapsible pole 19 is thusly brought into said extended position 34. Note most be taken that each successive inner winding of coil 20 has a portion of itself inside the preceding winding of coil 20 below protrusion or catch 28 and said portion of the inner coil must be sufficiently large to insure stability of the entire coiled element 20, of telescopic collapsible pole 19, when lateral force is applied because it is the result of the moments present about the lower edge of the inner coil and the upper edge of the outer coil which resists any lateral force or motion.

At this point a discussion of the coil 20 will be undertaken to clarify the later discussion of collapsing said telescopic collapsible pole 19.

Another novel feature of the invention resides in coil 20 as seen in FIG. 10 through FIG. 12 which is composed of metal, plastic, or the like in a thin flat strip 35 so designed and formed as to construct a coil of said material of numerous windings, the number of windings dependent on the length desired of said pole 19 proportionate to the width of said flat strip 35 or height of coil 20. The present strip utilized has a compound temper which holds it in the form of a coil and when said coil 20 is unrolled said strip 35 takes the form of a concave around said protrusion or catches 28 as seen in FIGS. 11 and 12. The concave carries along the entire length of said strip creating a slight U channel which holds the strip in the outstretched position. Of course only the coil temper in the strip is necessary in the operation of said pole 19 and the concave temper is explained only to better show the present embodiment of said coiled element 20. One necessary attribute of said coil 20 is that each successive winding of said coil 20 tends to occupy that area occupied by the outermost winding of said coil thusly having retained within each successive winding the force required to assure engagement of said protrusions or catches 28 on edge 33 of coil 20, when said telescopic collapsible pole 19 is extended.

A further novel feature of the invention resides in the collapsing of said telescopic collapsible pole 19 which commences with the removal of cap 25 and base 22 and the disengagement of clamp 21. Clamp 21 is completely disengaged by turning screw 36 until end 37 is free to swivel about pivot 38 which is approximately opposite the adjusting screw 36. Clamp 21 could be composed of the same material utilized in coil 20. After clamp 21 is disengaged, the coil element is unrolled to disengage the upper edge of each winding from the protrusions or catches 28. As the unrolling proceeds the end 39 of the first winding with clamp 21 attached is tucked or allowed to roll up to produce a coil with said outer winding becoming the inner winding of said coil 20. Continuing this above-mentioned procedure said coil is wound entirely backwards or inside out and said innner winding is said outer winding. The procedure is now reversed and said coil 20 is rewound into its original collapsed position 29. The clamp 21 is engaged by inserting clamp strap end 37 in slot 41 and turning screw 36 until clamp strap end 37 proceeds through said slot 41 thusly tightening the clamp 21. Base 22 and cap 25 are put in place and the telescopic collapsible pole 19 of spirally wound center element 20 achieves the collapsed position 29, FIG. 2. Also to collapse said coiled element 20, a spacer such as a screw driver can be inserted behind the upper edge of the lowermost winding and pulled or forced around the coil forcing the protrusions or catches 28 behind the edge 33 of said coiled element 20; the downward force of the coil to reach equilibrium in the collapsed position pulls the protrusions or catches 28 below said edge 33 thus allowing coil 20 to collapse.

Another novel feature of the present invention resides in the second embodiment 42 of said telescopic collapsible pole 19. As seen in FIG. 16 the coil element 43 does not utilize the protrusions or catches 28 of the first embodiment. The holding power of coil element 43 is achieved through increasing the friction created between the mating surfaces 44 of each outer winding and the consecutive inner winding, which is accomplished by roughing the surfaces 44 of the windings which come into contact as seen in FIG. 18. The action of said coil 43 is basically identical to that of previously mentioned coil 20 in that each winding seeks the same space occupied by the outermost winding therefore creating enough force to hold the coil in its extended position by means of the above mentioned friction forces. To increase this outward force of the windings and insure the pole 42 supporting a load applied longitudinal, the second embodiment cap 47 is distinguishable from cap 25 in that a greater expansion force is achieved. Said cap 47 is constructed of a metal plate 48 from which extend downward a plurality of pivoting pressure fingers 49 pivoting around pivot 50 within a clearance opening 51 in plate 48. An externally threaded screw 52 threads through the center of plate 48 and on the lower end is a circular plate 53 smaller in diameter than that of the inner winding, yet still small enough to allow adequate clearance for pressure fingers 49. Said circular plate 53 is fastened to the lower end of threaded screw 52 on a stud 54 and allowed to rotate around said stud 54. The extreme upper end of threaded screw 52 performs the same function as mounting post 37 and is referred to as mounting post 55. Below mounting post 55 and above plate 48 a sufficient distance is turning wheel 56 which is an integral part of threaded screw 52 or may be fastened to said screw. As the entire screw assembly 52 is turned in a direction opposite that of the coils winding the screw threads 57 bring the screw assembly 52 downward; and, plate 53 is forced down and slides along pressure fingers 49, which possess an angled portion or larger lower end, thus two objects, said plate 53 and fingers 49, tend to occupy the same space and the resultant force expands the coil 43 insuring greatly increased holding power. The turning in the direction opposite that of the coil windings further tends to snug up the roughened surfaces 44 previously mentioned. The pressure fingers 49 are of U cross section and one is provided with a protrusion 58 between the two sides of the U shaped pressure fingers. When the cap 47 is pulled upward to extend the coiled element 43, protrusion 58 catches on tap 59 which is fastened to the inner winding of coil 43 and located between the sides of pressure finger 49. This tab also performs the purpose of securing cap 47 to the inner winding and forcing the coil to tighten up as the screw is turned against the coil winding direction. Also turning the screw assembly, 52 in the direction opposite that of the coil windings will tend to loosen the coil windings and upon further loosening of said screw assembly 52 the pressure fingers 49 no longer exert force on the inner winding and the coil element 43 will collapse.

It is possible that the telescopic collapsible pole 19 could be constructed of a plurality of said elements 20. In this case it might be desirable to provide said platform 24 of base 22 with a female indention 60 to accommodate the mounting post 27 of cap 25.

While two preferred embodiments of the invention have been disclosed for illustrative purposes, numerous modifications in design and arrangement of component parts are possible.

I claim:

1. A collapsible pole comprising:

a continuous substantially flat ribbon-like element of uniform cross-section and coiled upon itself;

in its collapsed condition, said element forming a series of concentric, spirally wound loops, fully collapsed within each other to thereby reduce the height of said element to the width of said ribbon;

in its longitudinally extended condition, each loop of said element being substantially completely upwardly withdrawn from the next adjacent lower outer loop;

clamping means secured to the outer periphery of the outermost loop for selectively exerting an inward force upon said outermost loop;

pressure means mounted within the innermost loop for selectively exerting an outward force upon said innermost loop;

locking means for selectively preventing telescoping of said element from its extended condition to its collapsed condition;

whereby said pole may be extended from its collapsed condition by grasping said innermost loop and withdrawing each successive outer loop from the collapsed loop and thereafter applying inward and outward pressure by said clamping and pressure means, respectively, to maintain each loop in frictional contact with its adjacent loop.

2. The collapsible pole of claim 1, wherein said locking means comprises a series of outwardly directed protrusions spaced along the length of said element intermediate its upper and lower edges, whereby when the respective loops are upwardly withdrawn to erect the pole, said protrusions engage and bear against the upper edge of the next outer and lower loop to normally prevent collapse of said pole.

3. The collapsible pole of claim 1, wherein said locking means and said pressure means comprise a cap secured within the inner winding, said cap having a central aperture through which is threadedly mounted a screw having a disk rotatably secured to its lower end, said screw being threaded in a direction so that advancement of the screw downward through the cap will be in a direction opposite to the direction in which said element is wound, said cap being further provided with a plurality of downwardly and inwardly directed pressure fingers, pivotally secured to the lower periphery of said cap; whereby when said screw is advanced downwardly through said cap, said disk engages said pressure fingers and cams them radially outward into engagement with the inner face of said element, said pressure fingers tending to turn said element in an unwinding direction, thereby enhancing the frictional grip between adjacent loops.

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U.S. Cl. X.R.

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