

Feb. 12, 1952

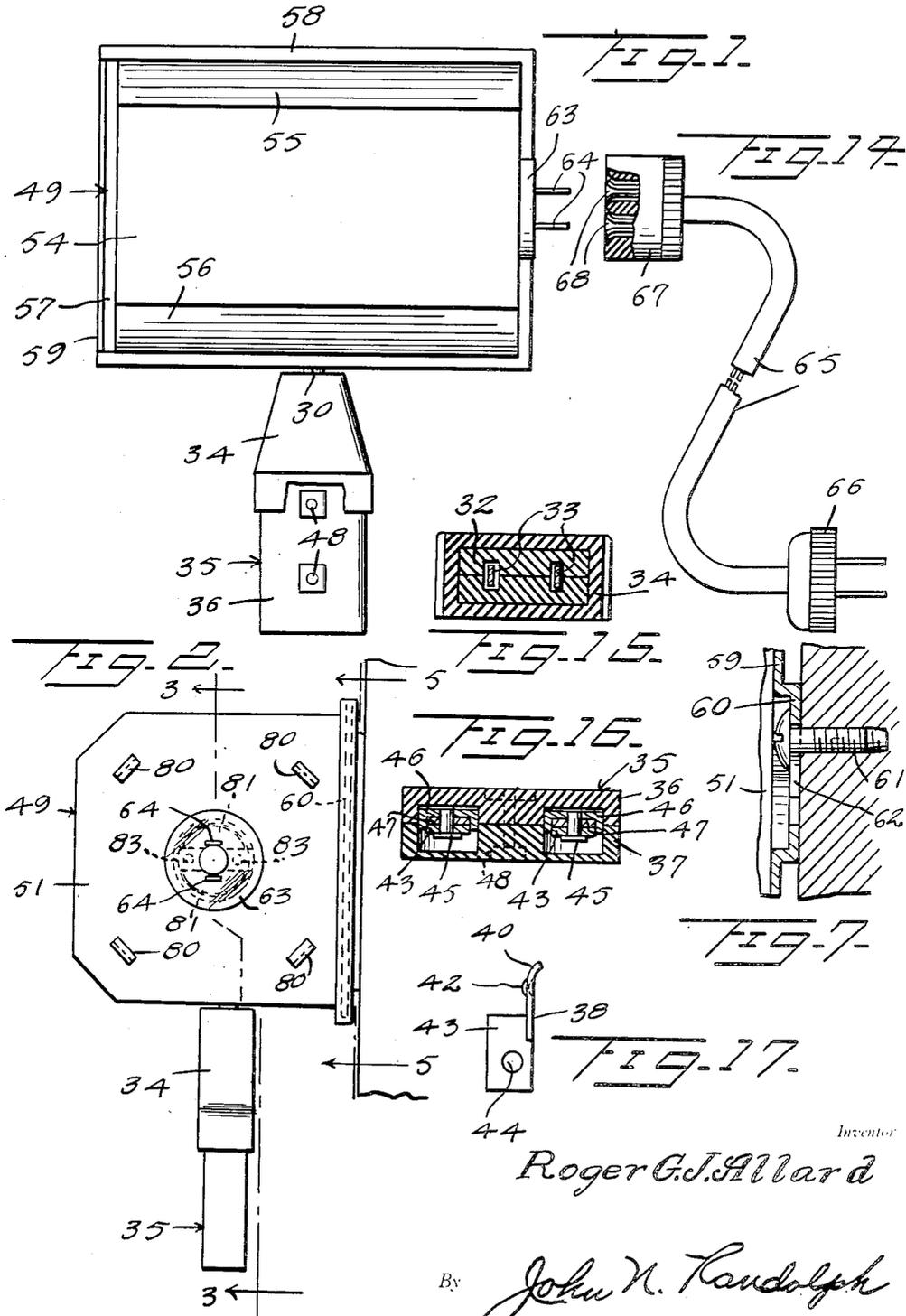
R. G. J. ALLARD

2,585,070

RETRACTABLE ELECTRIC EXTENSION CORD SWITCH

Filed May 27, 1949

4 Sheets-Sheet 1



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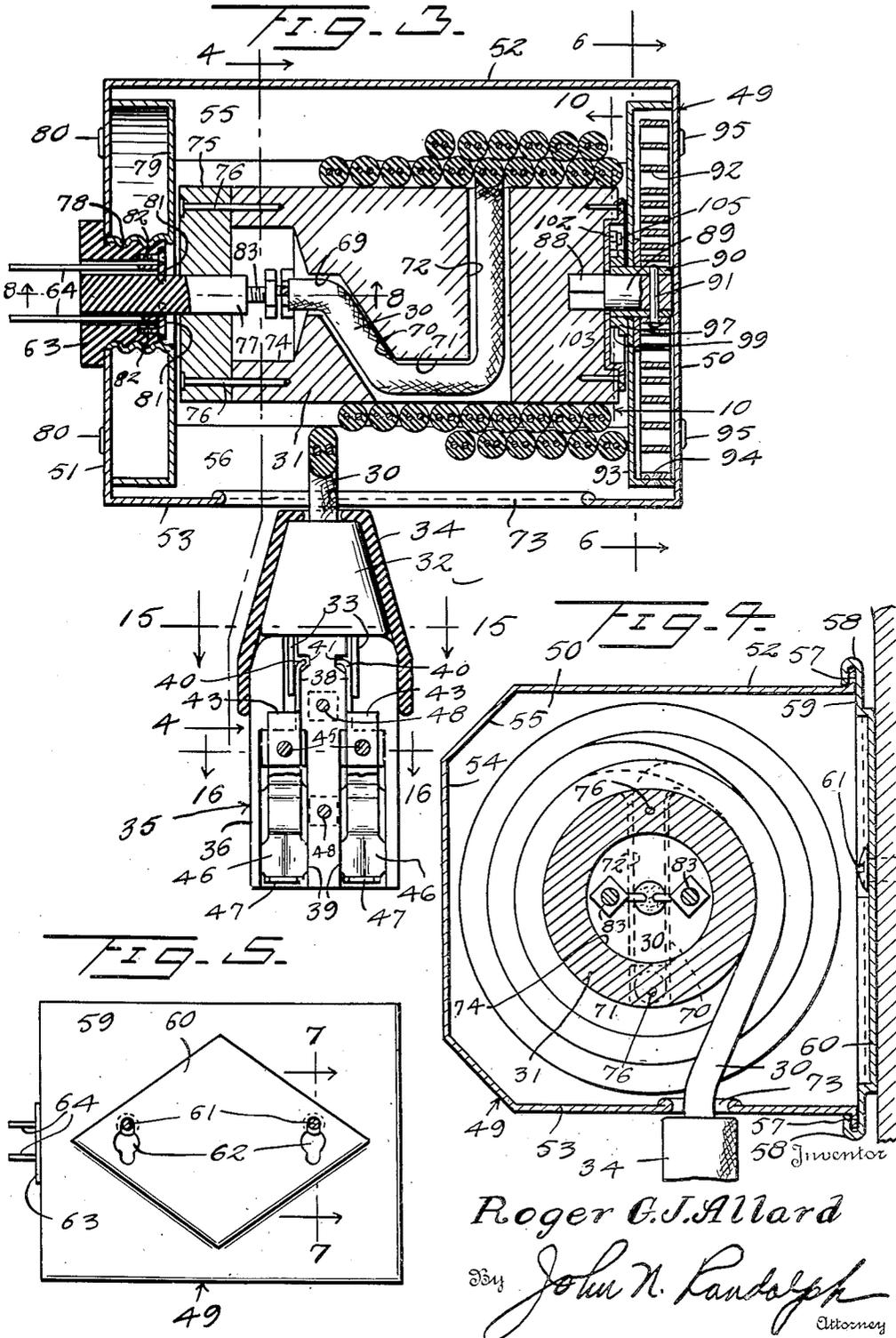
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RETRACTABLE ELECTRIC EXTENSION CORD SWITCH

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4 Sheets-Sheet 2



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RETRACTABLE ELECTRIC EXTENSION CORD SWITCH

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4 Sheets-Sheet 3

FIG. 6.

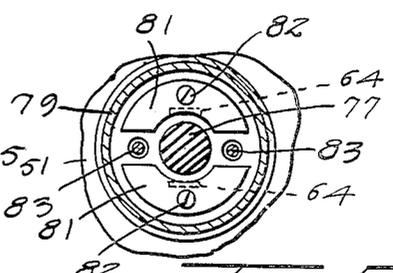
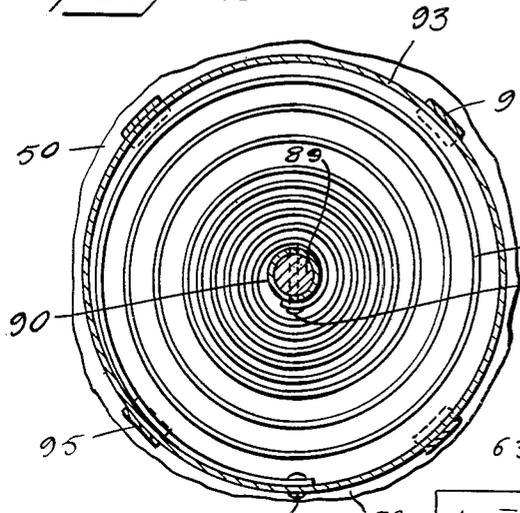


FIG. 8.

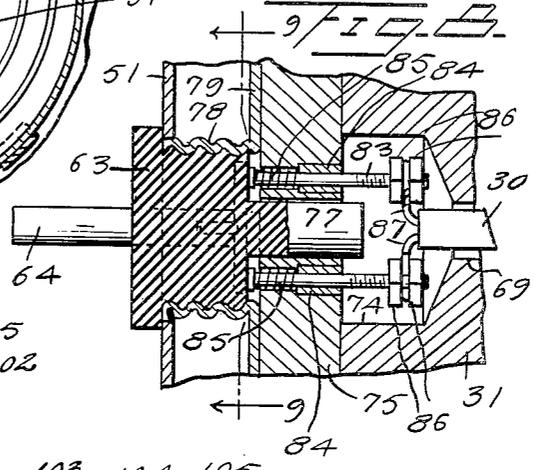


FIG. 10.

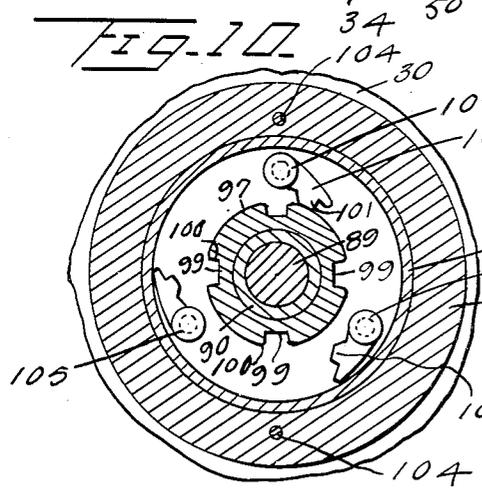


FIG. 11.

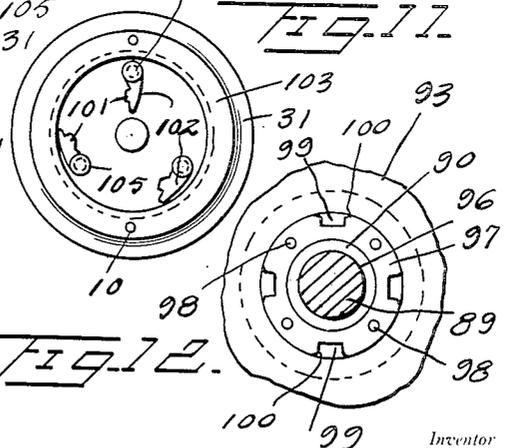


FIG. 13.

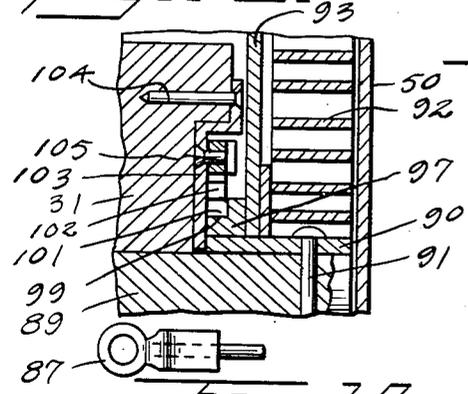
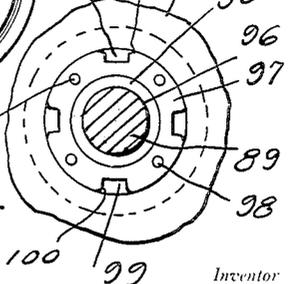


FIG. 12.



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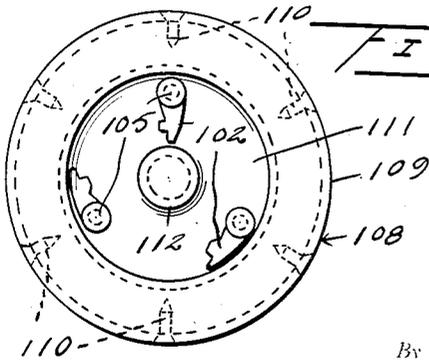
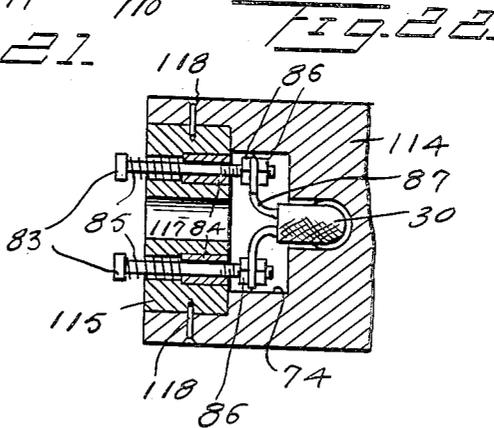
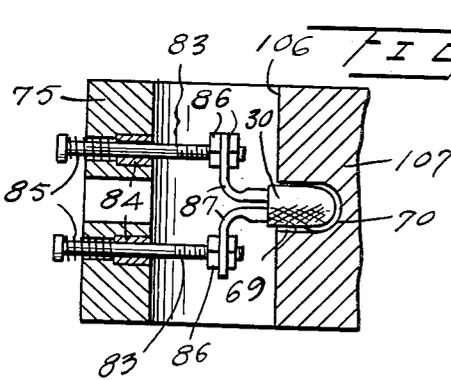
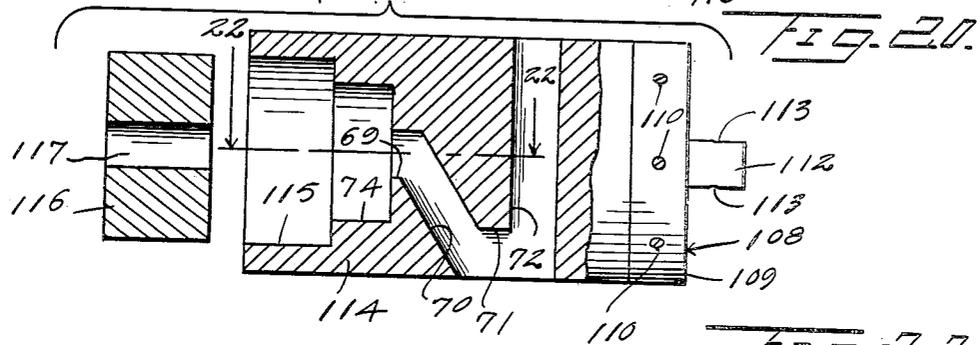
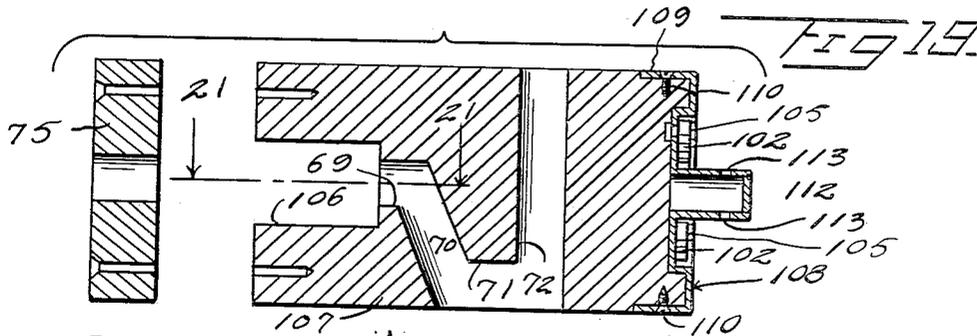
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RETRACTABLE ELECTRIC EXTENSION CORD SWITCH

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4 Sheets-Sheet 4



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# UNITED STATES PATENT OFFICE

2,585,070

## RETRACTABLE ELECTRIC EXTENSION CORD SWITCH

Roger G. J. Allard, Richmond, Vt.

Application May 27, 1949, Serial No. 95,718

5 Claims. (Cl. 200—153)

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This invention relates generally to electrical appliances and more particularly to improvements in retractable extension cords therefor having provision for enclosing a normally reeled-in supply of electric cord in a casing constructed and arranged for ready attachment to a wall, or the like, adjacent an electric outlet box.

The present invention also contemplates a retractable extension cord unit having further provision for facilitating connection of the cord to the outlet box and to appliances requiring plug-in connectors of different types, this being accomplished in accordance with one of the features and objects of the present invention by the use of a novel plug-in connector at the outlet end of the retractable cord. This connector may be used as a female plug for certain types of appliances having male plugs such, for example, as vacuum cleaners, toasters and waffle irons, or selectively the plug-in connector may be removed from the end of the retractable cord to provide a male plug at the end thereof for use with appliances having female type plugs. In the latter case, however, a safety device is provided for enclosing the otherwise exposed potential-bearing prongs of the male plug in order to satisfy underwriter's requirements.

As another one of the objects and features of the present invention, new and improved means are provided for conducting the electrical current from the stationary prongs of the male plug at the inlet to the reel housing to the rotatably mounted inner end of the retractable extension cord.

Still another object and feature of the present invention resides in the provision of a new and improved dogging and coacting braking mechanism for maintaining different lengths of the cord or extension in retracted and current conducting position while discontinuing the current through the cord when the same is in fully retracted position.

Still other objects and features of the invention reside in new and useful improvements in the reel or roller construction whereby the same may be cooperatively mounted for rotation within the casing therefor with attendant economies and ease of manufacture resulting in a low cost unit having a wide diversity of uses and which in addition possesses all of the desired qualities of ruggedness, reliability, and ease of operation.

Still further objects, features, advantages and improvements of the present invention relate to the novel combination, construction and arrangement of parts comprising the preferred embodiment of the invention together with certain modifications of some of the parts thereof as will presently become more fully apparent from the following specification, reference being had to the accompanying drawings wherein:

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Figure 1 is a front elevational view of the retractable extension cord unit, the cord being illustrated in fully retracted position within the casing therefor;

Figure 2 is an end elevational view as seen from the right of the unit in Figure 1;

Figures 3 and 4 are sectional views of the unit taken respectively along the lines 3—3 and 4—4 of Figures 2 and 3;

Figure 5 is a view in elevation of the unit as viewed from the rear in Figure 1 or along the line 5—5 of Figure 2;

Figure 6 is a fragmentary sectional view of the unit illustrating the retracting spring assembly as seen along the line 6—6 of Figure 3;

Figure 7 is a fragmentary view in section of the casing cover and attachment plate therefor taken along the line 7—7 of Figure 5;

Figure 8 is a somewhat enlarged fragmentary sectional view of the roller, rotative support therefor, and contact assembly as viewed along the line 8—8 of Figure 3;

Figure 9 is a fragmentary sectional view of the male inlet plug as seen along the line 9—9 of Figure 8;

Figure 10 is a fragmentary sectional view taken along the line 10—10 of Figure 3 and illustrating the roll and the dogging assembly in position thereon;

Figure 11 is a view in elevation of one end of the roll with the dogging assembly in position thereon, the braking assembly being removed;

Figure 12 is a fragmentary view in elevation of the braking mechanism;

Figure 13 is an enlarged fragmentary view in section of the dogging, braking, and spring assemblies;

Figure 14 is a view in elevation of a suitable cord for connecting the retractable extension unit to an outlet box or plug receptacle, or the like, portions of the female plug being shown in section to illustrate the construction thereof;

Figures 15 and 16 are sectional views of the plug-in connector for use on the outer end of the retractable cord, these views being taken along the lines 15—15 and 16—16 of Figure 3;

Figure 17 is a detail view of a contact element employed in the plug-in connector;

Figure 18 is a detail view of the terminals employed at the inner end of the retractable cord;

Figures 19 and 20 are exploded views in section of modified forms of the roller assemblies;

Figures 21 and 22 are sectional views taken along the lines 21—21 and 22—22 of Figures 19 and 20, respectively, and

Figure 23 is a view in elevation of the right end of the roller assembly as viewed in either of Figures 19 and 20.

Referring now to the drawings for a more complete understanding of the invention, and more

particularly to Figure 1, the extension cord per se is designated 30 and may be any conventional insulated two conductor electric cord having sufficient flexibility to wind and unwind readily on the roll or reel 31, as the cord is retracted into the casing or withdrawn therefrom.

The outer end of the cord terminates in a male plug 32 of conventional design having the usually outwardly projecting prongs 33. A safety cap or hood 34 constructed and arranged for sliding movement along the cord 30 is also arranged to surround the prongs of plug 32 when the cap is positioned thereagainst as in Figures 1 and 3, thereby to prevent the prongs from becoming engaged with an object effective to short the cord when the same is energized in the manner more fully to appear hereinafter.

In the foregoing manner, the cord 30 may terminate in a male plug while at the same time, in the use of the hood 34, satisfying underwriter's requirements that the prongs of the plug be not exposed.

Where it is required that the cord 30 terminate in a female plug, the plug-in attachment or receptacle 35 is employed. This plug-in is made in complementary halves 36 and 37 which are recessed to receive oppositely disposed male and female pairs of prongs 38 and 39, respectively.

Prongs 38 at the tips 40 thereof are curved inwardly to facilitate sliding engagement with the prongs 39 of plug 32 and plug-in halves 36 and 37 are correspondingly recessed as at 41 to receive curved tips 40. Each prong 38 is also provided with a substantially hemispherical projection 42 (Figure 17) which is arranged to be received into a suitable opening, not shown, formed therefor in the prong 33 individual thereto when the parts are fully together as seen in Figure 3, thereby securely to retain the parts together in assembled relation.

Each prong 38 terminates in a flange portion 43 having a substantially centrally located aperture 44 for receiving a rivet 45, or the like, for securing each prong 38 to the female prong 39 individual thereto, these also having suitable openings for receiving rivets 45. Each prong 39 comprises complementary halves 46 and 47 which together form an elongated longitudinal opening whereby the prongs 39 are adapted to receive the prongs of a male plug carried by an electric appliance to which energy is to be supplied through the retractable cord 30.

Plug-in halves 36 and 37 are held together as by the screws 48 and nuts therefor, the halves preferably being recessed in the well known manner illustrated to receive the head of the screws as well as the nuts therefor.

Reel or roll 31 having cord 30 wound thereabout is rotatably supported within a casing 49 which preferably is formed from a stamping comprising the end walls 50 and 51, top and bottom walls 52 and 53, front wall 54, and diagonally extending upper and lower front wall portions 55 and 56.

The casing at the backside thereof terminates in an outwardly extending flange 57 which is arranged to receive slidably thereon the U-shaped edge portion 58 of the casing cover plate 59, the U-shaped edge portion 58 extending around one end and both side edges of the cover whereby the same is arranged for sliding attachment to the casing.

Cover 59 is dished outwardly as at 60 in a diamond-shaped offset portion of sufficient depth to accommodate the head of screws 61 employed to detachably secure the casing to the wall ad-

acent an electric outlet box, the casing being positioned on the wall in the manner illustrated in Figure 4.

The cover offset portion 60 has a pair of spaced openings 62 of sufficient size to clear the heads of screws 61, these openings being elongated and narrowed at the top and bottom sufficiently to receive the shank of the screws only, as may best be seen in Figure 5 wherein the casing has been lowered with respect to the screws to bring the screws within the narrowed upper portions of the openings 62. In some cases it may be desirable to mount the casing upside down, in which case the narrowed lower portions of openings 62 serve to detachably secure the cover 59 and therefore the casing 49 to the wall.

In certain cases, it will be understood, that it may be sufficient to support the casing on a wall, or the like supporting surface, merely by inserting the male inlet plug 63 for the casing into a suitable female receptacle therefor such, for example, as the socket in a wall type outlet box, the prongs 64 of the male plug, in such case, providing means for detachably securing the casing to the wall, or like support therefor.

Where the casing is supported as by its cover 59, a short extension cord 65 having a conventional male plug 66 for connection into the socket of the outlet box is employed to conduct the electrical energy to the retractable extension cord 30 in casing 49, the cord 65 for this purpose also having a female plug 67 which is provided with a pair of female type spaced dual prongs 68 for respectively receiving the prongs 64 of male plug 63.

Plug 63 is electrically connected by means hereinafter to be described to the inner end portion of extension cord 30, which inner end portion is disposed in an axial bore 69 provided therefor in roll 31. From the axial bore 69 the cord 30 passes through a diagonal bore 70, thence through a longitudinal bore 71 adjacent the cylindrical surface of the roll, and thence outwardly through a diametrical bore 72 to the cylindrical surface of the roll about which it thereafter is wound in a series of successive convolutions arranged in one or more layers depending on the length and diameter of the roll in proportion to the maximum length of the extension cord 30. The windings of cord 30 may be arranged about roll 31 in any suitable manner which facilitates winding and unwinding of the cord thereon, preferably as indicated.

Lower wall 53 is provided with an elongated opening or slot 73 through which cord 30 passes into casing 49. The cord moves longitudinally of the casing within this slot as the cord is wound or unwound in successive convolutions about the reel 31 upon being retracted within or withdrawn from the casing respectively. Opening 73 preferably is formed by rolling over the edge portion of the opening, as illustrated, in order to provide a smooth surface against which cord 30 may slide as it is retracted within or withdrawn from the casing.

Roll or reel 31 preferably is formed of any suitable non-conducting material such, for example, as wood, plastic, hard rubber, or the like, and is provided with an enlarged cylindrical bore 74 arranged coaxially with respect to bore 69 and in communication therewith.

Bore 74 is closed by a disk 75 which may be composed of the same material as roll 31 and secured thereto as by the nails 76, or the like fastening means. Disk 75 is provided with an axially arranged bore for receiving the cylindri-

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cal projection 77 of plug 63 which is formed of any suitable electrically non-conducting material.

Plug 63 comprises an externally threaded shank which is threadedly received as at 78 within the correspondingly internally threaded in-turned flange of a cup shaped stamping 79 having a plurality of ears or tabs 80 on the lip portion thereof which project through suitable openings therefor in casing end plate 51. After projection through the casing end plate, the tabs are bent over, thereby to secure stamping 79 in supported position within the casing and projection 77 in fixed position to rotatively support disk 75.

Prongs 64 of plug 63 extend through suitable openings therein and terminate in a pair of diametrically arranged washer type segments 81, Figure 9, which are inserted in suitable correspondingly formed recesses provided therefor on the inner end of plug 63 and secured thereto as by screws 82.

Washer type plate segments 81 are formed of electrical conducting material such, for example, as brass and are arranged to be slidably contacted by the heads of a pair of diametrically spaced screws 83 intermittently as disk 75 and roll 31 rotate, the screws 83 being illustrated in the non-contacting position in Figure 9, in which case the heads of screws 83 bear against the insulation end surface of plug 63 disposed between plate segments 81 whereby the circuit to cord 30 is broken when the screws are in this position. The plates 81, as aforesaid, rest in recesses in the end of the plug and are flush with the end surface thereof whereby the heads of screws 83 move smoothly over the plug and plate surfaces from non-contacting to contacting positions thereon as the disk and roll rotate.

Screws 83 are slidably supported in tubular brass inserts 84 arranged in diametrically opposed relation in disk 75, and the heads of the screws are yieldably urged into contacting engagement with plate segments 81 by coil springs 85 sleeved about the screws and interposed between the heads thereof in inserts 84, suitable openings being provided in disk 75 to accommodate the inserts, screws and springs.

Screws 83 each carry a pair of nuts 86 which clamp an eyelet terminal 87 therebetween, the eyelet terminal having a skirt portion which is wrapped around and clamped in a well known manner to the bared end of one of the conductors comprising the two conductor extension cord 30, thus completing the electrical circuit from the outlet box through cord 30, plug 63, screws 83, and cord 30 to the plug-in 35, that is when screws 83 are in contacting engagement with plate segments 81.

The opposite end of roll 31 is provided with an axially arranged square opening for receiving the correspondingly squared end portion 88 of a short shaft 89. A metallic sleeve 90 is secured to shaft 89 as by a pin or rivet 91 which also secures the inner end of a spiral spring 92 to the shaft. The outer end of spring 92 is secured to a cup shaped stamping 93 as by a rivet 94, stamping 93 having a plurality of ears or tabs 95 which project through suitable openings provided therefor in casing end plate 50 whereby stamping 93 is secured in fixed position on the end plate by bending over the tabs after being inserted through the openings therein.

Sleeve 90 is journaled in a central opening provided therefor in stamping 93 and also in the

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correspondingly formed central opening 96 of a brake disk 97 which is secured to stamping 93 concentrically therewith as by rivets 98, or the like.

Brake disk 97 comprises a plurality of peripheral depressions or notches 99, preferably four as illustrated which are formed with rounded edges as at 100. These notches are arranged to receive the correspondingly formed pawl portions 101 of a plurality of dogs 102, preferably three as illustrated, which are arranged in circumferentially spaced relation within the dished portion of a stamping 103 which is secured as by nails 104, or the like, to the end of roll 31, the roll being suitably recessed to receive the dished portion of stamping 103 and the dogs 102 being freely pivotally supported on pins or rivets 105, or the like, which are secured to the stamping 103 as best seen in Figure 13.

The uppermost dog 102, as viewed in Figure 10, for example, brake disk 97, and plug 63 are so constructed and arranged that the uppermost dog engages a notch 99 to stop the screw contacts 83 in the position of Figure 9 when cord 30 is fully retracted whereby the circuit to the cord is interrupted when use thereof is not required, this being accomplished when plug 63 is fully screwed into stamping 79 such that the flange of the plug bears against casing end plate 51.

When either of the other two dogs engage a notch 99, however, upon withdrawal of cord 30 from the casing, the arrangement is such that screws 83 engage plate segments 81 to connect cord 30 into the power circuit. It will be understood that upon withdrawing cord 30, the roll may be stopped in a position in which the uppermost dog engages a notch in brake disk 97 and thereby interrupt the circuit to the cord. However, the chances are two-to-one against this happening in view of two dogs being employed to effect contacting and, in the event that the uppermost dog should stop the roll upon release of the cord after it has been withdrawn from the casing to a desired length, it merely is necessary to withdraw or retract the cord more or less until one of the other dogs take hold to complete the circuit, this action being much the same as that employed to set a window shade in a desired position.

It will be understood also that by reason of the rounded corners 100 of notches 99 and the construction of pawls 101, the dogs merely retain the roll releasably in an adjusted position of cord 30, the dogs being withdrawn from the notches in response to a pull on the cord and the dogs being free to ride over the brake disk without braking engagement therewith as the dogs are rotated with roll 31 either while being rotated by unwinding of spring 93 or winding thereof as cord 30 is withdrawn from the casing, much in the same manner as the action of a window shade.

In the modified structure of Figures 19 and 21, a diametrically extending notch or slot 106 is provided in the end of roll 107 to accommodate the cord connections to screws 83, notch 106 communicating with bore 69 and being closed by disk 75, this construction of this end of roll 107 otherwise being the same as roll 31.

The opposite end of roll 107 carries a stamping 108 having a flange 109 which fits over the reduced end portion of roll 107 in flushed relation therewith and secured thereto as by screws 110. The dished portion 111 of the stamping carries

the dogs 102 in the same manner as stamping 93.

Stamping 108 also comprises a hub portion 112 having diametrically opposed openings 113 to receive pin 91, the hub portion 112 taking the place of shaft 89 and sleeve 90 of the arrangement disclosed in Figure 3, for example.

In the modification of Figures 20 and 22, bore 74 in roll 114 terminates in an enlarged bore 115 for interfittingly receiving a disk 116 having a central opening 117 for rotatably receiving projection 77 of plug 63, disk 116 being retained in bore 115 by screws 118. The assembly of screws 83 in disk 116 is the same as that employed in the case of disk 75.

From the foregoing, it should now be apparent that a retractable extension cord unit has been provided which is well adapted to fulfill the aforementioned objects of the invention and whereas a certain physical embodiment and modification thereof has been disclosed with particularity herein, it will be understood that it is my intention to cover all such additional embodiments and modifications which fall within the spirit and scope of my invention as defined by the claims appended hereto.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. A retractable extension cord unit of the character disclosed comprising a casing, a cylindrical roll rotatively supported in said casing, a two conductor extension cord wound about said roll and having one end thereof disposed axially of the roll for rotation therewith and the other end extended freely outwardly of the casing, spring means arranged within the casing for winding the cord on the roll thereby to retract it into the casing, and electrical connections adapted to connect a source of electric current to said one end of the cord for connecting the same electrically together only in predetermined stopped positions of the roll, said electrical connections including a stationary member of electrical insulating material connected to the casing and a pair of diametrically opposed contact plates secured to said insulating member in mutually spaced relation and each connected electrically to the electric current source, said roll having an enlarged axial bore into which said one end of the cord extends, a disk of insulation material secured to said roll in enclosing relation with respect to said enlarged bore, a pair of parallel disposed screws carried slidably by said disk for engagement with said contact plates respectively when the roll is in any one of said predetermined stopped positions thereof, spring means for yieldable urging said contact screws into engagement with said contact plates, and terminal means for connecting said contact screws to the conductors of said extension cord.

2. A retractable electric extension cord unit of the character described comprising a casing having spaced end walls, a cup-shaped member secured to one of said end walls disposed within the casing and having an open end in abutting engagement with said end wall, a cylindrical roll journaled in the casing and disposed longitudinally thereof between the cup-shaped member and other end wall, a disk secured to a first end of said roll and located adjacent said other end wall and formed of electrical insulating material, a pair of arcuate contact plates each adapted to be connected to a source of electric current, means supporting the contact plates in electrically insulated relationship to one another rigidly in the casing adjacent said other end

wall, a pair of screws slidably carried by said disk in parallel relationship to one another and movable into electrical contact with said contact plates when the plates and screws are in diametrical alignment, spring means bearing on and yieldably urging the screws slidably toward and into engagement with said plates, a two conductor extension cord wound about said roll having one end disposed axially of the roll and adjacent said disk and the other end extending radially from the roll outwardly of the casing, terminal means connecting said screws to the conductors of the extension cord at said first mentioned end thereof, said cup-shaped member having a central opening, means including a shaft journaled in said central opening of the cup member and providing a journal for the other end of the roll, a spiral spring disposed in said cup-shaped member having one end secured to the side wall thereof and its other, inner end secured to said shaft, said spring being arranged to be wound as the roll is revolved in a direction to pay out the extension cord from the casing whereby the cord is retracted as the roll is rotated in the opposite direction under the biasing action of said spiral spring for rewinding the cord on the roll.

3. The combination as in claim 2, but further characterized in that the cup-shaped member is formed of metal and provided with a plurality of tabs on the lip portion thereof for extension through suitable openings formed therefor in said casing end wall individual thereto whereby the member is secured to the end wall when the tab extensions are bent over.

4. The combination as in claim 2, said shaft being anchored to and projecting axially from the end of the roll disposed adjacent the cup-shaped member, one end of the shaft being loosely disposed in the cup-shaped member, a metallic bearing sleeve on said shaft end, a pin for securing said other end of the spring and said sleeve to said shaft end, and a dish-shaped member secured to said last mentioned end of the roll around the shaft, said roll having a recess in said last mentioned end to receive the dish portion of said dish-shaped member.

5. A disk-shaped member as in claim 4, but further characterized by having said shaft formed with the dish-shaped member and having a cylindrical flange portion for engaging the peripheral end portion of the cylindrical roll.

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