Nov. 9, 1937. L. LAWTON 2,098,343

SKELETON POLE

Filed Nov. 18, 1936

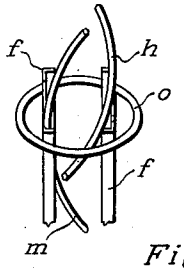


Fig. 5

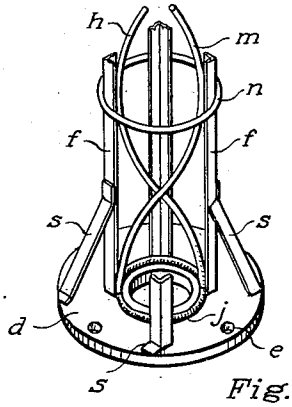


Fig. 4

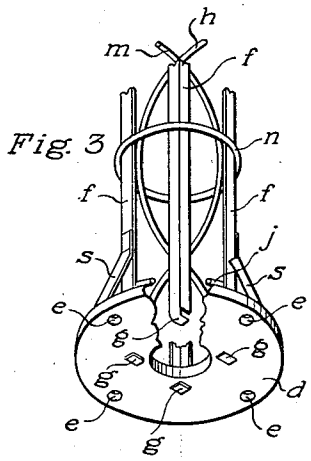


Fig. 3

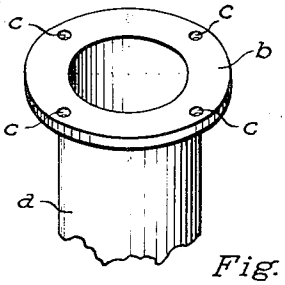


Fig. 2

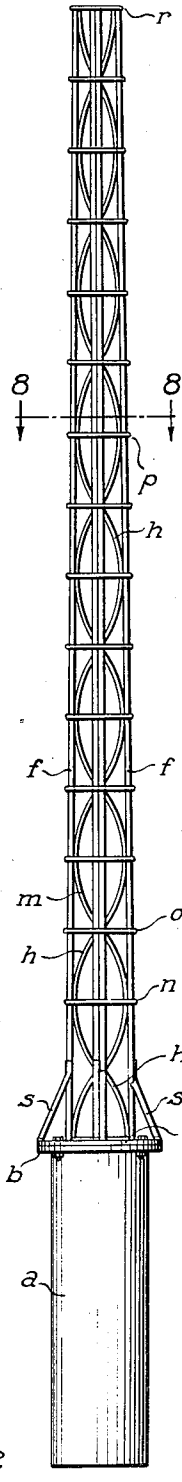


Fig. 1

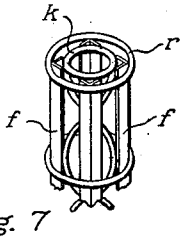


Fig. 7

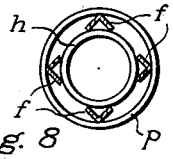


Fig. 8

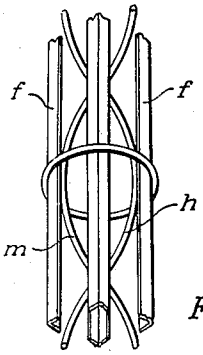


Fig. 6

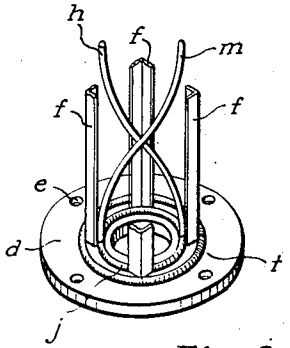


Fig. 9

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SKELETON POLE

Lon Lawton, Stevenson, Wash.

Application November 18, 1936, Serial No. 111,433

3 Claims. (Cl. 189—24)

My invention relates to fabricated steel or metal poles of a type required for supporting overhead transmission or communication lines, and also to poles used as standards for street lamps and other purposes.

An object of my invention is to construct a metal skeleton pole which will combine lightness, simplicity and economy of construction, and strength to withstand the stresses to which such poles may be subjected.

Another object of my invention is to provide a method of constructing such poles which can be used for poles of various sizes and for poles requiring various degrees of strength and rigidity.

I accomplish these and incidental objects by making a skeleton pole with a superstructure composed of a plurality of longitudinal bars arranged on the outside of a spiral frame comprising helically shaped rods, with rings slipped over the outside of the longitudinal bars at regular intervals, holding the bars against the inner spiral frame, and with all the contacting points between the longitudinal bars, inner spiral frame, and outer rings welded,—the number of longitudinal bars, spiral rods and outer rings depending largely upon the rigidity and strength desired for the pole.

The manner in which my skeleton pole is constructed will be apparent from a brief description with reference to the accompanying drawing, in which:

Fig. 1 is an elevation of my skeleton pole showing the pole completely assembled and set up and attached to the base section;

Fig. 2 is a view in isometric perspective of the upper portion of the base section drawn on a larger scale than Fig. 1;

Fig. 3 is a view in isometric perspective of the bottom portion of the pole itself, with part of the bottom plate *d* broken away, and showing details of construction of the lower part of the pole;

Fig. 4 is another view in isometric perspective of the bottom portion of the pole, but showing the bottom tilted the opposite way from Fig. 3 affording a view of the top face of the bottom plate *d*;

Fig. 5 is a fragmentary view in isometric perspective of a section of the pole at the ring *o* of Fig. 1, drawn to the same scale as Figs. 2, 3 and 4, but with the pole rotated 45° from the position of Fig. 4;

Fig. 6 is a view in isometric perspective of the part of the pole located above the portion shown in Fig. 3 drawn on the same scale and in the same position as Fig. 3;

Fig. 7 is a view in isometric perspective of the top portion of the pole;

Fig. 8 is a horizontal section corresponding to the line 8—8 of Fig. 1 but drawn on a larger scale than Fig. 1;

Fig. 9 is a view in isometric perspective of the lower portion of the pole and of the bottom plate, illustrating a modified method of constructing the lower portion of the pole.

Referring first to Figs. 1 and 2, *a* denotes the base section or support for the pole. I have found it preferable to make this base section in the form of a cast metal hollow cylinder or pipe of suitable length with the bottom end closed, except for a small opening which may be left for convenience in the lifting or moving of the base section, and with the top open and formed with an annular flange *b*.

The pole itself is comprised of a number of longitudinal metal bars *f* arranged about a spiral frame formed by one or more spiral shaped rods such as *h* and *m*,—the spiral rods *h* and *m* and the longitudinal bars *f* being secured to a bottom plate *d*,—and with rings such as *n*, *o*, *p* slipped over the longitudinal bars *f* when the latter are in position and holding the longitudinal bars against the inner spiral frame.

The lower portion of the pole is shown more clearly in Figs. 3 and 4. The bottom plate *d*, which is preferably of the same size as the outer circumference of the annular flange *b* of the base section *a*, is provided with a number of holes *e* corresponding in size and location to holes *c* in the flange *b* of the base section, so that when the pole is set up on the base section, it can be securely fastened thereto by suitable bolts or rivets extending thru the registering holes *c* and *e*.

The inner spiral frame for the pole, as illustrated in the drawing, comprises two spiral formed rods *h* and *m* wound in the same direction, the lower ends of which are welded to a ring *j*, at diametrically opposite points, the ring *j* in turn being welded to the bottom plate *d*. Similarly, the upper ends of the spiral rods *h* and *m*, when the pole is completed, are welded to a ring *k* (see Fig. 7). The longitudinal bars *f*, which extend the desired height of the pole, may be made of angle iron, as illustrated in the drawing, and have their bottom ends securely attached to the bottom plate *d*. I have found that a satisfactory manner of attaching the bottom ends of the bars *f* to the plate *d* is to cut

away one face or leg of each of the bars *f* a distance greater than the thickness of the bottom plate *d* and to provide the bottom plate *d* with slots to receive the ends of the bars *f*. These ends of the bars *f* are inserted in the slots in the plate *d* and bent over to lie flat against the bottom face of the plate *d*, as shown at *g* in Fig. 3, the ends *g* then being welded to the plate *d*. The slots in the plate *d* for the ends of the bars *f* are equally spaced in a circle about, and concentric with, the ring *j*, so that the bottoms of the bars *f* will touch the outer edge of the ring *j*. The bars *f* are preferably all arranged in the same position with respect to the inner spiral frame, that is all the bars *f* have the inside of their angular face opposed to the spiral frame, or all the bars *f* could be reversed and have their outside angular ridge placed adjacent to the inner spiral frame. While I have shown, as my preferred construction, the longitudinal bars *f* made of angle iron, they could also be made of I-beams, channel iron, or hollow tubing.

A plurality of rings or hoops, such as indicated at *n*, *o* and *p* in Fig. 1, are placed over the outside of the longitudinal bars *f* at regular intervals and a top ring *r* (see Figs. 1 and 7) finishes the top end of the pole.

Preferably the pole is tapered upwardly, the top ring *k* being made smaller in diameter than the bottom ring *j*, and the spirals formed by the rods *h* and *m* are tapered upwardly. The rings *n*, *o*, etc., are composed so as to be made with uniformly graduated diameters, respectively, the lowest ring *n* being of greatest diameter and the top ring *r* being the smallest in diameter. The proper taper of the pole is assured by spacing the uniformly graduated rings at equal distances apart along the length of the pole. When the outside rings have been set in place, and the top ends of the spiral rods *h* and *m* and of the longitudinal bars *f* have been welded to the upper ring *k*, the longitudinal bars *f* are welded to the spiral rods *h* and *m* wherever such spiral rods touch or cross the longitudinal bars, and the rings *n*, *o*, etc., are welded to the outside of the longitudinal bars *f* in their proper position. The combining and welding together of the inner spiral rods, the longitudinal bars, and the outer rings insures a strong pole suitable for any of the purposes which I have indicated. The strength and rigidity of the pole can be increased by increasing the number of longitudinal bars *f*, by increasing the number of coils formed by the spiral shaped rods *h* and *m*, and also by increasing the number of inner spiral rods, as well as increasing the number of external rings. The external rings *n*, *o*, etc., may be spaced at any equal distances along the pole, but are preferably placed at the points where the longitudinal bars *f* are crossed by the spiral rods *m* and *h*, thus holding the rods *f* against the surfaces of the interior spiral. By placing the rings close enough together, they may also be conveniently made to serve as a ladder facilitating the climbing of the pole.

In actual practice I have found it preferable to space the rings approximately two feet apart regardless of the number of inner spiral rods or the number of coils of the spiral.

In the accompanying drawing I have shown the inner spiral frame comprised of two spiral formed rods. It would be possible to construct my skeleton pole with an inner spiral frame comprising a single spiral rod, such rod having a greater number of turns or coils than the rods *h* or *m* of Fig. 1, but I consider the construction with a single spiral rod less desirable. The preferred construction is with two or more spiral rods, and for ordinary purposes two spiral rods, identically shaped, extending in the asme direction, and set opposite each other, will be sufficient.

As a reinforcement for the lower end of the pole structure angle iron braces *s* (see Figs. 1, 3 and 4) may be welded to the longitudinal bars *f* and bottom plate *d*. Fig. 9 shows these braces *s* omitted and instead an outer ring *t* fitted about the base of the longitudinal bars *f* and welded to the bottom plate *d*. Other means of bracing or reinforcing the lower portion of the pole structure will readily suggest themselves if such bracing or reinforcing is desired.

The base section *a* for my skeleton pole may be set in the ground or in a concrete foundation or other pedestal. When the base section is set directly in the ground, the closing of the bottom end of the base section will offset the tendency for the section to sink too far into the ground when the pole is placed upon it. The interior of the base section may be filled with concrete or other material before the pole is set up on the base section, and such filling will serve as an additional ballast for the pole. The base section can be of any size so long as the flange *b* is made so that the plate *d* can be properly secured to the base. The size of the base section *a* is preferably governed by the soil conditions and other local conditions.

The assembling and setting up of the pole is a relatively simple matter. Because of the light weight of the pole, rendering its transportation easy, the assembling and welding together of the parts can preferably be done in the factory. However, if desired, the assembling could also be done on the ground where the pole is to be placed, provided there is suitable welding means on hand. The inner spiral rods, such as *h* and *m*, after being pre-formed or wound into spiral shape slightly greater in diameter than required for the finished pole, are arranged and attached to the bottom ring *j* and ring *j* is attached to plate *d*. The ends of the longitudinal bars *f* are then secured to the plate *d*. Next the rings *n*, *o*, etc., are slipped over the outer ends of the bars *f* and forced into proper place. These rings force the longitudinal bars against the inner spirals compressing the latter slightly. The upper ends of the bars *f* are then welded to the upper inner ring *k*. Then the inner spiral rods *h* and *m* are welded to the ring *k* and any ends of the spiral rods *h* and *m* extending above the ring *k* are cut off. Then the welding between inner spiral rods, the bars *f*, and the outer rings is done at the points of contact. When the base section has been put in place, the skeleton pole is set on the base in upright position and secured to the base section in the manner indicated.

The comparative diameters of the upper and lower rings *k* and *j* determine the taper of the pole, and the external rings *n*, *o*, *p*, etc., are made with graduated diameters accordingly, depending upon the amount of taper and also upon the desired spacing of the external rings. The external rings, when forced into place over the outside of the longitudinal bars *f*, will hold securely in their positions even without being welded to the longitudinal bars. This skeleton pole could, of course, be made without a taper, but in such case the external rings might have a tendency to slip out of place until firmly welded to the longitudinal

bars. The tapered pole I regard as the preferable construction for ordinary purposes.

The skeleton pole in this invention is thus simply and inexpensively constructed. It is light and strong, but offers little resistance to the wind. It is adaptable to many uses and when employed as a support for street lamps lends itself to further ornamentation. It may be made of iron, steel, aluminum, aluminum steel, or any other suitable metal.

I claim:

1. A skeleton metal pole including a base plate, a resilient metal spiral attached to said base plate, said spiral extending approximately the full length of said pole, a plurality of longitudinal struts attached to said base plate about said spiral, said struts extending the full length of said pole, a series of encircling rings placed on said struts so as to cause said struts to compress said spiral, said rings secured in place on said struts at equal intervals.

2. The combination described by claim 1 with said rings of progressively smaller diameter, whereby to force said struts and spiral into a taper.

3. A skeleton metal pole including a base plate, a plurality of similar sized resilient metal spirals, wound in the same direction, attached to said base plate and extending approximately the full length of said pole, a plurality of longitudinal struts attached to said base plate about said spirals, said struts extending the full length of said pole, a series of encircling rings placed on said struts so as to cause said struts to compress said spirals, said rings secured in place on said struts at equal intervals.

LON LAWTON.