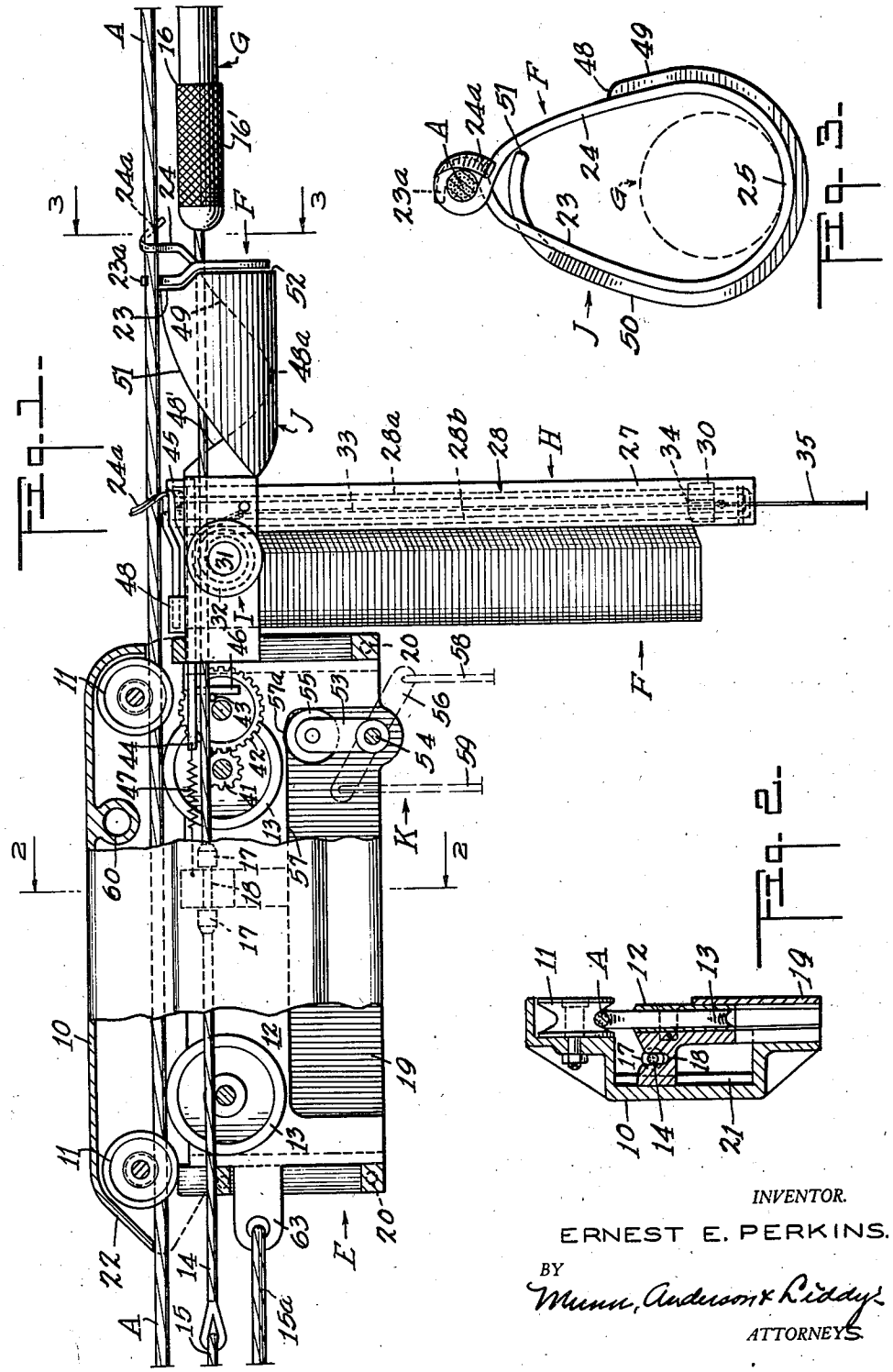
March 31, 1942. E. E. PERKINS 2,277,935

CLAMP APPLYING MACHINE

Filed May 6, 1940 3 Sheets-Sheet 1



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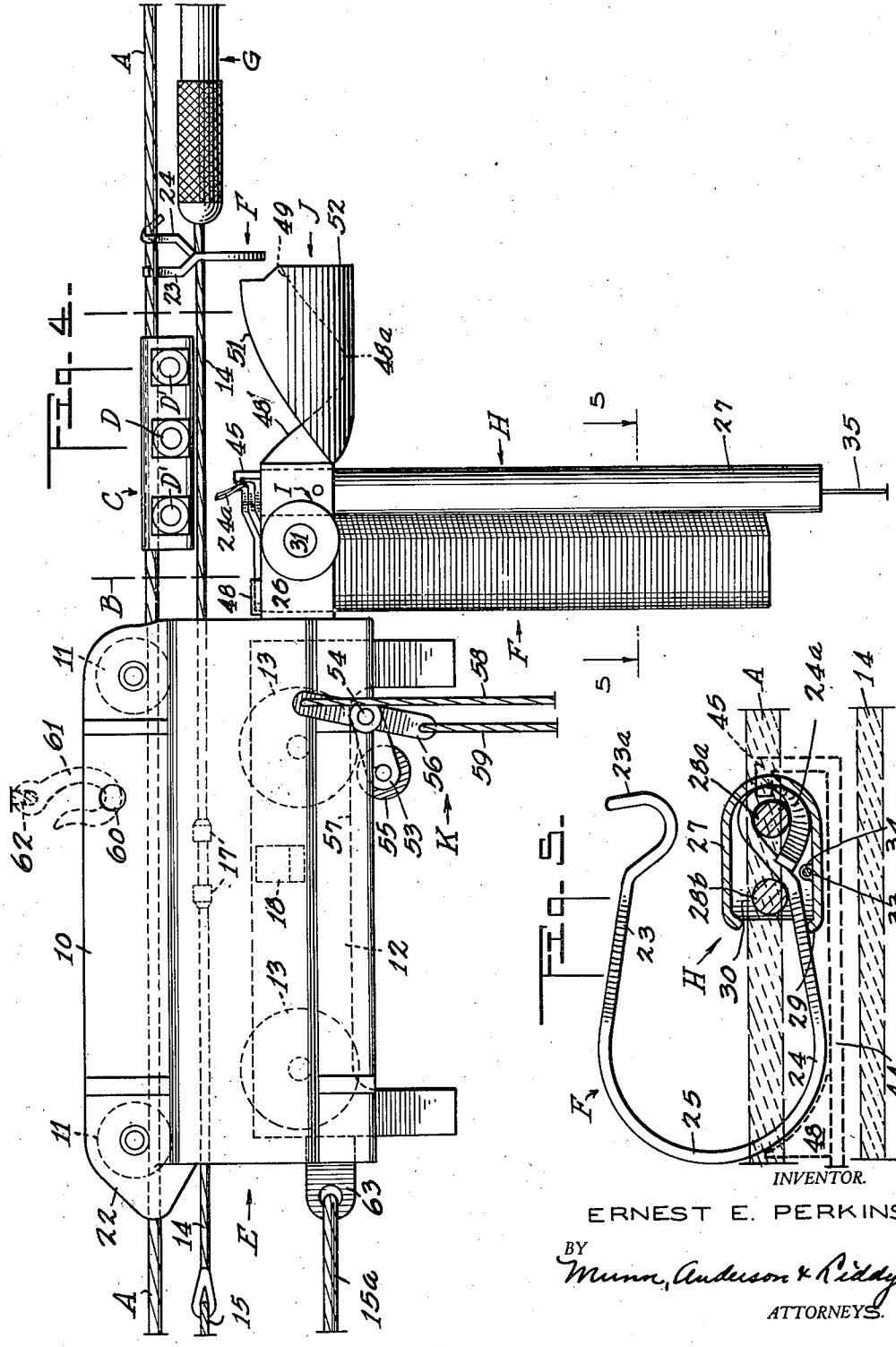
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CLAMP APPLYING MACHINE

Filed May 6, 1940 3 Sheets-Sheet 2



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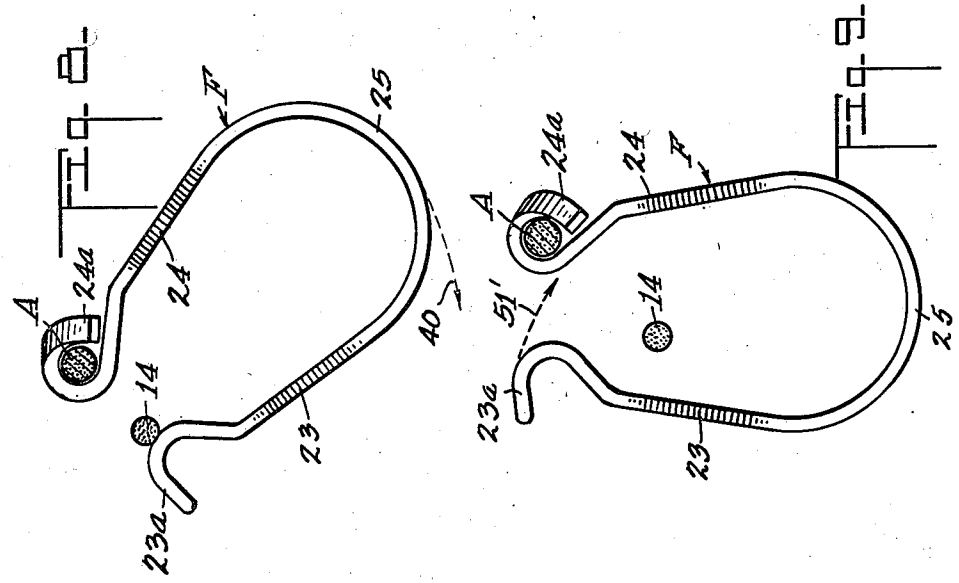
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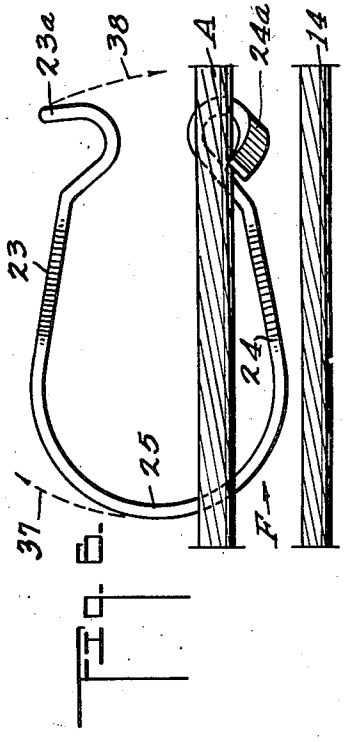
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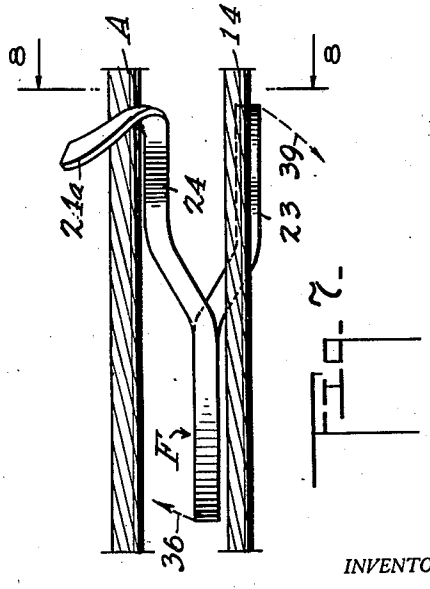
March 31, 1942. E. E. PERKINS 2,277,935

CLAMP APPLYING MACHINE

Filed May 6, 1940 3 Sheets-Sheet 3







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Patented Mar. 31, 1942

2,277,935

UNITED STATES PATENT OFFICE

2,277,935

CLAMP APPLYING MACHINE

Ernest E. Perkins, Menlo Park, Calif.

Application May 6, 1940, Serial No. 333,699

28 Claims. (Cl. 175—376)

The present invention relates to improvements in a clamp applying machine, and it consists of the combinations, constructions and arrangements hereinafter described and claimed. The invention has particular reference to a mechanical suspension ringer for placing power, light, communication, railroad signal cables and other suspended structures; although I do not wish to be limited in this respect.

At the present time, it is a common practice in mounting power or telephone cables on poles to first erect a suspension or messenger wire on the poles. Rings or clamps are then applied to the messenger wire at intervals by an operator riding on a platform or cable car suspended from the messenger wire. The clamps are engaged around a pull cable as they are applied and afterwards the power or telephone cable is drawn through the clamps by the pull cable.

It is proposed in this invention to entirely eliminate such a travelling platform or cable car, and to provide a mechanical machine that may be drawn along the messenger wire and which will automatically engage the rings or clamps around the messenger wire and around the pull cable. This elimination of the travelling platform or cable car will materially add to the safety of the crew engaged in the erecting of the cables. The pull cable may be attached to a power or telephone cable, or to any other suitable structure, and the latter drawn through the rings or clamps as the machine is advanced.

A still further object of the invention is to provide a clamp applying machine of the character described in which all parts thereof are operated automatically as the machine is advanced by means of a pull cable or other source of power. The machine includes a magazine for holding a plurality of rings or clamps and the latter are released at predetermined intervals for engagement with the messenger wire and the cable to be suspended.

It is also proposed to provide a removable magazine in which the rings or clamps are supported, and thus when one magazine has been emptied of its clamps, a new one may be substituted therefor and the operation continued. The magazines can be filled at any time convenient and thus the work may be speeded up.

A further object of the invention is to provide novel means for transferring the clamps from the magazine to their final positions around the messenger wire and the pull cable. The clamps that I employ are standard and have hook-shaped ends and an intermediate looped portion. I propose to engage the hooks on the messenger wire and at the same time draw the cable to be suspended through the loops of the clamps. Thus the entire operations of applying the clamps and placing the cable in final position are both accomplished as the machine is advanced.

It is further proposed to utilize the movement of the machine along the messenger wire for operating all parts of the clamp applying machine. The machine is designed for clearing obstructions, such as, the conventional clamp-like brackets that are used for supporting the messenger wire on the poles.

Another object is to provide a clamp applying machine that will permit the cable, which is to be suspended, to be pulled forward independently of the machine. For instance, this may be desirable at a turn or other point when additional slack or length of cable is desired.

Other objects and advantages will appear as the specification proceeds, and the novel features of the invention will be particularly set forth in the claims hereunto annexed.

For a better understanding of my invention, reference should be had to the accompanying drawings, forming part of this application, in which:

Figure 1 is a side elevation of my clamp applying machine with parts broken away to disclose the interior mechanism;

Figure 2 a transverse sectional view taken along the line **2—2** of Figure 1;

Figure 3 another transverse sectional view along the line **3—3** of Figure 1;

Figure 4 a side elevation of the clamp applying machine showing the latter arranged in a position for clearing an obstruction;

Figure 5 a horizontal section taken along the line **5—5** of Figure 4;

Figure 6 a top plan view of one of the clamps which I use, illustrating the clamp as having been moved upwardly into a position underneath the messenger wire, which corresponds to the position of the clamp at the time it is released from the magazine;

Figure 7 a front elevation of Figure 6 showing the same clamp;

Figure 8 a vertical view taken along the line **8—8** of Figure 7, but showing the clamp after it has swung into a position for engaging with the cable to be supported by the clamp;

Figure 9 a view similar to Figure 8, with the clamp swung into a further position and ready to have its free hook engaged by the messenger wire.

While I have shown only the preferred form of my clamp applying machine, it should be clearly understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit of my invention.

Detailed description

Referring now to the drawings in detail, wherein like reference letters and numerals designate corresponding parts in the several views, I have shown a suspension or messenger wire A that is secured to the poles at intervals. One of the poles is indicated at B in Figure 4, and a clamp-like member C is fixed to the pole by means of a bolt D. Bolts D' are utilized to secure the two parts of the clamp-like member together in clamping relation upon the messenger wire. The member C is commonly used at the present time and needs no further description, except it should be mentioned that the clamp-like member C spaces the wire or messenger A a short distance from the pole.

A clamp applying machine indicated generally at E is adapted to place rings or clamps F at regular intervals along the messenger wire as shown in Figures 1 and 2. As these clamps are secured to the messenger wire when the machine E is advanced, a telephone, power or like cable G is drawn through the clamps in the manner hereinafter described. The cable G will therefore be suspended beneath the messenger wire A by the clamps F. The latter are sometimes referred to in the art as "rings." As previously mentioned, I do not wish to be limited in regard to the structure to be supported by the clamps F.

The machine E includes a carriage 10 having V-shaped guide rollers 11 rotatably mounted thereon. These rollers are adapted to ride on the top of the messenger wire as clearly shown in Figures 1, 2 and 4, and the grooves in the rollers are sufficiently deep to prevent the carriage from jumping the messenger wire.

A slide 12 is guided for vertical movement in the carriage 10 and has rollers 13 rotatably carried thereby, which are designed for riding on the lower side of the messenger wire A when the slide 12 is held in raised position as shown in Figures 1 and 2. The messenger wire thus passes between the rollers 11 and 13. It may be pointed out that the rollers 13 are rotated as the machine is drawn along the messenger wire due to contact with the latter. The rollers 13 determine the spacing of the clamps F along the messenger wire and the entire mechanism of the machine E is operated by the rollers 13, as will appear later in the specification.

A pull cable 14 passes lengthwise through the machine and its forward end is adapted to be pulled by any suitable means, such as a truck, winch or the like. I have disclosed a cable 15 that may lead from the pull cable 14 to such a source of power. The trailing end of the pull cable 14 is provided with the usual basket 16, which may be telescoped over the end of the power cable or the like G. The basket includes a section made of woven wires 16' that clamp down upon the cable G when the pull cable 14 is drawn taut.

The central portion of the pull cable is provided with two spaced lugs or enlargements 17, which are disposed on the opposite sides of the jaw-like parts 18 when the slide 12 is in raised position as illustrated in Figure 1. However, the slide may be lowered, as indicated in Figure 4 and the jaw-like parts 18 are thereupon freed from the cable 14. This will allow the latter to be pulled forwardly independently of the machine E for such purposes as obtaining additional lengths of the cable G at turns in the line being erected, or at other points.

It will be noted from the transverse sectional view shown in Figure 2 that one side of the machine is partially left open so as to allow the machine to be moved laterally against the messenger wire and the rollers 11 engaged over the latter. The lower part of this open side (right-hand part of Figure 2) has a plate 19 fixed to the carriage 10 by bolts 20 or the like (see Figure 1).

The slide 12 has the jaw-like part 18 fixed thereto and the part 18 is guided in a vertical guideway 21 as will be seen by reference to Figure 2. In order to facilitate passageway of the carriage along the messenger wire when moving through branches of trees or the like, I provide a pointed nose 22 on the forward portion of the carriage (see Figures 1 and 4).

The clamps F are substantially U-shaped in plan view and include legs 23 and 24, which have hook-shaped ends 23*a* and 24*a*, respectively. The legs are interconnected by a looped portion 25 forming part of the clamp. The clamps are made from spring material and it will be noted that the hooks 23*a* and 24*a* face in opposite directions. Figure 7, which illustrated a side elevation of one of the clamps, indicates the hook 24*a* as extending upwardly from the leg 24. At the same time, the hook 24*a* curls toward the looped portion of the clamp.

A magazine H is designed to hold a plurality of clamps F and I do not wish to be limited as to the number of clamps to be held in the magazine, since with different requirements the number will vary. The slide 12 has a rearwardly-extending section 26 to which the magazine is removably secured by any suitable means.

The magazine H includes a guide shield 27, which is substantially U-shaped in horizontal section (see Figure 5). The clamps are stacked one above the other in the magazine, as shown in Figures 1 and 4. Within the guide shield 27 is mounted a U-shaped clamp guide member 28 (Figure 1) having vertically-extending legs 28*a* and 28*b* (see Figure 5) The clamps F are threaded over the leg 28*a* and the hooks 24*a* encircle this leg. The leg 24 of each clamp F passes out through the space defined between the leg 28*b* of the clamp guide member and the adjacent edge 29 of the shield 27. The clamps F, therefore, have their legs 23 and looped portions 25 extending clear of the magazine H, as shown in Figure 5.

A follower 30 is positioned within the shield 27 beneath the lowermost clamp F and is guided for vertical movement on the vertical legs 28*a* and 28*b*. A clamp advance mechanism I has a drum 31 or spool, which is urged in a counter-clockwise direction in Figures 1 and 4 by means of a spiral spring 32 (see Figure 1). A cord 33 extends from the spool 31, one end of the cord being fixed to the spool, while the free end of the cord is adapted to be fastened in a slot or the like 34 formed in the follower 30. An operating wire 35 is fastened to the lower end of the cord 33 and extends below the shield 27.

The wire 35 may be pulled downwardly and the cord engaged in the slot 34 of the follower. The clamps F are, therefore, urged upwardly in the magazine H by the spring-actuated spool 31.

The clamps F are horizontally disposed in the magazine and as they move upwardly the clamps clear the pull cable 14, since the latter is disposed to one side of the messenger wire A and the magazine H (see Figure 5).

The clamps F are advanced toward the messenger wire A so as to present the hooks 24a thereof in a position just below the messenger wire with the hook 24a of the uppermost clamp extending above the messenger wire; that is, as shown in Figure 7. It will be remembered that the carriage 10 is moving along the messenger wire (toward the left in Figures 1 and 4). When the uppermost clamp is released from the magazine H by the means hereinafter set forth in detail, the hook 24a, which is bearing against the more or less rough surface of the messenger wire A, will cause the clamp to raise its looped portion 25 as indicated by the arrow 36 (Figure 7) and at the same time the clamp is urged to swing in a general clockwise direction (Figure 6).

During this swinging of the clamp, the looped portion moves outwardly as indicated by the arrow 37 (Figure 6) and the hook 23a moves downwardly as indicated by the arrow 38 (Figure 6) and the arrow 39 (Figure 7). The hook 24a in reality serves as a fulcrum on which the clamp swings, and the hook 24a wraps itself around the messenger wire A.

Figure 8 shows the clamp F with its hook 24a engaging around the messenger wire and the hook 23a passing beneath the pull cable 14. The clamp in this view has been swung into a vertical position and the hook 23a is curved so as to cam itself beneath the pull cable 14 with the latter entering the space defined between the legs of the clamp.

The clamp will continue to swing in the direction of the arrow 40 (Figure 8) by gravity and will finally be moved into the position shown in Figure 9, as will appear later in the specification.

In order to release the uppermost clamp F at the proper time, I utilize one of the rollers 13 (see Figure 1). The right-hand roller 13 in this view, which is driven by the messenger wire A due to drawing the carriage along the messenger wire, has a pinion 41 fixed thereto. This pinion meshes with and drives a gear 42, the latter having a pin 43 projecting therefrom. A bar 44 is guided for horizontal sliding movement in the slide 12 and its extension 26.

The bar 44 carries a latch 45 that engages over the uppermost clamp F in the magazine near the hook 24a. The bar 44 has an arm 46 formed integral therewith. As the gear 42 is rotated, the pin 43 will strike the arm 46 during each rotation of the gear 42 and will move the latch 45 rearwardly (to the right in Figure 1). This will free the uppermost clamp F for swinging through the cycle just described and into the position shown in Figure 8 or just beyond, approaching the position shown in Figure 9. The bar 44 is urged to the left again in Figure 1 by a spring 47 to engage the catch over the next clamp in the magazine.

In order to assist the freed clamp F to move in the path previously set forth, a kicker cam 48 (see Figures 1, 4 and 5) may be provided as an extension on the bar 44. This cam will strike against the looped portion 25 of the clamp and force the latter in the direction of the arrow 37 (Figure 6).

The rearwardly-extending section 26 of the slide 12 is provided with a closing cam, which is indicated generally at J in Figures 1, 3 and 4. It will be noted from the rear elevation of the cam, as shown in Figure 3, that the cam is somewhat tubular with a cut-away portion 48' extending lengthwise of the cam.

As the uppermost clamp F is freed from the magazine H in the manner previously set forth and swings into the position disclosed in Figure 8, the clamp drops through an enlarged portion 48a of the cut-away portion 48' (see Figures 1 and 4). The rear of the closing cam embraces the loop 25 of the clamp F in the manner shown in Figure 3 so as to firmly hold the clamp in place for the step of forcing the hook 23a beneath and around the messenger wire A.

The right-hand part 49 of the closing cam rises in a gentle curve from the enlarged cut-away portion 48a (see Figures 1 and 4). This "right-hand part 49" is designated with reference to Figure 3, and the same view shows the left-hand part 50 as having a cam edge 51. This cam edge bears against the leg 23 of the clamp F and the cam edge is designed to gradually force the hook 23a from the position shown in Figure 9 in the direction of the arrow 51'. The cam edge increases its pressure on the leg 23 of the clamp until the hook 23a is passed to the right-hand side of the messenger wire A (Figure 3), whereupon the trailing edge 52 of the closing cam clears the leg 23 and the hook 23a then snaps over the messenger wire A.

Particular attention is called to the fact that the legs 23 and 24 are offset in opposite directions with respect to the looped portion 25 (see Figures 1, 4 and 7). Therefore, as the cam edge 51 increases its pressure in the direction of the arrow 51', the hook 24a will tighten its grip on the messenger wire A. This will positively hold the clamp F from slipping along the messenger wire A. It is also pointed out that the surface of the wire A is rough, due to the spiral winding of its wires. This will further insure the firm grip of the hook 24a on the messenger wire during the engagement of the hook 23a under, around and over the messenger wire.

In order to raise the slide 12 into proper position for its rollers 13 to engage with the underneath surface of the messenger wire, I provide a slide-elevating mechanism indicated generally at K in Figures 1 and 4. This mechanism consists of a link 53 having one end thereof secured to a transverse shaft 54 and a roller 55 is rotatably mounted at the other end of the link. A double lever 56 is also fixed to the shaft 54. The roller 55 is designed to bear against the underneath surface 57 as the roller is swung in a clockwise direction in Figure 4. This will elevate the slide 12 relative to the carriage 10 and will bring the rollers 13 into engagement with the messenger wire A.

Any suitable means may be employed for swinging the double lever, and for this purpose I have shown a pair of cables 58 and 59. When the slide 12 is in its lowermost position (Figure 4), the cable 58 may be pulled and this will cause the roller 55 to raise the slide into the position illustrated in Figure 1. The roller 55 may enter a slight recess 57a (see Figure 1) in order to hold the roller 55 in raised position. Upon pulling downwardly on the cable 59, the roller 55 is freed from the recess 57a and the link 53 is moved in a counterclockwise direction. The slide 12 will then gravitate into its lower position as shown in Figure 4.

The carriage 10 is provided with an opening 60 therein, which may be engaged by a hook 61 attached to a lifting cable 62 (see Figure 4). The

lifting cable may be used for hoisting the entire clamp applying machine E into proper position relative to the messenger wire A, and the same cable can be utilized for lowering the machine to the ground again.

In the event that it is desired to apply the clamps F to the messenger wire A without pulling the power or like cable G through the clamps as the machine is advanced, the secondary pull cable 15*a* may be used. The latter cable is attached to the slide 12 as at 63. In this case, the pull cable 14 is not used and if it remains in the machine, the basket 16 is disengaged from the power or like cable G. The rollers 11 are offset relative to the rollers 13 (Figures 1 and 4). This will permit the size of the messenger wire A to be varied and the rollers 13 will still be driven.

Brief operation

Having thus described the various parts of my clamp applying machine, the operation thereof may be readily understood. The messenger wire A is first strung in place along the poles B and the machine E is then hoisted so as to permit the operator to apply the carriage rollers 11 over the top of the messenger wire. The cable 58 is pulled, which will result in raising the slide 12 until its rollers 13 engage with the messenger wire. The magazine H, which has been previously loaded with clamps F is raised with the machine. The pull cable 14 is actuated to advance the entire machine along the messenger wire, and if it is desired to place the power or like cable G simultaneously with the fixing of the clamps F, the basket 16 is fastened to the latter cable.

As the clamp applying machine is pulled along the messenger wire, clamps F are periodically released by the catch 45. The freed clamps swing through the successive positions shown in Figures 6, 8 and 9. The closing cam J engages the clamps F over the messenger wire in the manner shown in Figure 3. As each clamp F is freed from the magazine H, the next clamp in the magazine is advanced by the clamp-advancing mechanism I.

When the machine is to clear an obstruction, such as a pole clamp C (Figure 4), the slide 12 is lowered by pulling on the cable 59. After the obstruction has been cleared, the slide 12 is again raised and the operation of applying clamps is continued.

As previously stated, the clamps F may be applied without pulling the power or like cable G through the looped portions of the clamps. The clamp releasing mechanism is operated by the rollers 13 being rotated as the machine is advanced along the messenger wire A, and thus the spacing of the clamps F is automatically determined and the clamps are dispensed at the proper time.

Although I have described my invention in detail in applying clamps to a messenger wire and around a power or like cable, it should be made clear that any suitable suspension means may be used in place of a messenger wire and power, light, communication, railroad signal cables or other suspended structures can be supported by the clamps F.

I claim:

1. A clamp applying machine comprising a carriage movable along a suspension wire or the like, a vertically-arranged magazine mounted on the carriage for holding a plurality of clamps in stacked relation one above the other, means for moving the clamps toward the suspension wire, means for discharging the clamps one at a time from the magazine at intervals along the suspension wire, and means for applying the freed clamps to the suspension wire as they are released.

2. A clamp applying machine comprising a carriage movable along a suspension wire or the like, means for supporting a loop-shaped clamp adjacent to the suspension wire, the clamp having hook-shaped ends with the hooks facing in opposite directions, the supporting means being made to present the hook at one end of the clamp in a position to engage around the suspension wire from one side of the latter when the clamp is released, means for releasing the clamp, and means for engaging the hook at the other end of the clamp over the opposite side of the suspension wire from that of the first-engaged hook.

3. A clamp applying machine comprising a carriage movable along a suspension wire or the like, means for supporting a plurality of clamps for advance toward the suspension wire, each clamp having hook-shaped ends with the hooks facing in opposite directions, the supporting means being made to present the hook at one end of each clamp in a position to engage around the suspension wire from one side of the latter when the clamp is advanced to the suspension wire and released, means for advancing the clamps toward the suspension wire for release, means for releasing the clamps one at a time, and means for engaging the hook at the other end of each clamp over the opposite side of the suspension wire from that of the first-engaged hook after each clamp is released.

4. A clamp applying machine comprising a carriage movable along a suspension wire or the like, means for supporting a plurality of clamps for advance toward the suspension wire, each clamp having hook-shaped ends with the hooks facing in opposite directions, the supporting means being made to present the hook at one end of each clamp in a position to engage around the suspension wire from one side of the latter when the clamp is advanced to the suspension wire and released, means for advancing the clamps toward the suspension wire for release, means for releasing the clamps one at a time at intervals along the suspension wire at substantially equal distances apart during advance of the carriage, and means for engaging the other end of each clamp over the opposite side of the suspension wire from that of the first-engaged hook after each clamp is released.

5. A clamp applying machine comprising a carriage movable along a suspension wire or the like, means for supporting a plurality of clamps horizontally in stacked relation one above the other for advance toward the suspension wire, means operable by the movement of the carriage along the suspension wire for releasing the clamps one at a time for engagement with the suspension wire, and means for securing the ends of the clamps to said wire with the clamps arranged in a vertical position on the suspension wire and with a portion of each clamp extending free of the suspension wire to constitute a support for a cable or the like.

6. A clamp applying machine comprising a carriage movable along a suspension wire or the like, a slide mounted in the carriage for movement toward and away from the suspension wire, rollers carried by the slide and being engageable with the suspension wire for rotation by the latter when the carriage is advanced along the suspension wire, means for moving the slide

toward and away from the suspension wire, a magazine attached to the slide for holding a plurality of clamps, means operable by one of the slide rollers for periodically releasing a clamp from the magazine as the carriage is advanced, and means for engaging the ends of the clamps over the suspension wire when the clamps are released.

7. A clamp applying machine comprising a carriage movable along a suspension wire or the like, a slide mounted in the carriage for movement toward and away from the suspension wire, rollers carried by the slide and being engageable with the suspension wire for rotation by the latter when the carriage is advanced along the suspension wire, means for moving the slide toward and away from the suspension wire, a magazine attached to the slide for holding a plurality of clamps, means for periodically releasing a clamp from the magazine as the carriage is advanced, means for engaging the ends of the clamps over the suspension wire when the clamps are released, and a pull cable removably attached to the slide for pulling a power cable or the like through the clamps as the carriage is advanced, the slide being made to disengage itself from the pull cable when moved into a retracted predetermined position relative to the carriage.

8. In a clamp applying machine, a magazine for holding a plurality of loop-shaped clamps in stacked relation, each clamp having hook-shaped ends, the magazine comprising a U-shaped guide member having one leg of the U passing through the hooks disposed at one end of the clamps, the other leg of the U bearing against the clamps adjacent to those hooks which are confined on the first-named leg of the U, and a shield extending partially around the hooks of the clamps that are confined on the guide member.

9. In a clamp applying machine, a magazine for holding a plurality of loop-shaped clamps in stacked relation, each clamp having hook-shaped ends, the magazine comprising a U-shaped guide member having one leg of the U passing through the hooks disposed at one end of the clamps, the other leg of the U bearing against the clamps adjacent to those hooks which are confined on the first-named leg of the U, a shield extending partially around the hooks of the clamps that are confined on the guide member, and a yielding follower within the shield riding on the guide member for urging the clamps toward an end of the magazine.

10. In a clamp applying machine, a magazine for holding a plurality of clamps in stacked relation, the clamps being loop-shaped and each having hook-shaped ends, the magazine comprising a guide member having two rods, one of the rods passing through the hooks disposed at one end of the clamps, the other rod bearing against the clamps adjacent to those hooks which are confined on the first-named rod, and a shield extending around the hooks of the clamps that are confined by the two rods, the other ends of the clamps extending free of the shield.

11. In a clamp applying machine, a carriage movable along a suspension wire or the like, a magazine on the carriage for holding a plurality of loop-shaped clamps in stacked relation, the clamps having hook-shaped ends, the magazine including means for guiding the clamps toward a suspension wire or the like for presenting one hook of each clamp in a position for engaging around the suspension wire, means for moving the said clamps to the suspension wire for release, means for releasing the clamps one at a time from the magazine, and a closing cam positioned for engaging the other hook of each clamp over the suspension wire upon release.

12. In a clamp applying machine, a magazine for holding a plurality of loop-shaped clamps in stacked relation, the clamps having hook-shaped ends, the magazine including means for guiding the clamps toward a suspension wire or the like for presenting one hook of each clamp in a position for engaging around the suspension wire, means for moving the said clamps to the suspension wire for release, means for releasing the clamps one at a time from the magazine, and a closing cam positioned for engaging the other hook of each clamp over the suspension wire upon release, the closing cam including a portion for firmly embracing the looped portion of each clamp during engagement of the second hook over the suspension wire.

13. In a clamp applying machine, a magazine for holding a plurality of loop-shaped clamps in stacked relation with the clamps arranged in horizontal position, means for mounting the magazine to deliver the clamps to a suspension wire or the like, the clamps having hook-shaped ends and the delivering means being made to present one hook of each clamp in a position for engagement around the suspension wire, means for moving the clamps to the suspension wire, means for releasing the clamps one at a time from the magazine, and a closing cam having a cut-away part for allowing the released clamp to swing from its horizontal position into a vertical position with one end of the released clamp still engaging around the suspension wire, the closing cam having a cam edge for forcing the other hook of the released clamp around the suspension wire.

14. A clamp applying machine comprising a vertically-arranged carriage having an open side whereby the carriage may be introduced sidewise over a suspension wire or the like, carriage rollers within the carriage for riding on the top of the suspension wire, a slide mounted on the carriage and having rollers to engage and ride on the underneath side of the suspension wire, means for securing the slide against being retracted relative to the carriage and for holding the slide and carriage rollers in engagement with the suspension wire, a magazine for holding a plurality of loop-shaped clamps, means operable by the movement of the carriage along the suspension wire for periodically releasing clamps one at a time from the magazine, and means for engaging the ends of the clamps over the suspension wire.

15. A clamp applying machine comprising a magazine for holding a plurality of loop-shaped clamps, each clamp having hook-shaped ends facing in opposite directions, means for periodically releasing clamps one at a time from the magazine as the latter is moved along a suspension wire or the like, and means for squeezing the ends of the clamps to cause their hooks to pass each other for engagement of the hooks over the suspension wire from opposite sides of the latter and for thereupon releasing the clamp for engagement of the hooks on the wire.

16. A clamp applying machine comprising a vertically-arranged carriage movable along a suspension wire or the like, the carriage having an open side and a retractable slide for allowing the carriage to move over a pole clamp or the like when the slide is retracted, means operable from the ground beneath the suspension wire for moving the slide relative to the carriage, and

means advanced with the carriage for applying clamps to the suspension wire at spaced intervals along the suspension wire.

17. A clamp applying machine comprising a vertically-arranged carriage movable along a suspension wire or the like, the carriage having an open side and a retractable slide for allowing the carriage to move over a pole clamp or the like when the slide is retracted, means operable from the ground beneath the suspension wire for moving the slide relative to the carriage, and means advanced with the carriage for applying clamps to the suspension wire at spaced intervals along the suspension wire, the clamp-applying means being carried by the slide and movable therewith so as to also clear the pole clamp when the slide is retracted relative to the suspension wire.

18. A clamp-applying machine comprising a vertically-arranged carriage movable along a suspension wire or the like, the carriage having an open side and a retractable slide for allowing the carriage to move over a pole clamp or the like when the slide is retracted, and means advanced with the carriage for applying clamps to the suspension wire at spaced intervals along the suspension wire, the clamp-applying means being carried by the slide and movable therewith so as to also clear the pole clamp when the slide is retracted relative to the suspension wire.

19. A clamp-applying machine comprising a carriage movable along a suspension wire or the like, a vertically-arranged magazine mounted on the carriage and depending therefrom and adapted for holding a plurality of clamps in stacked relation one above the other, means for moving the clamps toward the suspension wire, means for discharging the clamps one at a time from the magazine at intervals along the suspension wire, and means extending beyond the trailing end of the carriage for applying the freed clamps to the suspension wire as they are released, the carriage and the clamp-applying means being disposed on opposite sides of the magazine.

20. In a clamp applying machine, a magazine for holding a plurality of clamps in stacked relation, the clamps being loop-shaped and each having hook-shaped ends, the magazine comprising a guide member having two rods, one of the rods passing through the hooks disposed at one end of the clamps, the other rod bearing against the clamps adjacent to those hooks which are confined on the first-named rod.

21. In a clamp applying machine, a carriage movable along a suspension wire or the like, a magazine on the carriage for holding a plurality of loop-shaped clamps in stacked relation, the clamps having hook-shaped ends, the magazine including means for guiding the clamps toward a suspension wire or the like for presenting one hook of each clamp in a position for engaging around the suspension wire, means for moving the said clamps to the suspension wire for release, means for releasing the clamps one at a time from the magazine, and a closing cam having a spiral face disposed to bear against the released clamp adjacent to the other hook for forcing the latter hook over the suspension wire.

22. In a clamp applying machine, a carriage movable along a suspension wire or the like, a magazine on the carriage for holding a plurality of loop-shaped clamps in stacked relation, the clamps having hook-shaped ends, the magazine including means for guiding the clamps toward a suspension wire or the like for presenting one hook of each clamp in a position for engaging around the suspension wire, means for moving the said clamps to the suspension wire for release, means for releasing the clamps one at a time from the magazine, and a closing cam having a spiral face disposed to bear against the released clamp adjacent to the other hook for forcing the latter hook over the suspension wire, the magazine being secured to the carriage for positive advance with the latter without slippage therebetween as the carriage is moved along the suspension wire.

23. In a clamp applying machine, a carriage movable along a suspension wire or the like, a pull cable extending through the carriage, a magazine for holding a plurality of loop-shaped clamps in stacked relation with the clamps arranged in horizontal position, means for mounting the magazine to deliver the clamps to the suspension wire, the clamps having legs with hook-shaped ends and the delivering means being made to present one hook of each clamp in a position for engagement around the suspension wire, means for moving the clamps to the suspension wire, means for releasing the clamps one at a time from the mazagine, each clamp as it is freed being swingable from its horizontal position into a vertical position and being aided in this swinging movement by the first-named hook bearing against the suspension wire as the carriage and magazine are advanced, the pull cable being so positioned relative to the suspension wire that one leg of each released clamp will pass around the pull cable during the swinging of the clamp with the pull cable passing into the loop of the clamp, and means for engaging the other hook of each released clamp around the suspension wire.

24. In a clamp applying machine, a carriage movable along a suspension wire or the like, a pull cable extending through the carriage, the pull cable being disposed below and to one side of the suspension wire, a vertically-arranged magazine for holding a plurality of loop-shaped clamps in stacked relation with the clamps arranged in horizontal position, means for mounting the magazine to deliver the clamps upwardly past the pull cable, the clamps having legs with hook-shaped ends and the delivering means being made to present one hook of each clamp in a position for engagement around the suspension wire, means for moving the clamps to the suspension wire, means for releasing the clamps one at a time from the magazine, each clamp as it is freed being swingable from its horizontal position into a vertical position and being aided in this swinging movement by the first-named hook bearing against the suspension wire as the carriage and magazine are advanced, the pull cable being so positioned relative to the suspension wire that one leg of each released clamp will pass around the pull cable during the swinging of the clamp with the pull cable passing into the loop of the clamp, and means for engaging the other hook of each released clamp around the suspension wire.

25. In a clamp applying machine, a carriage movable along a suspension wire or the like, a magazine for holding a plurality of loop-shaped clamps in stacked relation with the clamps arranged in horizontal position, means for mounting the magazine to deliver the clamps to the suspension wire, the clamps having legs with

hook-shaped ends and the delivering means being made to present one hook of each clamp in a position for engagement around the suspension wire, means for moving the clamps to the suspension wire, means for releasing the clamps one at a time from the magazine, each clamp as it is freed being swingable from its horizontal position into a vertical position with the first-named hook still engaging around the suspension wire and being aided in this swinging movement by the first-named hook bearing against the suspension wire as the carriage and magazine are advanced, and means for engaging the other hook of each released clamp around the suspension wire.

26. In a clamp applying means, a vertically arranged carriage movable along a suspension wire or the like, the carriage having an open side to permit it being applied to the wire, a retractable slide normally contacting with the underside of the wire, said slide being movable away from the wire to permit the carriage to move over a pole clamp or the like, and means carried by the slide for applying clamps to the suspension wire at spaced intervals therealong, said means being brought into operative engagement with the wire when the slide contacts with the wire.

27. In a clamp applying machine, a carriage movable along a suspension wire or the like, a clamp containing magazine supporting clamps independent of the wire, means mounted on the carriage for removing loop-shaped clamps from the magazine and applying them to the suspension wire at spaced intervals therealong, and a pull cable attached to the carriage and extending past the clamp magazine for drawing a power cable or the like through the loops of the clamps as the carriage is advanced, said clamp applying means causing each clamp to pass around and enclose the pull cable without interfering therewith as the clamp is secured to the suspension wire, whereby the clamps will be in a position to receive the power cable as it is drawn through the clamps by the pull cable.

28. A clamp applying machine comprising a carriage movable along a suspension wire or the like, means for supporting a plurality of clamps independently of the wire, means operable by the movement of the carriage along the suspension wire for feeding one clamp at a time to the wire in spaced relation along the wire, and means for securing the ends of the clamps to said wire with the clamps arranged in a vertical position on the suspension wire and with a portion of each clamp extending free of the suspension wire to constitute a support for a cable or the like.

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