July 2, 1940. R. C. PIERCE 2,206,121

APPARATUS FOR HANDLING COILS OF WIRE

Filed Sept. 3, 1938 3 Sheets-Sheet 1

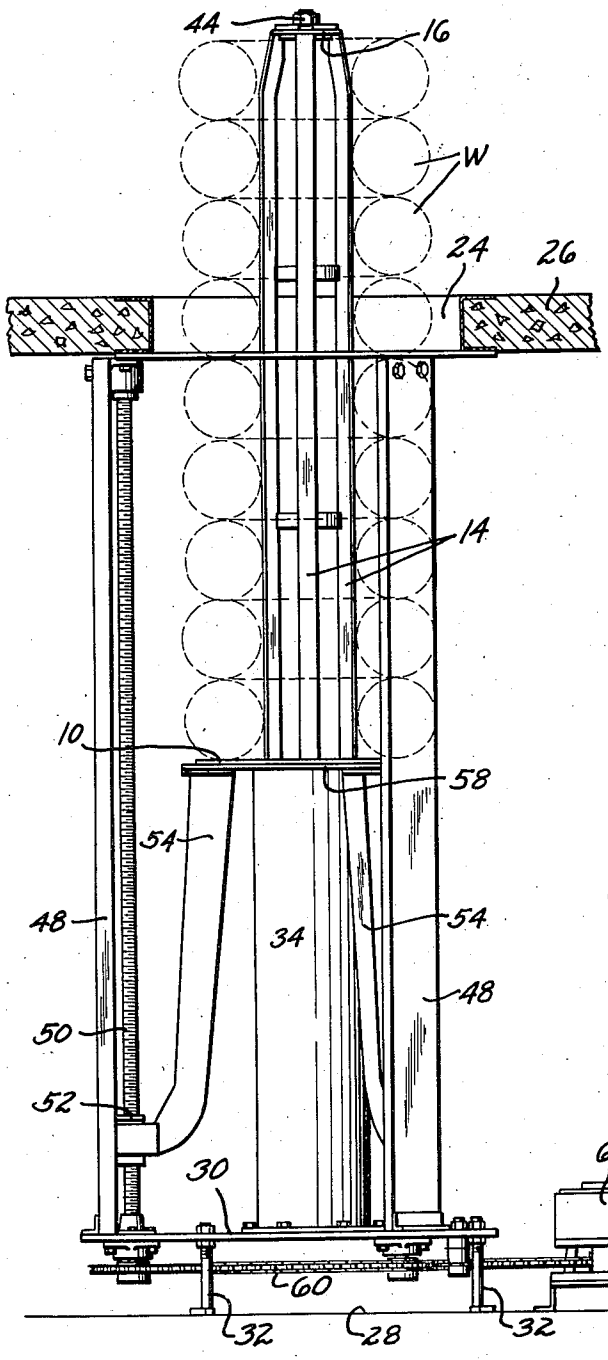


Fig. 1

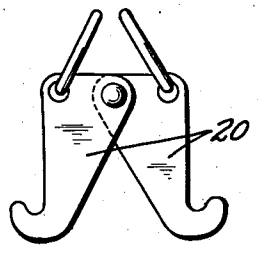


Fig. 2

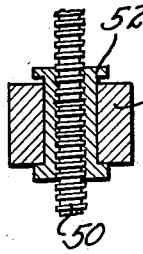


Fig. 3

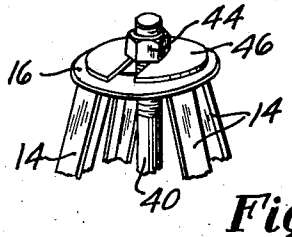


Fig. 4

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APPARATUS FOR HANDLING COILS OF WIRE

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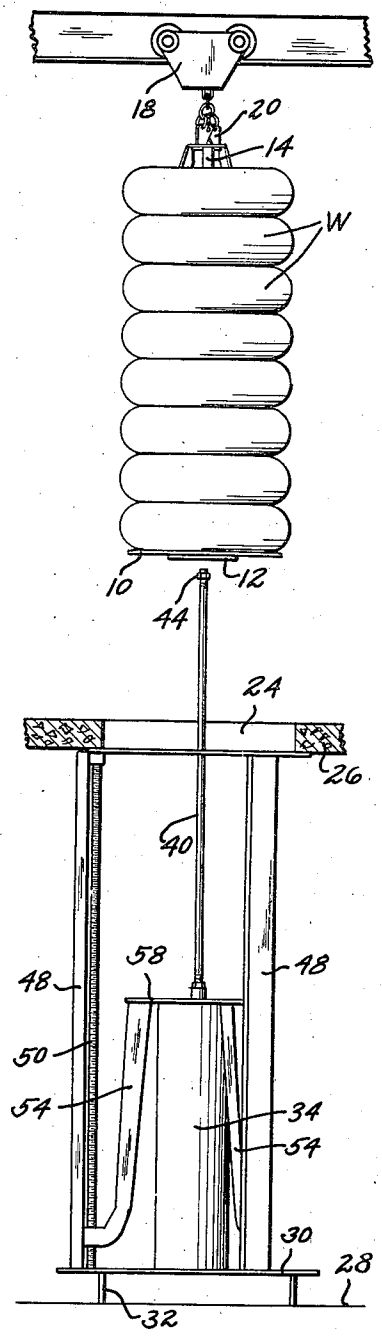


Fig. 5

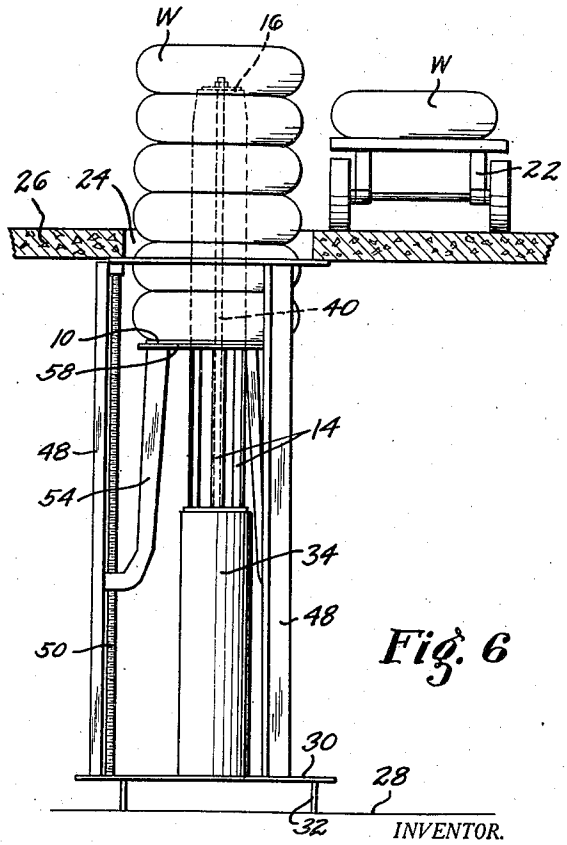


Fig. 6

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APPARATUS FOR HANDLING COILS OF WIRE

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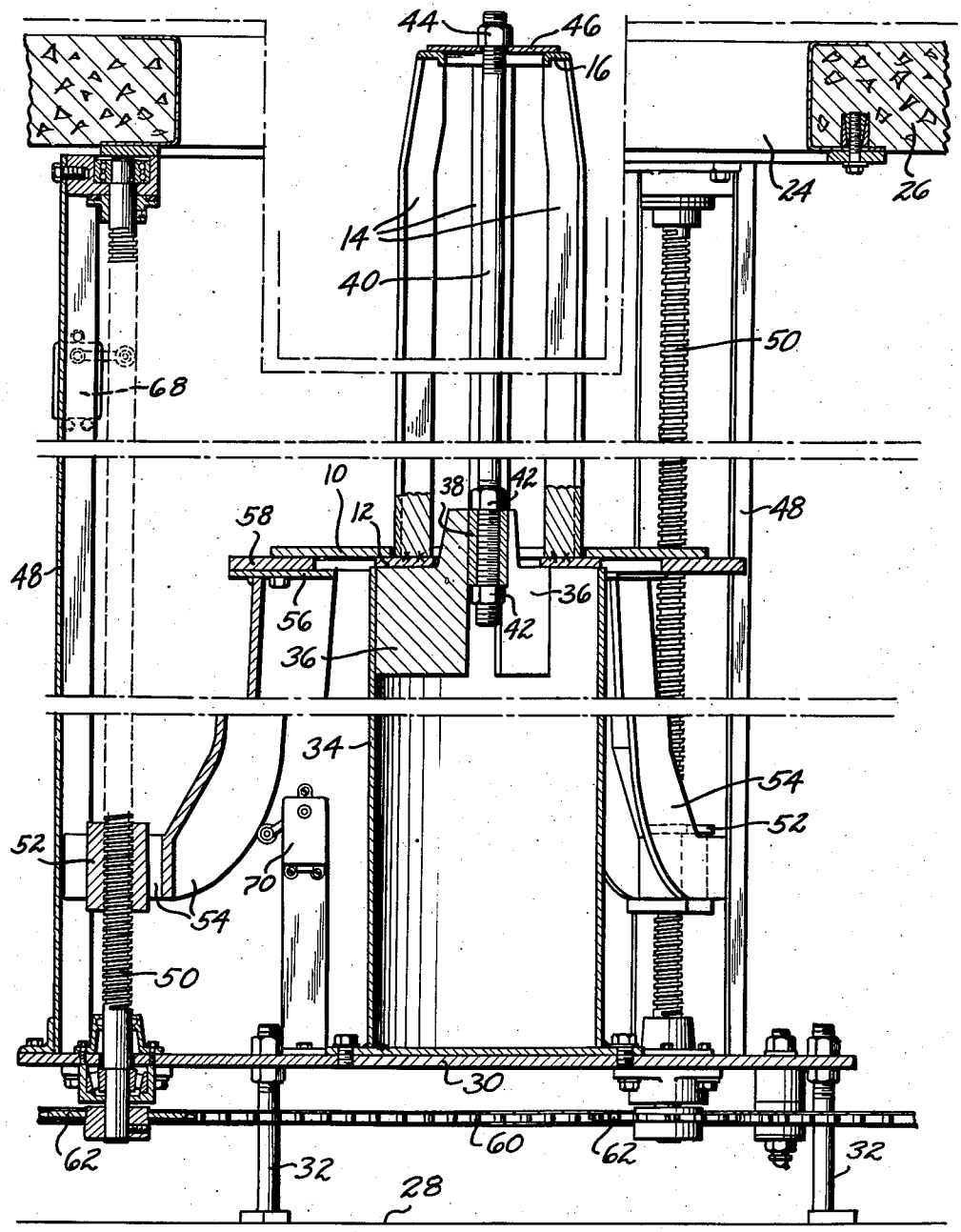


Fig. 1

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UNITED STATES PATENT OFFICE

2,206,121

APPARATUS FOR HANDLING COILS OF WIRE

Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Mich., a corporation of Michigan

Application September 3, 1938, Serial No. 228,283

10 Claims. (Cl. 214—95)

This invention relates to handling heavy coils of wire and the like, and is illustrated as embodied in a power-driven apparatus for lifting the coils from a carrier by means of which they are transported around a factory. The apparatus is especially useful in handling the wire when it is too hot to be easily manipulated manually.

Preferably the carrier for the wire has the lowermost coil of wire resting on a movable support. The carrier is secured to a base, and power-driven mechanism is operated to lift a support surrounding the base, to engage and lift the first support with the pile of coils of wire carried thereby, thus stripping the coils vertically from the carrier. The permanently-installed part of the apparatus, with which the carrier cooperates, is most conveniently arranged on the lower floor of a building, below an opening in the upper floor through which the pile of wire coils is lifted, so that as the topmost coil reaches a convenient height a workman may readily push it off onto a truck standing on the upper floor.

The above and other objects and features of the invention, including various novel combinations of parts and desirable particular constructions and arrangements, will be apparent from the following description of the illustrative embodiment shown in the accompanying drawings, in which:

Figure 1 is a section vertically through two floors of a building, with the wire-handling apparatus shown in side elevation;

Figure 2 is a detail elevation of one form of device for lifting the carrier, with coils of wire thereon, by means of a crane or the like;

Figure 3 is a detail section through one of the worm-and-nut devices by which the wire is raised and lowered;

Figure 4 is a detail perspective view of the upper end of the wire carrier, showing the means for quickly attaching it to a holding rod;

Figure 5 is a partial section through a building, showing a load of wire about to be lowered into the apparatus;

Figure 6 is a similar section, showing the wire being lifted to the upper floor and pushed off onto a truck; and

Figure 7 is a sectional view taken vertically through wire-handling apparatus embodying the invention.

When wire (usually in heavy coils) has been annealed, or heated for any other reason, it is desirable to save as much time as possible by transporting it to the next operation just as soon as it is cool enough so that it will not oxidize in the air. At this time it is still quite hot and, especially with very heavy coils, is difficult to handle with ordinary equipment.

According to the present invention, the coils W of wire are piled one on top of the other on an annular support 10 resting on a ring or flange 12 forming the bottom element of a carrier for transporting the wire. The carrier has, welded to the bottom ring 12, an annular series of bars or the like 14 which pass upwardly through the coils, and the upper ends of which are welded or otherwise secured to an upper ring 16. To facilitate lowering the coils onto it in loading, the upper end of the carrier is preferably tapered, the bars 14 converging at their upper ends and the ring 16 being of smaller diameter than the ring 12. This carrier is claimed per se in my application No. 322,870, filed March 8, 1940, which as to this common subject-matter is a partial continuation of the present application.

The wire, as shown in Figure 5, when on such a carrier is easily transported by a traveling crane 18 or the like, grapples or hooks 20 of any desired type being provided to grasp the upper ring 16.

In removing the hot wire from the carrier and placing it on trucks (one of which is shown diagrammatically at 22 in Figure 6), the crane 18 is manipulated to bring the carrier above an opening 24 in an upper floor 26 of a building. Immediately below the opening 24, on a lower floor 28, is mounted a stripper apparatus which cooperates with the carrier.

This apparatus includes a base comprising plates 30 secured to the floor 28 by adjustable legs 32, and on which is mounted a pedestal shown built up of a sheet steel cylinder 34 secured to the plates 30 and having radial webs 36 welded in its upper end and welded or otherwise secured to a threaded axial sleeve 38. A vertical axial holding bar 40, arranged to project upwardly from the upper face of the pedestal, is threaded at its lower end into the sleeve 38 and locked there by suitable nuts 42.

The carrier and the coils of wire are lowered from the position of Figure 5, through the opening 24, until the lower ring 12 rests on the top of the pedestal, as shown in Figure 7, with the holding bar 40 passing axially up through the center of the carrier. A nut 44 is then loosened, a C-shaped locking plate 46 (see Figure 4) is placed over the ring 16 about the bar 40, and the nut

44 is then tightened again to secure the carrier to the pedestal.

The apparatus supported on the floor 26 also includes channel-section uprights 48 extending between the floors, and adjacent which are rotatably mounted a series of vertical worms 50 symmetrically arranged about the axis of the apparatus. Threaded on the worms 50 are square nuts 52, grooved on their opposite faces to embrace and support a plurality of arms 54, the ends of which project into and are guided by the channels in the uprights 48.

The arms 54 converge upwardly, and form a pyramidal structure welded to a ring 56 on which rests and to which is secured a movable annular support 58 surrounding the upper end of the pedestal, around and (when in lowered position) approximately in the plane of the ring 12. The support 58 in this position is just below the support 16, and when the support 58 is lifted it will raise the entire pile of wire coils, stripping them upwardly off the carrier 14.

The worms 50 are simultaneously driven by sprocket gearing, shown as including a sprocket chain 60 driving sprocket gears 62 on the lower ends of the worms. The chain 60 is reversibly driven through a reduction gear 64 by an electric motor 66. The control circuit of the motor 66 includes upper and lower limit switches 68 and 70 engaged and opened by one of the arms 54 at the limits of travel of the support 58.

In operation, the arms 54 and the support 58 slowly lift the pile of wire coils off the carrier 14 at such a height relatively to the floor 26 that a workman can conveniently push them off directly onto trucks 22.

While one illustrative construction has been described in detail, it is not the intention to limit the scope of the invention by that description, or otherwise than by the terms of the appended claims.

I claim:

1. Apparatus for handling coils of wire and the like comprising a base having a holding member projecting upwardly therefrom, a support surrounding the upper portion of said base, and means for lifting said support upwardly away from said base, in combination with a carrier having a central portion adapted to pass centrally through a pile of said coils and having at its lower end coil supporting means including a movable support for the lowermost coil which is adapted to rest on the first support when the carrier is lowered onto said base, said carrier having at its upper end means for securing the carrier to the holding member to prevent upward movement of said carrier while the lifting means raises the two supports with the coils of wire thereon.

2. Apparatus for handling coils of wire and the like comprising a base having a holding member, a support surrounding the upper portion of said base, and means for lifting said support upwardly away from said base, in combination with a carrier having a central portion adapted to pass centrally through a pile of said coils and having at its lower end coil supporting means including a movable support for the lowermost coil which is adapted to rest on the first support when the carrier is lowered onto said base, said carrier having means for securing the carrier to the holding member to prevent upward movement of said carrier while the lifting means raises the two supports with the coils of wire thereon.

3. Apparatus for handling coils of wire or the like comprising, for use in combination with two floors of a building the upper one of which has an opening therein large enough for the coils to pass through, a support below said opening having lifting means mounted on the first floor, a carrier for a pile of coils of wire having a movable support for the lowermost coil adapted to rest on the first support, and means readily attachable to and detachable from said carrier by an operator standing on the upper floor for securing the carrier against vertical movement without interfering with vertical movement of the two supports as the two supports are lifted to raise the pile of coils through said opening.

4. Apparatus for handling coils of wire or the like comprising, for use in combination with two floors of a building the upper one of which has an opening therein large enough for the coils to pass through, a support below said opening having lifting means mounted on the first floor, a carrier for a pile of coils of wire having a movable support for the lowermost coil adapted to rest on the first support, and a stationary holding bar adapted to pass through the center of the carrier axially of said coils and having means for attaching it to the upper end of the carrier to hold the carrier as the two supports are lifted to raise the pile of coils through said opening.

5. Apparatus for handling coils of wire or the like comprising a vertically movable support having lifting means, a carrier for a pile of coils of wire having a movable support for the lowermost coil adapted to rest on the first support, and a stationary holding bar adapted to pass through the center of the carrier axially of said coils and having means for attaching it to the upper end of the carrier to hold the carrier as the two supports are lifted to raise the pile of coils.

6. Apparatus for handling coils of wire or the like comprising, for use in combination with two floors of a building the upper one of which has an opening therein large enough for the coils to pass through, a support below said opening having lifting means mounted on the first floor, a carrier for a pile of coils of wire having a movable support for the lowermost coil adapted to rest on the first support, and means for holding the carrier as the two supports are lifted to raise the pile of coils through said opening, said lifting means comprising a plurality of vertical worms having nuts supporting arms engaging the first support, and mechanism for simultaneously driving said worms comprising a sprocket on the end of each worm and a motor driven sprocket and a continuous sprocket chain meshing with all of said sprockets.

7. Apparatus for handling coils of wire and the like comprising an upwardly-projecting base having a holding rod projecting upwardly from its upper face, an annular support surrounding the upper end of said base and having a plurality of arms extending downwardly symmetrically around said base, a corresponding plurality of vertical worms having nuts engaging and lifting and lowering said arms respectively, means for rotating said worms to lift and lower said support, and a carrier for a pile of coils passing axially therethrough and having at its lower end a flange adapted to rest on said base and a movable support for the lowermost coil resting on said flange and adapted to be engaged and lifted by the first support and having at its

upper end means to be secured to the upper end of the holding rod.

8. Apparatus for handling coils of wire and the like comprising an upwardly-projecting base having a holding rod projecting upwardly from its upper face, an annular support surrounding the upper end of said base and having a plurality of arms extending downwardly symmetrically around said base, a corresponding plurality of vertical worms having nuts engaging and lifting and lowering said arms respectively, and means for rotating said worms to lift and lower said support.

9. Apparatus for handling coils of wire and the like comprising a base in the form of a pedestal, an annular support having downwardly-extending arms symmetrically arranged about the pedestal, power-driven mechanism engaging and raising or lowering said arms, and holding means secured to the upper face of said pedestal.

10. Apparatus for handling coils of wire and the like comprising a base in the form of a pedestal, an annular support having downwardly-extending arms symmetrically arranged about the pedestal, and power-driven mechanism engaging and raising or lowering said arms.

ROBERT C. PIERCE.