Mar. 13, 1923. 1,448,543.

P. B. JAGGER.

ROPE UNTWISTING APPARATUS.

FILED SEPT. 25, 1919. 4 SHEETS—SHEET 1.

Fig. 1.

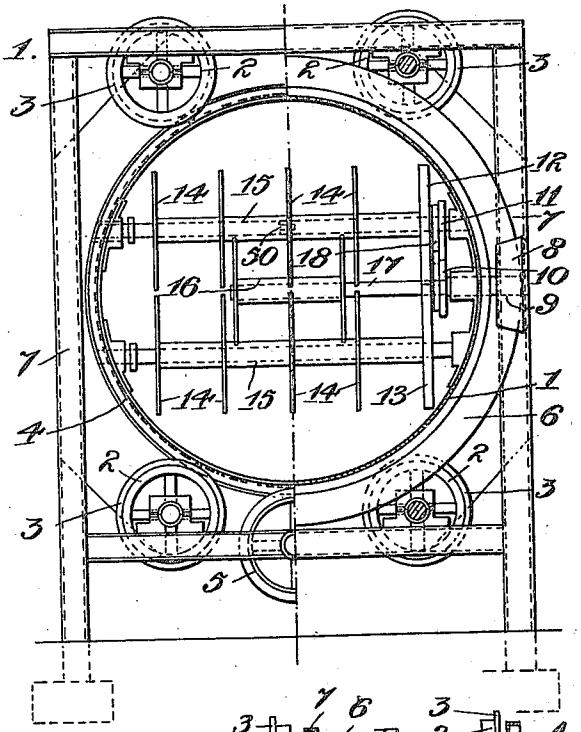
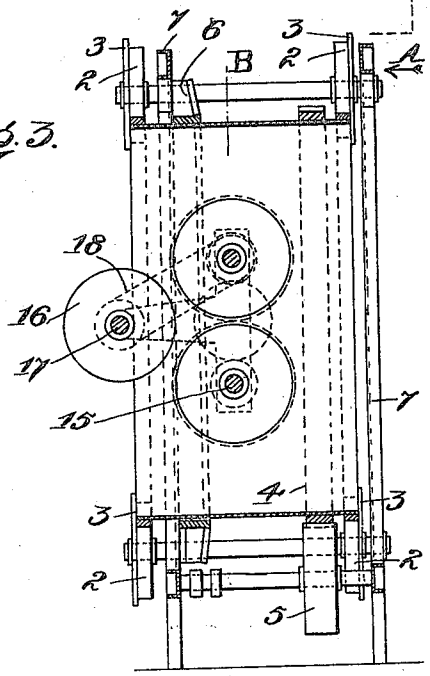


Fig. 3.



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Fig. 2.

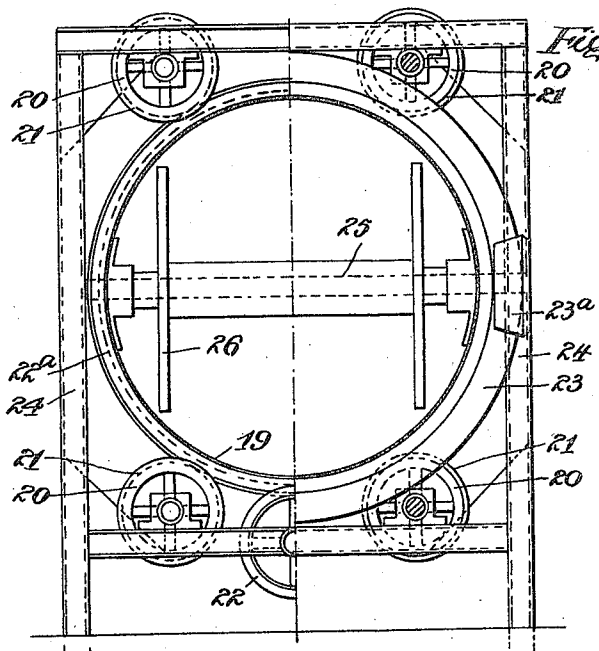
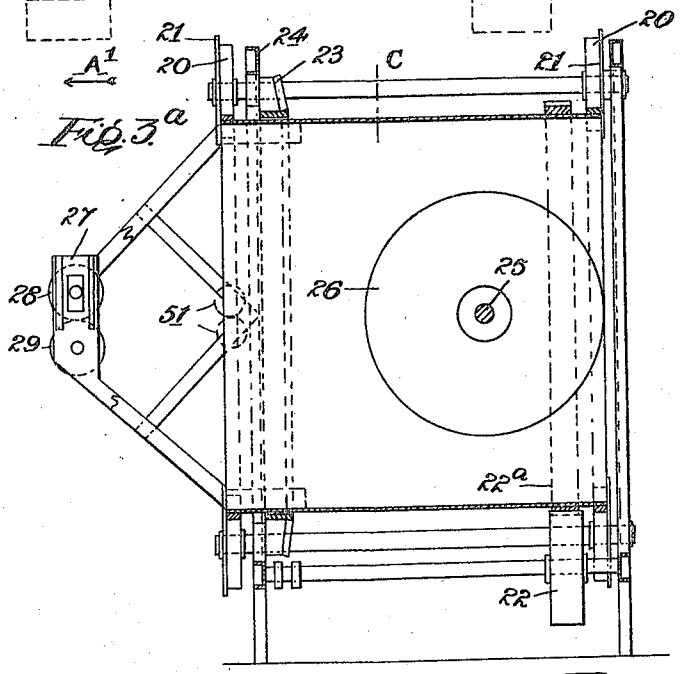


Fig. 3a.



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Fig. 4.

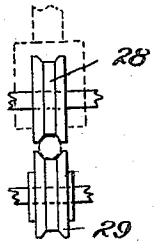


Fig. 5.

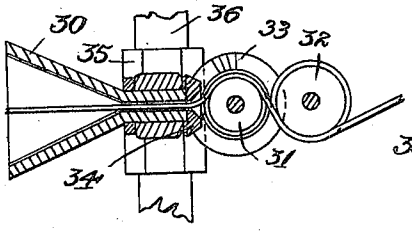


Fig. 6.

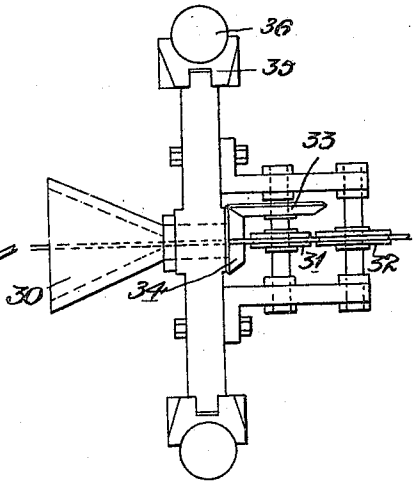
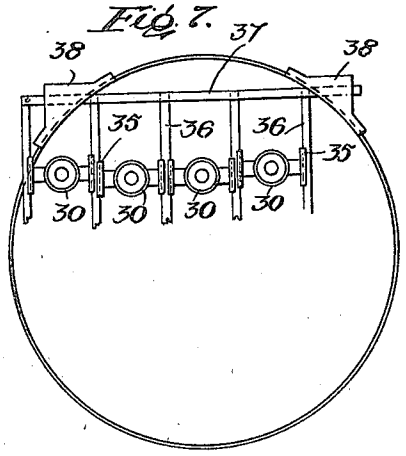


Fig. 7.



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ROPE UNTWISTING APPARATUS.

FILED SEPT. 25, 1919. 4 SHEETS—SHEET 4.

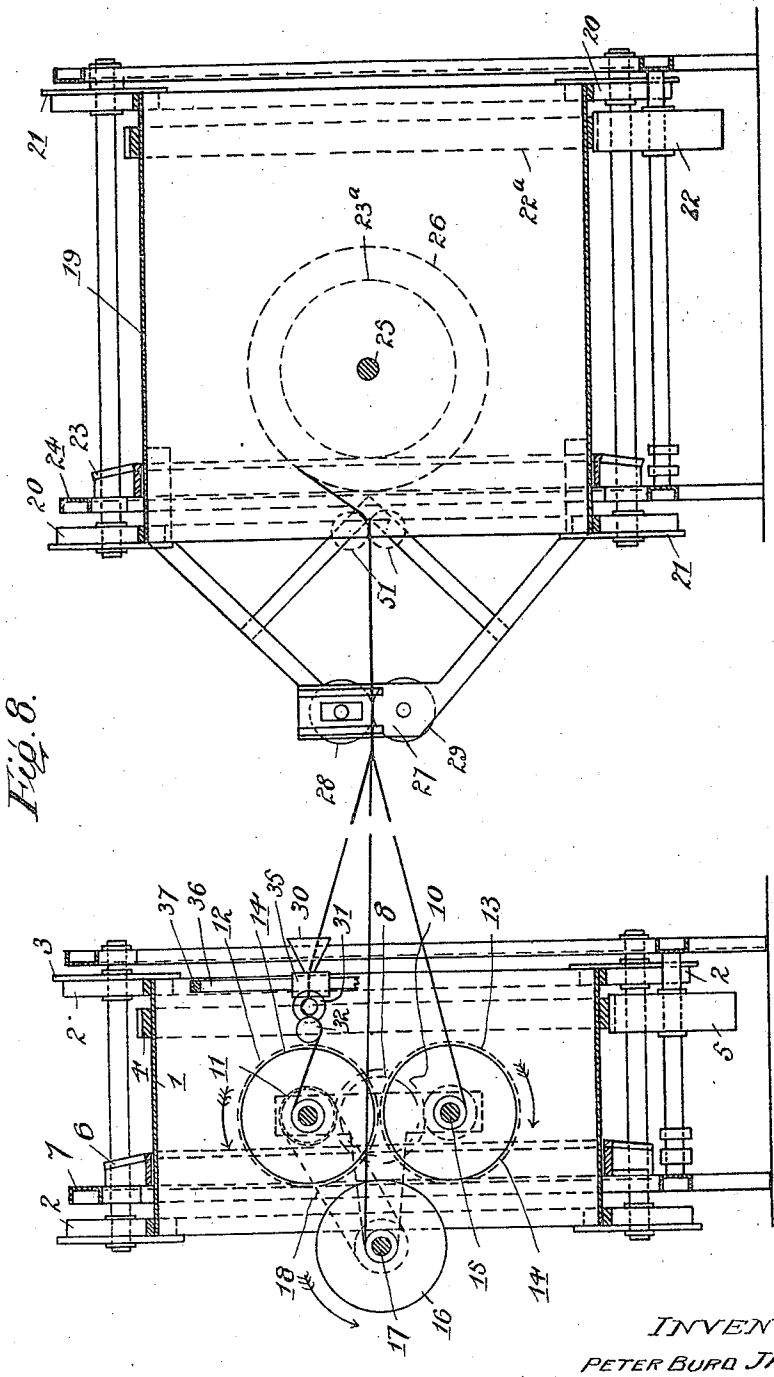


Fig. 8.

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Patented Mar. 13, 1923. 1,448,543

UNITED STATES PATENT OFFICE.

PETER BURD JAGGER, OF LONDON, ENGLAND.

ROPE-UNTWISTING APPARATUS.

Application filed September 25, 1919. Serial No. 326,298.

To all whom it may concern:

Be it known that I, PETER BURD JAGGER, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in and Relating to Rope-Untwisting Apparatus, of which the following is a specification.

Modern industrial exigencies make desirable the utilization of used or discarded wire ropes, such as are commonly used in mining, or shipping, etc., for haulage and other purposes, also the recovery and utilization of the fibrous cores, usually hemp cores, of the various strands; and the main fibrous (hemp) core of the complete rope when such cores are employed.

Such used or discarded ropes have but a small value as such, whereas if the metal component is re-manufactured as a woven or other suitable re-inforcing material for articles and works of concrete, or as a material the interstices of which may be suitably filled in, as for one example, with a hydraulic cement, its value is multiplied many fold, while the value of the recovered fibrous core is approximately equal to the original cost of the used or discarded ropes.

The present invention particularly aims to utilize the metal component of used wire ropes in the production of ship-plates, and all kinds of constructional material in which a metal network or mesh reinforcement is filled in with suitable material to make a solid structure free from voids and capable of being drilled and tapped like ordinary steel material.

To the foregoing end, the present invention consists of improved mechanism for mechanically untwisting and reeling or spooling the separate strands of a rope, or the separate wires or groups of wires of a strand, ready for further treatment.

Spools or bobbins are mounted so as to revolve on a common axis while simultaneously rotating independently on their own axes.

The used rope is conducted to a pair of gripping rolls which grip the rope at a point situate on the produced common axis on which the spools or bobbins revolve; these gripping rolls revolving on the common axis in the same direction as the spools or bobbins and at a speed relatively to the spools or bobbins to ensure untwisting.

The gripping point, when the direction of the rotating axes is at right angles to the direction of the revolving axis, is so determined as to make practically negligible the variation in distance from the gripping rolls of the different spools or bobbins.

Those spools or bobbins which are more remote from the common revolving axis than others may also, or alternatively be increased in diameter. Otherwise the spools may be driven at different rates of speeds.

Confining and conducting devices such as bell or trumpet shaped guides may be provided to confine and conduct the advancing end of a broken wire of any strand on to the spool or bobbin.

A simple rotating spool or bobbin may be included in the machine or added thereto for spooling the main core or strand core simultaneously with the spooling of the strands or wires, the core, in general, taking a central course to its spool or bobbin.

A machine under the present invention which will serve, comprises a drum or annulus rotatably mounted in an external system of rollers; these rollers having flanges whereby the drum or annulus is completely held against bodily displacement in any direction.

On the drum or annulus is an external toothed gear meshing with another gear by which a drive of rotation is imparted to the drum or annulus from any convenient source of power.

Surrounding the drum or annulus is a fixed bevel gear with which meshes a small bevel gear on an axis which passes through the wall of the drum or annulus at right angles to a tangent line at this point and carries a fixed spur wheel on its inner end.

By a suitable gear train this spur wheel drives one or two or more rows of spools ranged parallel with its axis and journalled within the drum or annulus.

For providing for the ready removal of the spools, each shaft on which these are mounted may consist of two lengths coupled together by any suitable known shaft coupling, which coupling may be broken down, and one length of the shaft drawn away

from the other, so that the spools may be moved to the gap and quickly withdrawn.

Any suitable means may be embodied for laying or winding the strands or wires regularly on the spools, as for example means similar to the known automatically reciprocated traverse guide used in winders for the shuttle bobbins of sewing machines.

The gripping rolls may be journalled in a drum or annulus which is rotatably mounted and arranged for drive of rotation similarly to that described with reference to the drum or annulus which carries the spools or bobbins.

The drum or annulus which carries the gripping rolls may also carry the wire supply roll.

By a revolving of the gripping rolls of like hand to the revolving of the spools or bobbins, injurious torsional stress on the strands or wires by the unwinding operation is prevented.

In order that the invention may be more clearly understood, reference will hereinafter be made to the accompanying two sheets of drawings, showing by way of example one convenient form of machine which will serve to carry out the invention.

Fig. 1 is an end view of the spool drum or annulus looking in the direction of the arrow A of Fig. 3, the right hand side of the view being taken on the line B, Fig. 3.

Fig. 2 is an end view of the drum carrying the gripping rolls and supply roll looking in the direction of arrow A′ of Fig. 3ª, the right hand side of the view being taken on the line C of this figure.

Figs. 3 and 3ª form a combined side view of the machine.

Figs. 4 to 7 are detail views hereinafter referred to.

Fig. 8 is a diagrammatic view showing a complete lay-out of the machine.

Referring to Figs. 1 and 3 the drum or annulus 1, is rotatably mounted in an external system of rollers 2, these rollers having flanges 3 whereby the drum or annulus is completely held against bodily displacement in any direction. On the drum or annulus 1 is an external toothed gear 4 meshing with another gear 5 by which a drive of rotation is imparted to the drum or annulus from any convenient source of power.

Surrounding the drum or annulus is a bevel gear 6 fixed to the framing 7 of the machine, with which bevel gear 6 meshes a small bevel gear 8 (Fig. 1) on a shaft 9 which passes through the wall of the drum or annulus and carries a fixed spur wheel 10 on its inner end. By a suitable gear train 11, 12 and 13 this spur wheel 10 drives two rows of spools 14 journalled within the drum or annulus 1.

For providing for the ready removal of the spools each shaft 15 on which these are mounted may consist of two lengths coupled together by any suitable known shaft coupling, as indicated at 50 (Fig. 1), which coupling may be broken down, and one length of the shaft withdrawn from the other length, so that the spools may be moved to the gap and quickly withdrawn.

The spool 16 is for spooling the main core or strand core simultaneously with the spooling of the strands or wires, this spool 16 being mounted on a shaft 17 driven by a belt or the like 18 from the shaft 15.

Referring to Figs. 2 and 3ª, the drum or annulus 19 is rotatably mounted in an external system of rollers 20, these rollers having flanges 21 whereby the drum or annulus is completely held against bodily displacement in any direction. On the drum or annulus 19 is an external toothed gear 22ª meshing with a gear 22 by which a drive of rotation is imparted to the drum or annulus 19 from any convenient source of power.

Surrounding the drum or annulus is a bevel gear 23 fixed to the framing 24 of the machine, and with this bevel gear 23 meshes a small bevel gear 23ª (Fig. 2) carried by a shaft 25 on which is mounted the wire supply roll 26. A tensioning and gripping device is indicated at 27 mounted to revolve with the drum 19 which device may be of any suitable construction. As shewn diagrammatically in Fig. 4 the tensioning and gripping device comprise two grooved wheels 28 and 29 between which the rope from the supply roll 26 passes, the wheel 28 being in an adjustable bearing or mounting so that the pressure applied to the rope may be varied according to requirements.

The tensioning and gripping device may be located at any convenient position, and a supplemental tensioning device or devices in the form of tension rollers as indicated at 51 (Fig. 3ª) may be provided.

Figs. 5, 6 and 7 illustrate a confining and conducting device which may be provided to confine and conduct the advancing end of a broken wire of any strand on to the spools 14. The device comprises a trumpet 30, grooved wheels 31 and 32, and has a bevel wheel 33 meshing with a bevel wheel 34, the wheel 33 being arranged to rotate 34 when the machine is in operation.

The conducting and confining devices are mounted on slide blocks 35 on slide bars 36, so as to be capable of vertical adjustment to meet the conditions of winding of the spools. As shewn in Fig. 7 the slide bars 36 are mounted on a bar or frame 37 extending across the machine, this bar or frame being housed in bearings 38 on the drum 1 or an extension thereof.

As an example of the operation of the machine, the wire to be untwisted into separate strands is led from the supply roll 26 to the gripping and tensioning device 27.

Before the wire is led to the trumpets 30, it is sufficiently unwound by hand into the separate strands. Each strand is passed through its respective trumpet, then over the wheel 31 and under the wheel 32, and the strands are then led to the spools 14, each strand being fastened to a separate spool. The machine being then set in motion, the spools revolve on a common axis while simultaneously rotating independently on their own axes. The conducting and confining devices being mounted on the drum or annulus revolve therewith. The tensioning and gripping device, and the supply roll by virtue of the mounting previously described are also revolved on the same common axis as the spool drum or annulus, and in the same direction, and at a speed relatively to the spools or bobbins to ensure untwisting.

The gripping rolls 27 grip the rope at a point situate on the produced common axis on which the spools revolve, and in the operation of the machine the rope is placed under tension between the gripping rolls 27 and the spool drum or annulus 1, and a mechanical untwisting of the rope into its separate strands is effected after the rope leaves the gripping rolls 27, or just ahead of the gripping point, i. e., on that side of the gripping point most remote from the supply roll.

The tension set up in the strands impart through the bevel wheels 33 and 34 rotation to the trumpet 30 in a direction opposite to that of the strand passing through, and therefore when a broken strand reaches the entrance of the trumpet the severed wire or wires is gradually revolved around the main strand as it proceeds inwards and becomes again a portion of the main strand before it leaves the trumpet.

The relative speeds of the drums 1 and 19 are arranged according to the class of rope to be unwound and other working conditions.

Any suitable means may be provided for removing the windings on the spools. In one arrangement a moveable device is run up from behind the machine and the windings transferred to spools carried by the movable device. The device may run on a track or otherwise, and is provided with suitable gearing for imparting rotation to the spools carried by the said device.

In the case of stands unwound from the main rope, each strand may be repassed through the machine for the purpose of a further unwinding of the separate wires or separate groups of wires.

Any convenient means may be arranged for distributing the windings on the spool.

The machine may be made duplex to work from both ends simultaneously in spooling different ropes or strands. For example two sets of spools or bobbins may be mounted on drums arranged in tandem on a common base, each set having a separate gripping and tensioning device co-operating therewith, the drums being located intermediate of the two gripping and tensioning devices. In the case of ropes having opposite twists the two sets of spools or bobbins may be mounted on one drum.

What I claim is:—

1. Mechanism for untwisting and reeling or spooling the separate strands of a rope, or the separate wires or groups of wires of a strand, comprising spools mounted so as to revolve on a common axis while simultaneously rotating independently on their own axes, means for revolving the spools on said common axis, and means for rotating said spools on their own axes, a gripping and tensioning device for gripping the rope or the like at a point situate on the produced common axis aforesaid, means for rotating the gripping and tensioning device about its own centre on said common axis in the same direction as the spools.

2. In mechanism as claimed in claim 1 hereof, an external system of rollers, and a spool carrying member rotatably mounted therein, substantially as described.

3. In mechanism as claimed in claim 1 hereof, an external system of rollers, and a member rotatably mounted therein, said member carrying gripping rolls and a supply roll, substantially as described.

4. In mechanism as claimed in claim 1 hereof, an external system of rollers, and a member rotatably mounted therein, said member carrying gripping rolls, a supply roll and supplemental tensioning devices, substantially as described.

5. In mechanism as claimed in claim 1 hereof a gear for imparting the drive of rotation to the spool carrying member.

6. In mechanism as claimed in claim 1 hereof a gear for driving the spools substantially as described.

7. Mechanism for untwisting and reeling or spooling the separate strands of a rope, or the separate wires or groups of wires of a strand, comprising spools mounted so as to revolve on a common axis while simultaneously rotating independently on their own axes, means for revolving the spools on said common axis, and means for rotating said spools on their own axes, a gripping and tensioning device for gripping the rope or the like at a point situate on the produced common axis aforesaid, means for rotating the gripping and tensioning device about its own centre on said common axis in the same direction as the spools, and conducting and confining devices for the separate strands of a rope, or the separate wires or groups of wires of a strand.

8. Mechanism as claimed in claim 9 here-

of, wherein each confining and conducting device comprises a trumpet, guide wheels, and means for imparting rotation of the trumpet.

9. In mechanism as claimed in claim 1 hereof, a spool for spooling the main core or strand core, substantially as described.

10. In mechanism as claimed in claim 1 hereof, a coupling on the spool carrying shaft, for the purpose described.

11. Mechanism for mechanically untwisting and reeling or spooling the separate strands of a rope, or the separate wires or groups of wires of a strand, comprising a member, spools carried thereby so as to revolve on a common axis while simultaneously rotating independently on their own axes, means for revolving the spools on said common axis, and means for rotating said spools on their own axes, conducting and confining devices carried by the spool carrying member, a second member, a gripping and tensioning device for gripping the rope or the like at a point situate on the produced common axis aforesaid, a supply roll, said gripping and tensioning device and supply roll being carried by the second member, means for rotating the supply roll, and means for imparting rotation to said second member whereby the gripping and tensioning device is rotated about its own centre on said common axis in the same direction as the spools.

12. Mechanism for mechanically untwisting and reeling or spooling the separate strands of a rope, or the separate wires or groups of wires of a strand, comprising a member, spools carried thereby so as to revolve on a common axis while simultaneously rotating independently on their own axes, means for revolving the spools on said common axis, and means for rotating said spools on their own axes, means whereby the spools may be removed, conducting and confining devices carried by the spool carrying member, a second member, a gripping and tensioning device for gripping the rope or the like at a point situate on the produced common axis aforesaid, a supply roll, supplemental tensioning devices, said gripping and tensioning device, supplemental tensioning devices, and supply roll being carried by the second member, means for rotating the supply roll, and means for imparting rotation to said second member whereby the gripping and tensioning device is rotated about its own centre on said common axis in the same direction as the spools.

In testimony whereof, I affix my signature.

PETER BURD JAGGER.