May 5, 1936. A. J. MORGAN 2,039,438

WIRE ROPE MACHINE

Filed May 16, 1935

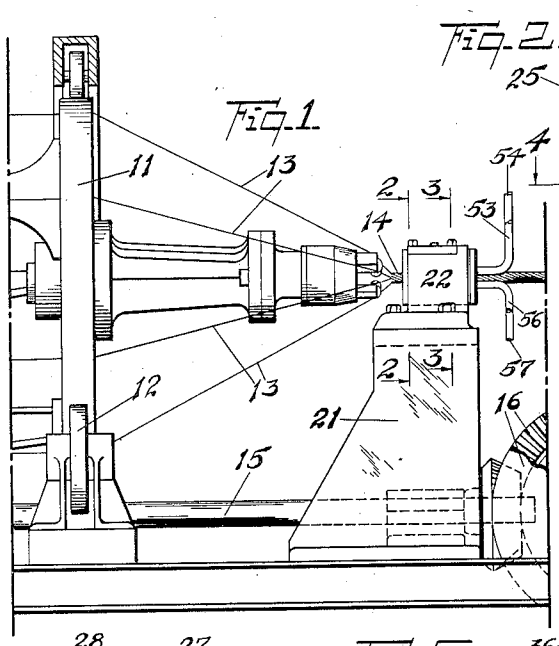


FIG. 1.

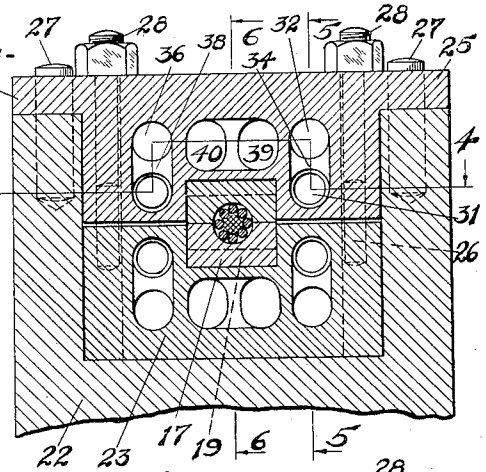


FIG. 2.

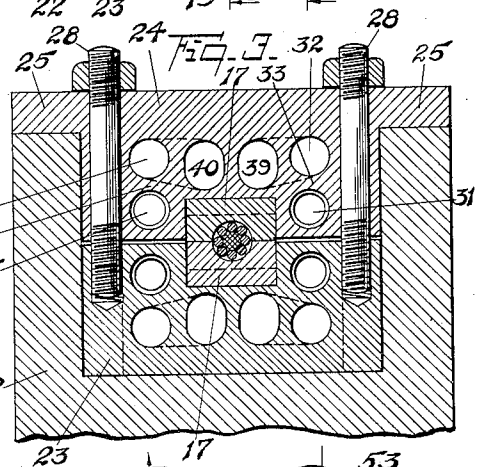


FIG. 3.

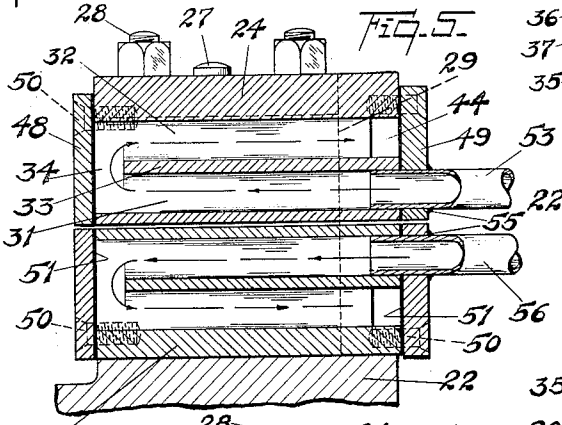


FIG. 5.

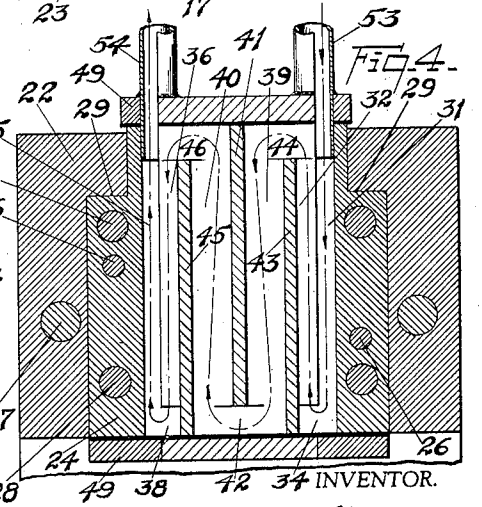


FIG. 4.

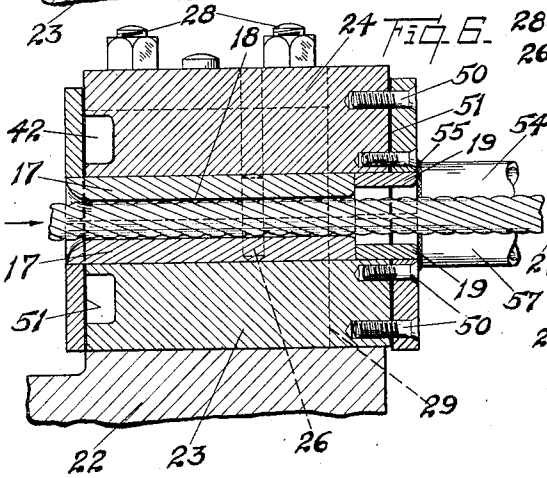


FIG. 6.

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WIRE ROPE MACHINE

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Application May 16, 1935, Serial No. 21,730

12 Claims. (Cl. 117—50)

This invention relates to rope making machines and more particularly to the squeezer unit of such machines.

In the description and claims herein, the word "wire" is to be understood as including both a wire and a wire strand and the word "rope" as including both rope formed of strands and strands formed of wires, the invention being equally applicable to both.

In the manufacture of wire rope and strands it is customary to pass the rope through a squeezer just after it comes from the closing point. This squeezer performs a function which its name implies, that is, it squeezes or compacts the lays. Such squeezers are usually merely a two-part block with the parts adjustable to maintain a bore of the desired diameter. The rope, on its way to the draw-off rolls, is drawn through this bore and compacted to proper diameter.

The passage of a wire rope through such a bore generates heat, the higher the speed the greater the heat. It is desirable for various reasons to use a hardened and polished squeezer. But it has been found impractical, if not impossible, to use hardened and polished squeezers with high speed machines, such as the horizontal long type, because the polished condition cannot be maintained beyond very short intervals under the high heat generated. Whether this is because of the break-down of the lubricant under the heat generated or the expansion of the squeezer or both, is difficult to ascertain and is largely immaterial. The fact remains that after a considerable production of rope, the rope becomes marked in the squeezer in such a manner that it may be unfit for sale.

A second undesirable result of this heat is the possible deleterious effect on the rope itself. It is known that steel "ages". Just what takes place during this aging process is probably not fully understood and need not be discussed. But some sort of a change occurs and this change is accelerated by increased temperatures. In rope machines as heretofore known, the rope, although it requires but a fraction of a second to pass through the squeezer, acquires considerable heat—so much that it cannot ordinarily be touched with the bare hand. It is apparent that if the machine is stopped for any purpose, as not infrequently becomes necessary, the short section of the rope enclosed in the squeezer acquires a much greater amount of heat because of the increased time element. Whether or not such heating of the rope is seriously injurious, at any rate it is desirable that it should be avoided.

It is an object of the present invention to obviate the disadvantages of an overheated squeezer.

More particularly it is an object of the invention to provide a rope machine such that the squeezer is maintained at cool temperatures.

With these general objects and others in view, the invention consists in the features, combinations, details of construction and arrangements of parts which will first be described in connection with the accompanying drawing and then more particularly pointed out in the appended claims.

In the drawing,—

Figure 1 is a view in side elevation of one end of a rope making machine constructed in accordance with the invention;

Figures 2 and 3 are sectional views (enlarged) taken, respectively, on the lines 2—2, 3—3 of Figure 1;

Figure 4 is a sectional view taken on the broken line 4—4 of Figure 2, and

Figures 5 and 6 are sectional views taken, respectively, on the lines 5—5, 6—6 of Figure 2.

Referring to the drawing, while the invention is applicable to various types of rope making machines, it is particularly adaptable to machines of the horizontal long type. Such machines, which are well known in the art, comprise a horizontal frame or flyer having a series of disks running on rollers. In this frame are mounted the wire spools. A machine of this type is shown, for example, in U. S. Patent No. 1,961,379. This patent shows a machine for making preformed rope but the invention is equally applicable to machines for making standard rope.

Figure 1 herein illustrates a flyer head 11 running on rollers 12. From the flyer head the wires 13 pass to the closing point to be laid up in a rope 14. The flyer is driven through any suitable connection from shaft 15 which is driven, in turn, through a reversible bevel gear train 16 from a main shaft (not shown). The latter also drives the draw-off rolls (not shown).

Between the closing point and the draw-off rolls the rope passes through a squeezer. This squeezer, in the embodiment here illustrated as an example, comprises a block 17, square in cross section and having a hardened and polished bore 18 of a diameter generally corresponding to the desired diameter of the finished rope. For manufacturing convenience and to enable the squeezer

to be adjusted so as to adapt it to rope diameter the squeezer is split longitudinally, forming at least two longitudinal parts or sections, as appears more clearly in Figures 2 and 3. The squeezer block is elongated in the direction of the axis, that is to say, its length is greater than the rope diameter and preferably is five or six times longer than such diameter for ropes of the common sizes, as shown, for example, in Figure 6. At the entrance end the squeezer has a bell mouth (Figure 6) for an easy reception of the rope. The exit end abuts against plates 19 which are secured to a holder hereinafter described.

The invention includes means for cooling the squeezer. This may be accomplished by directing a flow of cooling fluid on the squeezer or on or through the squeezer holder. While various cooling fluids may be utilized, water has been found satisfactory.

In accordance with the invention in its entirety, there is provided a holder for the squeezer and means for applying a cooling fluid thereto. This may be conveniently accomplished by a holder that encloses the squeezer, the holder having a plurality of passages therethrough which surround the squeezer. In carrying out the invention to what is now considered the best advantage, the squeezer holder is formed in two parts for convenience of manufacture and assembly and each section has its own independent cooling system, the two systems being arranged and related to provide the enclosure of passages above referred to. To this end, as here shown as an example carried by a pedestal or frame 21 is a recessed supporting block 22. Set in the recess of this block is a lower holder block 23. Above the latter is an upper holder block 24. These two holder blocks have alined recesses which, when the parts are assembled, form a passage, square in cross section, for receiving the squeezer 17.

The upper holder block 24 has, at each side, a flange 25 which seats on the edge of the supporting block 22. The upper and lower holder blocks are positioned with respect to each other by dowels 26 and the upper holder block is positioned in the supporting block by dowels 27. The upper and lower holder blocks are secured together by bolts 28.

In the embodiment here shown as an example, the recess in the supporting block is formed with shoulders 29 and the upper and lower holder blocks have corresponding shoulders (Figure 4). The inter-fit of these shoulders constitutes a stop to take the thrust arising from the passage of the rope.

Each half of the holder has half of the passages that enclose the holder. To avoid a multiplicity of connections, the several passages of each holder block are so interconnected as to provide a continuous and tortuous path for the cooling fluid, e. g. water. To this end, as here shown as an example, at the right side of the upper holder block 24 (as viewed in Figures 2 and 3) and near the bottom thereof, is a passage 31 and above the latter is a passage 32. These two passages are separated by a partition 33. For convenience of description the side of the squeezer unit at which the rope emerges will be termed the front. The partition 33 terminates short of the rear of the holder (Figure 5) whereby the passages 31, 32 are connected by a vertical cross passage 34.

At the left side of this upper holder block are two vertically alined passages 35, 36 which are duplicates of passages 31, 32 respectively. These passages are separated by a partition 37 which terminates short of the rear of the holder whereby the passages 35, 36 are connected by a vertical cross passage 38.

Between passages 32, 36 are two passages 39, 40 located just above the squeezer. These passages are separated by a partition 41 which terminates short of the rear of the block whereby passages 39, 40 are connected by a horizontal cross passage 42. Passages 32 and 39 are separated by a partition 43 which terminates short of the front of the block, whereby the passages are connected by a cross passage 44. Passages 36 and 40 are separated by a similar partition 45 and are similarly connected by a cross passage 46.

In the construction here shown as an example, the several cross passages are open to the face of the block. To close the same, the block has a rear cover plate 48 and a front cover plate 49. These covers or closure plates are secured in place in any suitable manner, as by screws 50. As shown, sealing gaskets 51 of rubber or other suitable material are inserted between the faces of the block and the cover plates. The plates 19 above referred to are secured, in any suitable manner, to cover plate 49.

Considering passage 31 as the entrance, the course of the cooling water is backward through passage 31, up vertical passage 34, forward through passage 32, across passage 44, backward through passage 39, across passage 42, forward through passage 40, across passage 46, backward through passage 36, down passage 38 and forward through passage 35.

There is provided means for connecting the tortuous system of holder block 24 with a source and an outlet. To this end, as here shown as an example, the front cover plate 49 has two holes corresponding to passages 31, 35. In these holes pipes 53, 54 are secured in any suitable manner, as by a tight fit reinforced by soldering 55. The pipes are so positioned that their inner ends extend a short distance beyond the cover plate, as shown in Figure 5. When the cover plate is assembled, these projecting ends of the pipes fit into passages 31, 35. Pipe 53, which is the inlet pipe, is connected in any suitable manner with a source of water or other cooling fluid and outlet pipe 54 is connected in any suitable manner with a drain or other disposal system.

As here illustrated as an example, the lower holder block 23 is provided with passages and connections which, considered vertically, constitute a reverse-hand duplication of the system above described. The inlet pipe 56 corresponds to upper inlet pipe 53 and outlet pipe 57 corresponds to upper outlet 54. Figs. 2, 3, 5, and 6 show the analogous passages of the lower block and no further description is considered necessary.

With the construction described the squeezer is surrounded by a series of twelve paralleling passages for the flow of water, whereby the squeezer holder, and hence the squeezer itself, may be maintained in a cool condition. As a result, a hardened and polished squeezer may be utilized even in high speed machines and injury to the rope because of heat is avoided. Moreover, the construction is such that it may be conveniently assembled and disassembled.

What is claimed is:

1. In a rope making machine, in combination with means for laying up a rope, a squeezer through which the rope passes, a holder for said squeezer, said holder having a network of tortuous and connected passages therein surrounding

the squeezer, and means for connecting said network with a source of cooling fluid.

2. In a rope making machine, in combination with means for laying up a rope, a squeezer through which the rope passes, a two-part holder for said squeezer, each section of said holder having an independent system for the flow of cooling fluid, and means for connecting said systems with a source of cooling fluid.

3. In a rope making machine, in combination with means for laying up a rope, a squeezer through which the rope passes, a holder for said squeezer formed in two sections, each section having a plurality of passages therein, and means for connecting said passages with a source of cooling fluid.

4. In a rope making machine, in combination with means for laying up a rope, a squeezer through which the rope passes, a holder for said squeezer formed in two sections, each section having a network of tortuous and connected passages therein, the passages of the two sections being so arranged and related as to surround the squeezer, and means for connecting said networks with a source of cooling fluid.

5. In a rope making machine, in combination with means for laying up a rope, a squeezer through which the rope passes, a holder block for the squeezer, the holder block having a plurality of passages paralleling the squeezer, adjacent passages being separated by a partition terminating short of the length of the block, the block being cut away adjacent the terminations of said partitions to form cross passages for connecting said passages, cover plates secured to the block to close said cross passages, and pipes carried by one of said cover plates and connecting, respectively, with the first and last of said paralleling passages and serving as an inlet and outlet, respectively, for a cooling fluid.

6. In a rope making machine, in combination with means for laying up a rope, an elongated squeezer through which the rope passes, a holder block for the squeezer, the holder block having a plurality of inter-connected passages paralleling the squeezer, and means for connecting said passages with a source of cooling fluid.

7. In a rope making machine, in combination with means for laying up a rope, an elongated squeezer through which the rope passes, a two-part holder block for the squeezer, each section of the holder block having a plurality of interconnecting passages paralleling the squeezer, and means for connecting the respective sets of passages with a source of cooling fluid.

8. In a rope making machine, in combination with means for laying up a rope, an elongated tubular squeezer through which the laid up rope passes, and means whereby a flow of cooling fluid may be maintained in such close proximity to said squeezer as to prevent the generation in the squeezer of excessive temperatures.

9. In a rope making machine, in combination with means for laying up a rope, an elongated tubular squeezer through which the laid up rope passes, and means for preventing the generation in the squeezer of excessive temperatures.

10. In a rope making machine, in combination with means for laying up a rope, an elongated tubular squeezer through which the laid up rope passes, a holder block for said squeezer, said holder block having an internal passage therein for the flow of a cooling fluid, and means for connecting said passage to a source of cooling fluid.

11. In a rope making machine, in combination with means for laying up a rope, a tubular squeezer, split longitudinally, through which the laid up rope passes, and means whereby a flow of cooling fluid may be maintained in such close proximity to said squeezer as to prevent the generation in the squeezer of excessive temperatures.

12. In a rope making machine, in combination with means for laying up a rope, a tubular squeezer, split longitudinally through which the laid up rope passes, a holder block for said squeezer also split longitudinally, said holder block having an internal passage therein for the flow of a cooling fluid, and means for connecting said passage to a source of cooling fluid.

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