

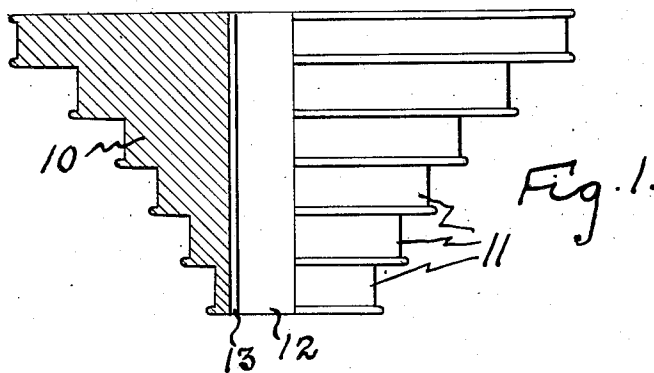
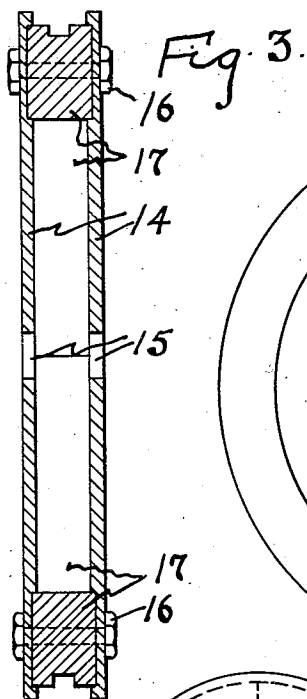
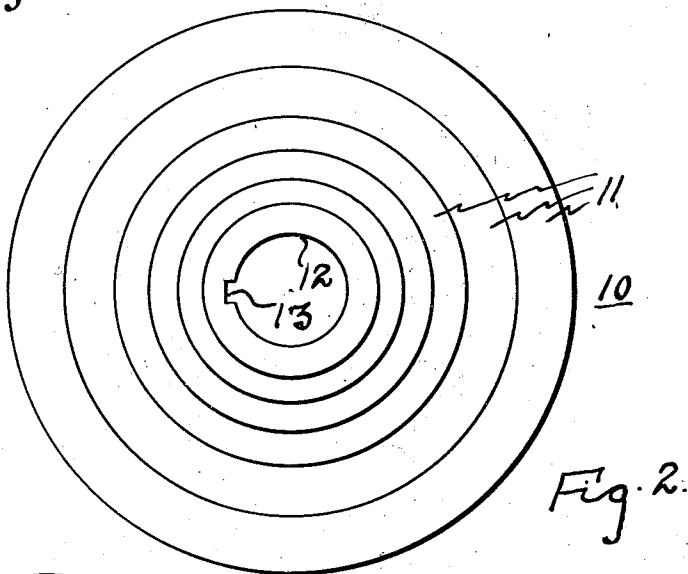
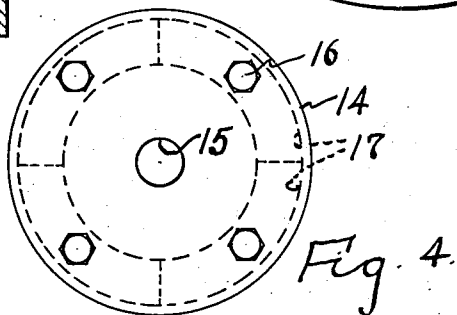
Nov. 2, 1943.

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2,333,387

PULL BLOCK

Filed May 5, 1942



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2,333,387

PULL BLOCK

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Application May 5, 1942, Serial No. 441,834

11 Claims. (Cl. 205—20)

This invention relates to improvements in pull blocks such as the rotatable drawing pulleys forming part of wire drawing machines, finishing capstans for wire drawing machines, the feeding capstans of wire reeling and coiling machines, and the like.

An object of the invention is to construct pull blocks of the type enumerated above from or provide them with wire contacting surfaces of carbon or carbon impregnated with a metal, and in some cases with a lubricant.

A further object of the invention is to provide pull blocks or capstans constructed of carbon for improving the operation of wire drawing and feeding devices, which improvements will be set forth hereinafter.

This invention resides substantially in the combination, construction, arrangement, relative location of parts, steps and series of steps, all as will be explained in full detail hereinafter.

In the accompanying drawing,

Figure 1 is an elevational view, partly in cross-section, of a stepped wire drawing pulley composed entirely of carbon or carbon impregnated with a metal and, if desired, a lubricant.

Figure 2 is a front elevational view thereof.

Figure 3 is a vertical cross-sectional view through a modified form of construction showing particularly a finishing or feeding capstan having carbon wire contacting surfaces.

Figure 4 is a side elevational view of the construction of Figure 3.

In the feeding of wire in various processing operations in the manufacture thereof, the wire engages one or more pulleys at a point or points in its travel by being looped therearound in one or more turns. In accordance with common practice these pulleys are generally made, at least at the areas contacted by the wire, of hardened steel. For example in a wire drawing machine, the stepped pulleys, of which a plurality are employed, are arranged in relation to each other so that the wire moves progressively from pulley to pulley so as to successively engage the steps thereof. These pulleys are employed for the purpose of pulling the wire through the various drawing dies which are disposed in the path of travel of the wire.

In accordance with common practice, these pulleys which are of course power driven, are mounted within a housing so that they may be flooded with lubricant during the operation of the machine. In addition, wire drawing machines have a finishing capstan which is mounted outside this housing and which draws the

wire through the finishing die. This finishing capstan, likewise at the present time of hardened steel, runs dry. In various other wire processing operations, as in the reeling and coiling of wire, other hardened steel capstans are employed for feeding the wire and in these cases they usually run dry.

While hardened steel puller blocks and capstans may be made to operate satisfactorily, there are many inherent difficulties encountered in their use which it is desirable to eliminate. In accordance with this invention puller blocks, capstans and the like are made entirely of or are provided with wire engaging portions composed basically of carbon by means of which many of the above indicated difficulties may be eliminated.

For example, in wire drawing machines it is frequently necessary to stop the movement of the wire. When hardened steel drawing blocks are employed if they remain in operation the wire is burned off. On the other hand, pull blocks composed of carbon in accordance with this invention may run at full speed with the wire at rest without burning the wire off at the points of contact between it and the blocks. This very beneficial result is secured whether the blocks are running in lubricant or are running dry.

Another very important advantage of the use of carbon pull blocks, the details of which will be fully appreciated by those skilled in the art, resides in the fact that the pull exerted by them on the wire is substantially constant for all percentages of slip above ten to fifteen percent slip. Below fifteen percent slip, and particularly below ten percent slip, there is a considerable variation in the tension in the wire or the pull thereon, but above fifteen percent slip and up to substantially one hundred percent slip, the pull on the wire and hence the tension in it remains substantially constant. This is a very important advantage of this invention, especially in the operation of wire drawing machines. Likewise the tension in the wire remains substantially constant for a variation in the speed of movement of the wire in feet per minute of as much as one hundred percent.

In the case of steel pull blocks, if the wire passes therearound in two turns it is not possible to run the machine without breaking the wire because the slippage characteristics of such blocks are very erratic. In addition difficulty is encountered in starting the machine. With the use of carbon pull blocks there appears to be little difference in starting or stopping or in running,

whether the wire engages them in one or two or even more turns. This is no doubt due to the favorable slippage characteristics of such blocks.

In operation steel pull blocks are subject to grooving, as are the carbon pull blocks, but in the latter case this does not seem to interfere with the satisfactory operation of the machine.

All of these advantages of the carbon pull blocks and capstans make it practical, as one instance of the advantage of the invention, to operate a constant speed spooler with a wire drawing machine. As is well known in this art, the problem of spooling or reeling wire coming from a wire drawing or other processing machine at a constant number of feet per minute, is complicated by the fact that as the spool or coil of wire builds up in diameter it requires more feet of wire per minute if it is revolving at a uniform speed. The natural result is that the tension increases in the wire under these conditions until it breaks unless some form of variable speed control is provided for the spooler or coiler so as to gradually slow it down as its diameter increases. This, of course, involves complications which in practice have seldom been found satisfactory. By the use of carbon puller blocks and capstan wheels, due to the characteristics thereof as explained above, it is possible to employ constant speed spoolers or coilers without danger of breaking the wire.

There are other advantages of this invention but it is not deemed necessary to detail them here.

Referring to the drawing, there is shown in Figures 1 and 2 one embodiment of this invention. In these figures there is shown a unitary stepped pull block comprising a solid body 10 of carbon which is preferably of the graphitized type. The body is molded of carbon to the proper shape and dimensions to provide a series of stepped pulley surfaces 11, a central bore 12 for mounting on a suitable shaft, and a keyway 13 for securing it on the shaft. The molded body of carbon can be graphitized by heating in accordance with well known practice. Likewise the details of molding such a body are not herein described as they represent an art old and in use. Spooler blocks of this type may consist solely of carbon, or they may be impregnated with a metal which appears to improve their operating characteristics for the purposes disclosed. Suitable metals by way of example are cadmium, copper and silver.

The carbon block bodies can be impregnated with one of these metals by immersing them in a molten bath of the metal and subjecting the molten body to pressure so as to force some of the metal into the body. The metal may be incorporated in these blocks by mixing the metal in the form of a powder into the carbon before it is molded, or powdered carbon, powdered metal and a suitable binder, of which molasses and sugar are examples, are thoroughly mixed and the mixture is then molded in accordance with known practice to form a body which is heated to volatilize the binder and graphitize the carbon. The present invention is not particularly concerned with the method of preparing the blocks

or capstans, although the above description has been given in the interest of completeness. In some cases, and in accordance with known practice, the molded bodies may be impregnated with a lubricant, of which paraffin and the like are examples. This is likewise a practiced art.

The construction of the blocks solely of carbon alone or as modified above, is only suitable for the smaller sizes of blocks and capstans. There is therefore illustrated in Figures 3 and 4 a built up structure more suitable for stepped blocks, capstan pulleys, and the like which are of larger size. In this construction a capstan pulley is illustrated as composed of a pair of side plates 14 of suitable material, as for example a metal, having aligned central passages 15 for mounting on a shaft. A number of segmental carbon blocks 17 are arranged between the plates to form a ring and the plates are then secured together by the bolts 16 to clamp the carbon blocks into ring form. It is, of course, apparent that a stepped pull block could be constructed in this way.

The above detailed description of two physical embodiments of this invention is presented herein for the purpose of illustrating the nature of the invention, but not with the intention of limiting it to these forms. Those skilled in the art will readily appreciate that the subject matter of this invention may be embodied in many forms and I do not therefore desire to be strictly limited to this disclosure, but rather to the scope of the claims granted me.

What is claimed is:

1. A pull-block for a wire drawing machine having a wire engaging surface of free carbon.
2. A pull-block for a wire drawing machine having a wire engaging surface of carbon having incorporated therein metal particles.
3. A pull-block for a wire drawing machine having a wire engaging surface of carbon having incorporated therein cadmium particles.
4. A pull-block for a wire drawing machine having a wire engaging surface of carbon having incorporated therein copper particles.
5. A pull-block for a wire drawing machine having a wire engaging surface of carbon having incorporated therein silver particles.
6. A wire drawing pull-block comprising a body composed substantially of carbon.
7. A wire drawing pull-block comprising a body of free carbon and a metal.
8. A wire drawing pull-block comprising a body of carbon and metal and a lubricant incorporated therein.
9. A pull-block of the type described comprising a metal supporting body having mounted therein a wire engaging body composed mainly of carbon.
10. A pull-block of the type described comprising a metal supporting body having mounted therein a wire engaging body of carbon having a metal incorporated therein.
11. A pull-block of the type described comprising a metal supporting body having mounted therein a wire engaging body of carbon having a metal incorporated therein and a lubricant.

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