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METHOD OF STRETCHING METAL RODS

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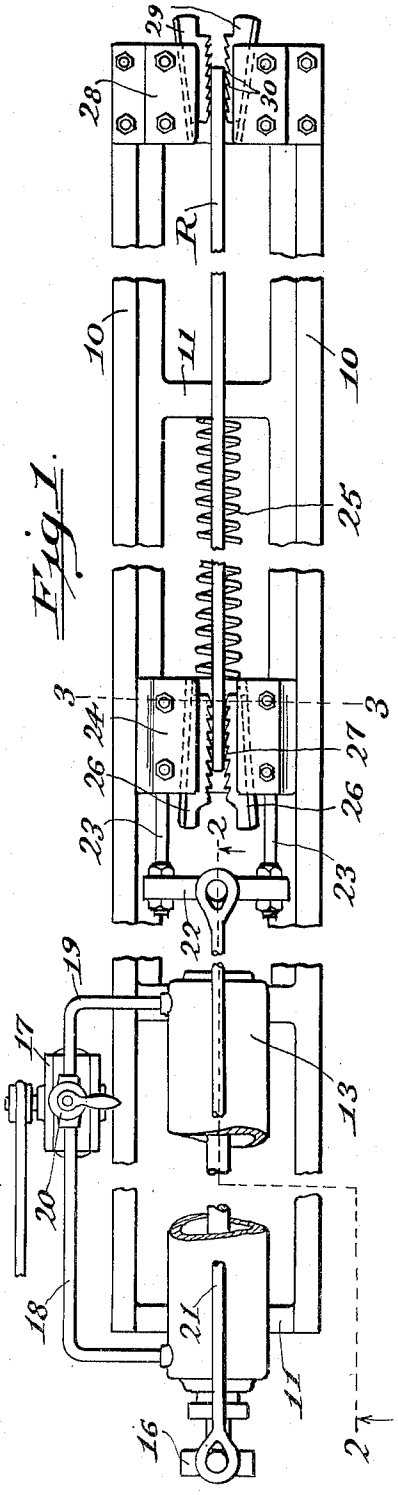


Fig. 1.

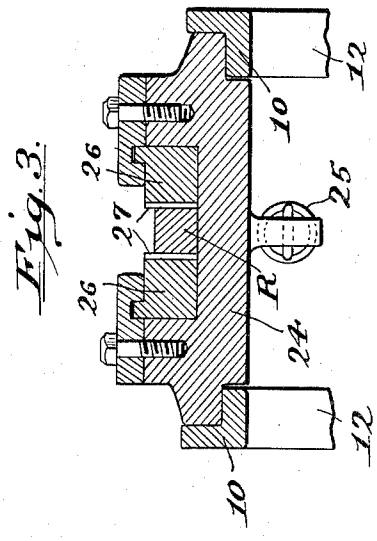


Fig. 3.

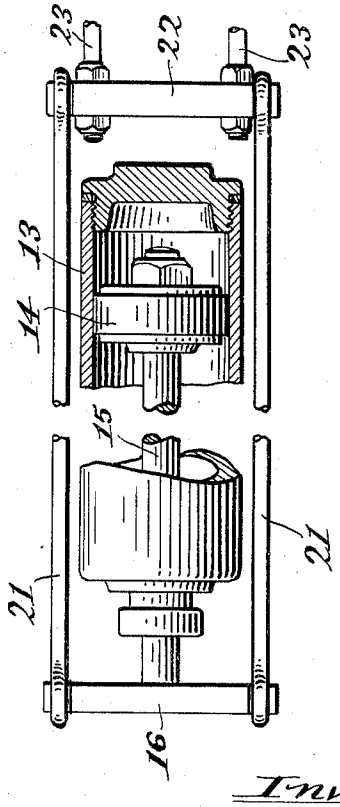


Fig. 2.

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METHOD OF STRETCHING METAL RODS

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4 Claims. (Cl. 205—8)

My invention relates to a method of and apparatus for stretching metal rods in order to straighten the same, for increasing the tensile strength of the rod and increasing the resistance of the rods to bending strains or stresses, also for the purpose of removing scale, rust and the like from the surface of the rod and also for the purpose of materially increasing the usable lengths of the ordinary commercial rods that are received from the mill.

The principal object of my invention is, to provide a relatively simple and easily practiced method whereby metal rods, particularly of the type utilized as a support for curtains and the like, may be conveniently and economically stretched and straightened while said rods are cold and after the same have been delivered by the mill to the shops or factories where the rods are cut into proper lengths and treated so as to be sold in the open market for use as curtain supporting rods.

Metal rods of the type used in the production of curtain rods, when delivered by the mill to the curtain rod shops or factories, are to a greater or lesser degree, covered with rust and scale that accumulates during storage and transit and said rods are generally bent as a result of rough handling during transportation and it is one of the principal objects of my invention to provide a relatively simple apparatus for simultaneously straightening the rods and removing the scale and rust therefrom prior to the cutting of the rods into the desired lengths for use as curtain supporting rods.

A further object of my invention is, to stretch the rods for the purpose of materially increasing the usable length of the rods as they are received from the mill and in practice I have by means of the apparatus herein shown and described stretched one-half inch square twenty foot length metal rods, eighteen inches and which stretching operation materially increases the tensile strength of the rod and at the same time materially increase its resistance to bending strains. As a result of this stretching of the rods and the consequent increase of tensile strength and resistance to bending strains I am able to provide rods of considerable length which when supported by suitable brackets adjacent to their ends, will support relatively heavy curtains and like hangings without the requirement for an intermediate support or bracket, thereby eliminating the expense of such intermediate bracket and its installation and at the same time providing a much more presentable support for the curtain.

With the foregoing and other objects in view my invention consists in certain novel features of construction and arrangements of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a plan view of a relatively simple form of apparatus that I have designed for carrying out my improved method of stretching metal rods.

Fig. 2 is a vertical section partly in elevation, taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged cross section taken on the line 3—3 of Fig. 1.

Referring by numerals to the accompanying drawing which illustrates a practical form of apparatus which may be used for practicing my improved method, 10, 10 designate a pair of parallel rails which are connected at suitable points by cross members such as 11 and the entire structure being supported by suitable legs 12.

Rigidly mounted on one end of the frame between the rails 10, is a cylinder 13, within which operates a piston 14 and said piston being carried by a piston rod 15 that extends through the rear end of cylinder 13.

Carried by the projecting end of the piston rod, is a cross head 16.

Located adjacent to the cylinder, is a pump 17, preferably of the rotary type and leading from said pump to the ends of the cylinder, are pipes 18 and 19.

Located between the pipes 18 and 19 and the pump 17, is a valve 20, which controls the flow of fluid between the pump and cylinder and the valve may be provided with a by-pass for the fluid acted upon by the pump while the piston within the cylinder is at rest.

The fluid utilized in the apparatus as shown and described may be oil or any other relatively heavy liquid.

Connected to the ends of cross head 16, are rods 21 that extend along the sides of the cylinder 13 and the forward ends of said rods are connected to a cross head 22. This cross head is connected in any suitable manner, preferably by means of short rods 23, to a block 24 that is mounted for sliding movement on the rails 10 and connected to the underside of this block and to one of the cross members 11 of the frame of the apparatus, is a retractile spring 25 that yieldingly resists the movement of block 24 toward the cylinder 13.

Arranged for sliding movement in the upper

portion of block 24, is a pair of wedges 26 having teeth 27 formed on their adjacent vertical faces.

Rigidly fixed on the ends of the rails 18 opposite the ends that support cylinder 13, is a block 28, in which is arranged for sliding movement a pair of wedges 29 provided on their adjacent vertical faces with teeth 30.

In practicing my improved method with the apparatus just described, one end of the rod R to be stretched and straightened, is engaged between the toothed faces of the wedges 29 and the other end of the rod is engaged between the toothed faces of the wedges 26, it being understood that when the rod is thus engaged by the pairs of wedges, the block 24 is at the forward end of its travel with piston 14 near the forward end of its travel in cylinder 13.

Valve 20 is now manipulated so that fluid passes from pump 17 through pipe 19 to the forward end of the cylinder and following such action the piston will be slowly moved rearwardly through the cylinder and the fluid to the rear of the piston will pass through pipe 18 to pump 17.

Through the connections 16, 21, 22 and 23, block 24 will be drawn toward the cylinder, thereby stretching rod R, one end of which is firmly gripped between the wedges 29 that are arranged in stationary block 28 and during this stretching operation practically all scale and rust on the surface of the rod will be broken and dislodged therefrom and at the same time all bends and kinks will be removed from the rod so that the same is perfectly straight at the termination of the stretching operation.

It has been demonstrated by tests and experiments, that the stretching of the rod as just described, stretches and straightens the fibers and compacts the molecules of metal within the rod, so as to materially increase its tensile strength and also to materially inorease its resistance to bending strains.

As a matter of fact laboratory tests show that a hot rolled mild Bessemer steel rod twenty feet in length, one-half inch square when stretched eighteen inches in accordance with my improved method, shows an increase in strength as measured by yield points of 32.6 percent, an increase in tensile strength of 8.8 percent and with a decrease in cross sectional dimensions of only .008 percent.

After the stretching operations as just described have been accomplished, the valve 20 is shifted to its normal position so as to by-pass the fluid from one side of the pump through the valve to the other side and to establish direct communication between the pipes 18 and 19 and after the stretched, scale free rod has been removed from the machine, the power stored in coil spring 25 will act to draw block 24 back to its normal forward position, during which movement the fluid will pass from the chamber in cylinder 13 in front of piston 14 through pipes 19 and 18 to the chamber within the cylinder behind said piston.

While I have described my improved method and apparatus as being particularly designed for the stretching of metal rods that are utilized for supporting curtains and like hangings, it will be understood that my invention may be utilized with equal advantage in stretching all forms of rods utilized in the mechanical arts and for building purposes, for instance, concrete reenforcing rods and the same method and apparatus may be advantageously employed in stretching angle bars, channels and flanged bars or rods of various cross sectional shapes.

Thus it will be seen that I have provided a relatively simple and practical method and apparatus for stretching metal rods and which stretching operation automatically removes scale, rust and the like from the surfaces of the rods, materially increases the tensile strength of the rods and also increases the resistance of the rods to bending strains or stresses and also materially increases the usable lengths of the ordinary commercial rods that are produced by the mill.

Inasmuch as the rods when stretched in accordance with my method, are free from scale and rust, they may be finished with a coating of lacquer or the like without resorting to the usually employed methods of removing scale, rust and the like, thereby materially lessening the cost of production of the finished rods.

I claim as my invention:

1. The herein described method of stretching hot run metal rods to produce drapery supporting rods, which consists in clamping and rigidly holding one end of a rod and then gripping the other end of said rod and pulling same away from the rigidly held end so as to subject said rod to tensional strains and stretch same to a sufficient degree to break and remove all scale and rust from the external surfaces of the rod.

2. The herein described method of stretching commercially produced hot run metal rods to produce drapery supporting rods, which consists in anchoring one end of a rod and then gripping the other end of said rod, stretching same away from its anchored end sufficient to break and dislodge all scale and rust from the surfaces of said rod.

3. The herein described method of stretching commercially produced hot run metal rods to produce drapery supporting rods which consists in clamping and rigidly holding one end of a rod and then gripping the other end of said rod and pulling the same away from the rigidly held end so as to subject said rod to tensional strains sufficient to stretch said rod and to produce a straightening and permanent elongation thereof and to break and dislodge all scale and rust from the surfaces of the rod.

4. The method of removing scale from hot rolled steel rod and the like which comprises gripping opposite ends of the rod in gripping devices and causing one gripper device to move away from the other to subject the rod to a tensile stress sufficient to permanently elongate said rod in a single uninterrupted movement and to stress the scale on the rod beyond the breaking point of the scale whereby the scale will break up and be freed from the rod.

ARTHUR H. BORWICK.