

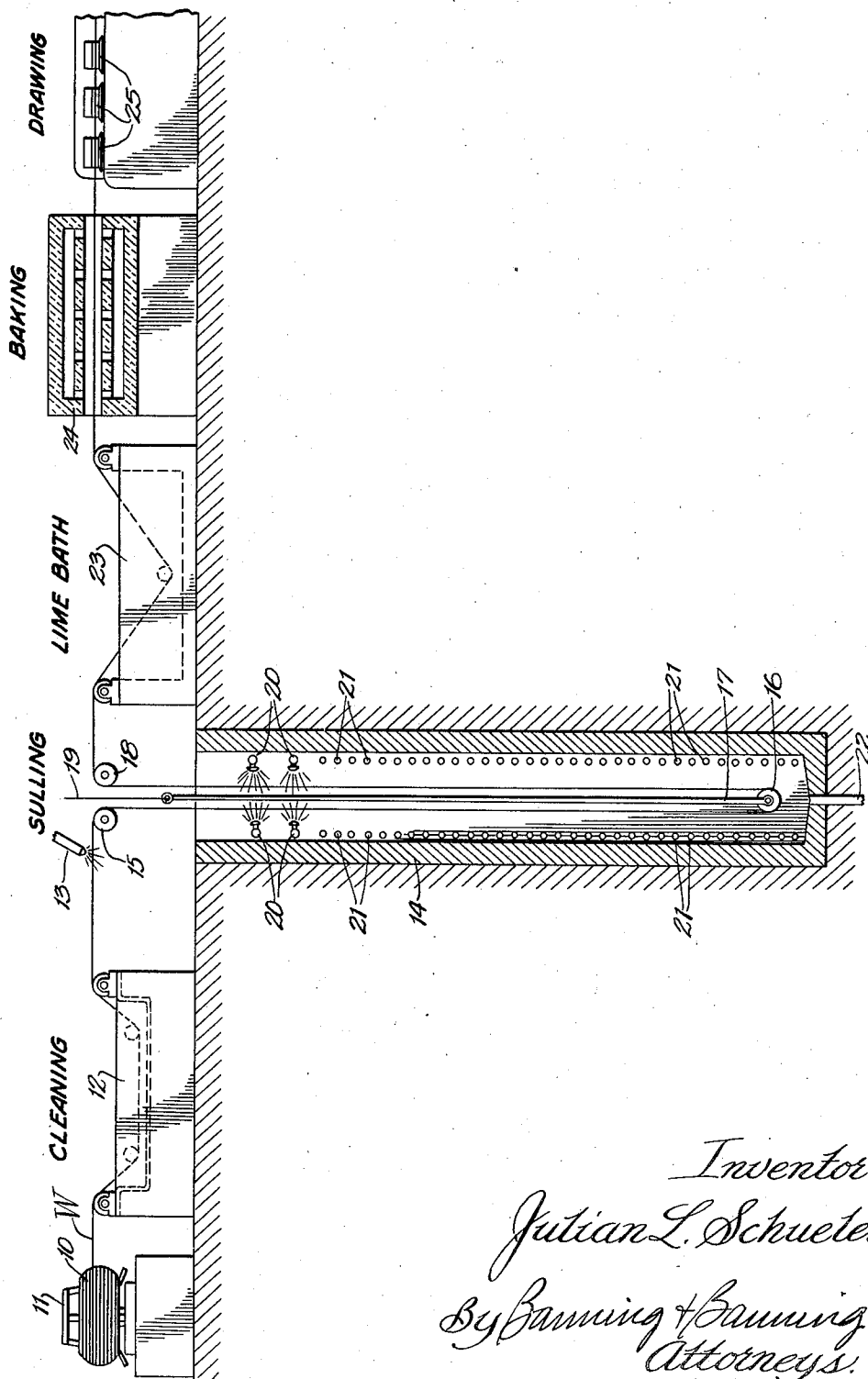
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METHOD OF AND APPARATUS FOR TREATING AND DRAWING WIRE

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METHOD OF AND APPARATUS FOR TREATING AND DRAWING WIRE

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An object of this invention is to provide an improved method of and apparatus for cleaning or pickling iron or steel rods or wire for the removal of scale acquired during a hot rod rolling process and for sulling and/or lime coating the same, and for drawing the rods or wire thus treated to smaller gauges, all as a continuous process applied to a strand, or preferably many parallel strands, of the wire running continuously through the apparatus. The word "wire" as used in the specification and claims is intended for convenience to include both rods and wire of all shapes and sizes which are subject to the processes disclosed herein.

Another object is the provision of means for varying the amount of pickling, sulling, liming or the like, applied to each wire individually while it travels at a uniform speed through the baths and other treating apparatus. It will be understood that while only a single strand of wire is shown, this process adapts itself advantageously to the use of a number of parallel strands of wire, each being drawn independently of the others through the various baths or other treating apparatus, and also through wire-drawing dies.

These objects, as well as others which will hereinafter appear, are accomplished by this invention which is fully described in the following specification and shown in the accompanying drawing, in which the figure is a diagrammatic view partly in vertical section showing apparatus through which one or more strands of wire may be advanced for cleaning, sulling, liming, baking and drawing to smaller gauges.

In the apparatus illustrated, a coil of rod 10 as received from the rod mill is placed on a reel 11 from which it is unreeled as a rod or wire W. It is then passed through a tank 12 containing a suitable cleaning liquid such as dilute sulphuric acid which removes the scale (iron oxide) acquired by the rod during the process of hot rolling in the rod mill. This acid while partly dissolving the scale removes it principally by the formation of hydrogen gas between the scale and the rod, thus operating to dislodge the scale mechanically. As the rod or wire leaves the cleaning tank, it is thoroughly washed by a spray or the like 13.

The tank 12 may contain any other suitable cleaning liquid such as a molten salt bath or it may be replaced by a mechanical etching system using grit, sand or other abrasive material applied to the wire with force by means of an air blast or by centrifugal means.

If a sull coating is desired, the wire then passes to a sulling well 14 where a coat of "sull" or iron rust is applied to act as a lubricant for later wire drawing operations. The thickness of this sull coat may vary from a slight green to a very dark brown depending on the use to which the wire is to be put. The sulling well which is preferably relatively deep and narrow is provided with a sheave 15 located near the top over which the wire passes, thence down under a sheave 16 journaled at the bottom of a frame 17, and up over a sheave 18, thus completing a loop. The frame is suspended by a rope 19 attached to a hoist or the like (not shown) by means of which the frame may be raised and lowered in the well at will to increase or decrease the length of wire exposed to the sulling action. Nozzles 20 serve to spray water or steam on the wire and the well may be heated by steam pipes 21 thereby maintaining an atmosphere where sulling takes place rapidly. Any water collecting in the well passes out through the drain 22. It will be understood that sulling may be omitted for certain forms of continuous wire drawing machines.

As the wire leaves the sulling well, it may pass into a lime bath 23 where the wire acquires a coating of lime and thence passes through a baking oven 24 which is highly heated by any well known means so as to bake the lime on the wire, preferably in a matter of seconds. Sal soda and other chemicals in solution may be substituted for the lime for certain purposes, and baking may sometimes be dispensed with. As an alternative procedure, the wire in the form of coils, as received from the mill, may undergo an initial cleaning in the usual manner, followed, if desired, by sulling while still in coils, the wire being then uncoiled for liming and baking treatments in strands preliminary to drawing operations.

The wire is then drawn to and through one of the drawing blocks 25 where it is reduced in diameter following which it is again coiled for shipping or storage. Suitable means (not shown) are provided beyond the drawing blocks for drawing the wire through the various pieces of apparatus shown. After one coil has been unwound from the reel 11, another coil is mounted thereon and the forward end of the new coil is attached to the rear end of the coil that is just unwound, preferably by welding, so that the process is continuous.

All the apparatus shown and described is intended primarily for use with a number of parallel strands of wire, each running continuously

and independently through the apparatus. Adjacent strands may be of different size or composition, and, of course, may travel at varying speeds.

- 5 The wires may also receive an initial heat treatment in which case they can be handled as strands by being passed through a heat treating furnace or the like, then allowed to cool preliminary to annealing; or quenched, if the wires are to be
10 heat treated for tempering or hardening; the process, as to its remaining steps prior to wire drawing, being thereafter continued, i. e., through the steps of cleaning, liming and baking, with, or without, sulling. The heat treating furnace may
15 be of any conventional type, depending on whether the wire is processed wire, patented wire, spring wire or the like.

I claim:

1. In apparatus for continuously treating and
20 drawing a strand of wire, means for removing scale from the wire, means for sulling the wire including a deep well through which the wire passes, means for heating the well interior, means in the well for spraying the wire, means
25 for varying the length of travel of the strand of wire in the well, means for coating the wire with a chemical, means for baking the wire, and

means for continuously drawing the wire to smaller gauge.

2. In the continuous method of treating and drawing a strand of wire including removing the scale from the wire, sulling the wire, coating the wire with lime, baking the lime, and drawing the wire to a smaller gage, with the wire traveling continuously, the step of sulling the wire consisting of continuously moving the wire in a substantially vertical direction and reversing the
10 direction of vertical movement while spraying the wire with steam and controlling the condition of temperature of the wire.

3. In the continuous method of treating and drawing a plurality of strands of wire including
15 removing the scale from the wire, sulling the wire, coating the wire with lime, baking the lime, and drawing the wire to a smaller gage, with the strands of wire traveling continuously, the step of sulling the strands of wire consisting of continuously moving the wire in a substantially vertical direction and reversing the direction of vertical movement while spraying the wire with steam and controlling the condition of temperature of the strands of wire.

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