

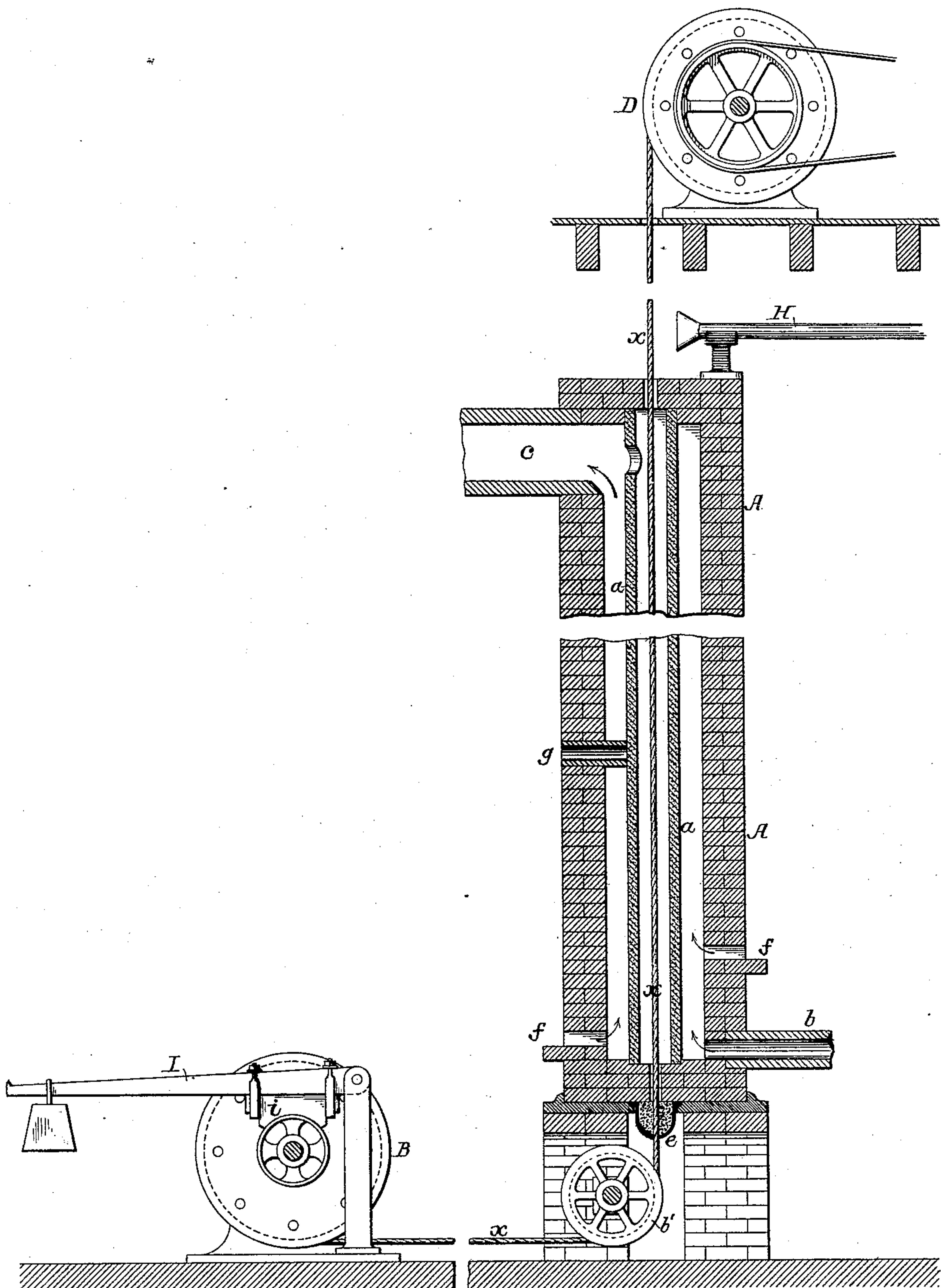
(No Model.)

A. F. W. PARTZ.

PROCESS OF AND APPARATUS FOR MANUFACTURING WIRE ROPE.

No. 482,190.

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Witnesses:

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UNITED STATES PATENT OFFICE.

AUGUST F. W. PARTZ, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF AND APPARATUS FOR MANUFACTURING WIRE ROPE.

SPECIFICATION forming part of Letters Patent No. 482,190, dated September 6, 1892.

Application filed June 20, 1891. Serial No. 396,983. (No model.)

To all whom it may concern:

Be it known that I, AUGUST F. W. PARTZ, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented
5 certain Improvements in Processes of and Apparatus for Manufacturing Wire Rope, of which the following is a specification.

The object of my invention is to manufacture wire rope the independent strands of
15 which will be of equal tension, thus lessening to a great extent the tendency of the single strands to break or tear.

My invention consists, first, in a process of equalizing the tension upon the different
15 strands of a wire rope by exposing it under suitable strain to a sufficient softening heat to cause the tighter strands to be drawn out and all to become evenly stretched and compactly joined, and, second, in certain appa-
20 ratus herein described for executing said process.

The figure in the accompanying drawing is a vertical section and partial side view of a device embodying the mechanical parts of
25 my invention.

I do not confine myself to the use of the devices shown, since the same object may be accomplished by other devices; but I deem the device shown especially well adapted for my
30 purpose.

The service of a wire rope is oftener terminated by the tearing or breaking and untwisting of single strands than by ordinary gradual wear due to attrition. This is chiefly owing
35 to the fact that it is practically impossible to twist a number of wires into a rope so that they are throughout of equal tension. Those in places most tightly drawn must therefore actually bear the strain for the respective
40 length of rope till they either stretch or tear, while those of lesser tension are liable to bend aside and eventually break in passing over grooved wheels or upon a drum, but especially when they are in cables subjected to the push-
45 ing force of the grips of traction-cars.

Referring to the drawing, A is a furnace in the form of a shaft, through the middle of which extends a vertical tube *a*, of clay, graph-
50 ite, or other suitable material, the furnace in the present instance being heated by gas introduced through the flue *b*, combustion taking place around the tube *a*, and the products

being led off through a flue *c* to a chimney. The wire rope *x* passes up through the tube
55 *a* of the furnace, being unwound from a drum B, mounted in suitable bearings and wound upon a drum D after leaving the furnace, said drum D also being furnished with suitable bearings. The rope passes around a grooved
60 guide-wheel *b'* below the arched base of the furnace and through a box *e*, filled with coarse sand or granular iron, the object of this box being to prevent the air from entering the
65 tube to an objectionable degree, though other means may be employed to shut off the entrance of air without departing from my in-
vention.

Air-holes *f f* are formed in the stack, which may be partly closed by bricks or irons, and
70 *g* is a tube of clay or graphite which I use for the introduction of a pyrometer.

The drum D is driven in any suitable manner, and I have shown in this instance a pulley mounted on the drum-shaft and driven
75 through the medium of a belt, and to keep the rope properly stretched while passing through the furnace I place a brake upon the drum B. In the present instance I have shown
80 a brake-lever I, having a shoe *i*, which bears against a wheel on the shaft of the drum, and I provide the lever with an adjustable weight or spring.

In the present instance I have shown a pipe
85 H, preferably provided with a flat nozzle, through which a blast of air or a spray of water may be forced against the wire rope as it comes from the furnace; but other cooling devices may be used without departing from my invention.

The heat to be maintained in the tube *a*
90 and the speed at which the wire rope is to be drawn through the same naturally depend one upon the other and both on the thickness of the rope and the material from which it is made, as well as the length of the tube in the
95 furnace, wherefore the speed of the wire rope and the heat of the furnace are matters to be determined by practical trials under given conditions. For general guidance it may be
100 said that the wire rope should emerge from the furnace with a red glow indicative of a temperature of between 550° and 600° centigrade, at which the iron or steel wires composing the rope will be sufficiently soft to at-

tain under a proper strain a perfectly-uniform tensile state. The said temperature implies for the tube α , from which the rope is heated by radiation, one ranging approximately between 900° and 1,000° centigrade. By maintaining the rope in an upright position while it is subjected to heat the sag of the rope is obviated, and consequently an even strain can be placed upon all portions of the rope, and when the rope is subjected to transmitted heat, as in a tube, the rope will be in a central position, and therefore evenly heated, whereas if it were heated in a horizontal position the lower half would be heated to a greater degree than the upper half, and consequently it would be stretched to a greater degree.

In order that a wire rope may be speedily cooled as it leaves the furnace, and if it be of steel also be tempered, it is exposed to either a blast of air or a spray of water. In the one case the pipe H is connected with a blowing-engine, and the air may in some instances be led through a cooling apparatus. In the other case the pipe is connected with a pump or reservoir furnishing water under sufficient pressure to produce a spray by its ejection from a narrow slot or a row of small holes in the pipe, and in order to effect a more thorough cooling there may be two or more such pipes placed in any suitable manner with respect to the rope.

In some instances the wire rope may be subjected to the direct action of combustion in any suitable furnace. It will thus be seen that by the above-described apparatus a wire rope may be unwound from one drum, heated to the required degree, and when at the proper heat be stretched so that the strands composing the rope will be of equal length, after which the rope may be cooled and wound upon a second drum or otherwise disposed of. A rope thus treated will not be open to the objections mentioned in the fore part of this specification, as the strain will be upon all of the strands rather than upon only a portion of them, as is now the case.

It will be seen that the application of the described process admits of steel ropes being made of soft wire and subsequently brought to the desired temper.

Cables composed of several wire ropes may be first mechanically completed and then

treated in the same way as single ropes, provided their cores are of incombustible material.

I claim as my invention—

1. The process herein described of equalizing the tension and compacting the strands of a wire rope, said process consisting in subjecting the rope to the action of heat while under strain and while maintained in an upright position, substantially as described.

2. The process of equalizing the tension and compacting the strands of a wire rope, said process consisting in subjecting the rope to the action of transmitted heat while said rope is under strain, is maintained in an upright position, and is protected from a flow of air, substantially as described.

3. In an apparatus for heating wire rope, the combination of a furnace, an upright fireproof tube therein through which the rope to be heated is passed, and mechanism for feeding said rope through the furnace and for imparting tension to the rope, substantially as described.

4. The combination of the upright furnace, the upright fireproof tube therein, inlets and outlets for the passage of the rope to be heated, and a box containing granular material, through which the rope passes into the tube, substantially as described.

5. The process of tempering ropes of steel wire, consisting in passing the rope under tension through an upright furnace, in which it is subjected to a softening heat, and exposing the rope to a blast of air or a spray of water as it emerges from the furnace, substantially as described.

6. The combination of the furnace, the upright chamber therein through which the rope to be heated is passed, a delivery-drum and a receiving-drum for the rope, and a water-spraying device situated between the furnace and the receiving-drum through which water can be forced against the rope, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST F. W. PARTZ.

Witnesses:

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