

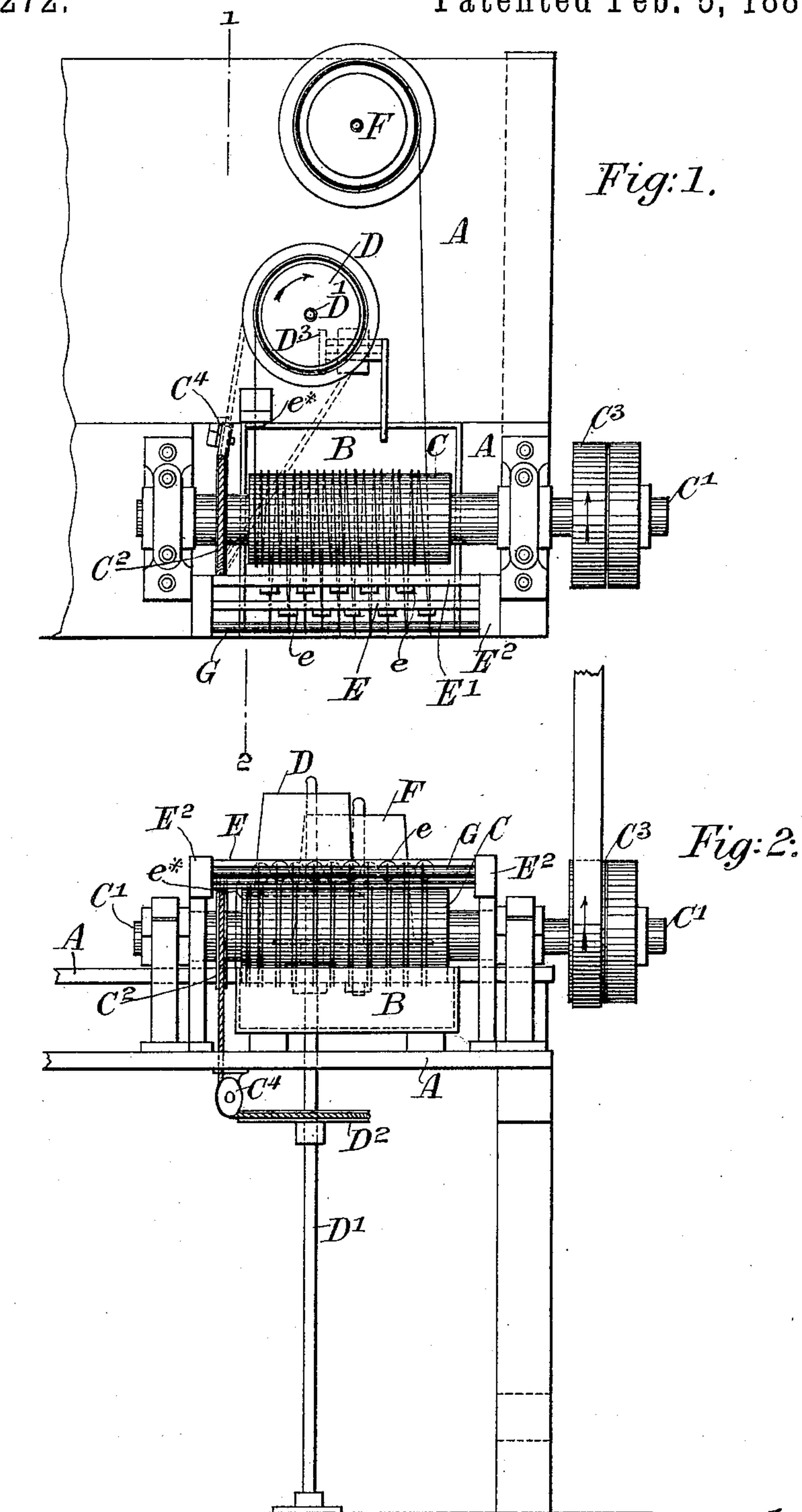
(No Model.)

2 Sheets—Sheet 1.

A. S. & T. BOLTON.  
APPARATUS FOR DRAWING WIRE.

No. 397,272.

Patented Feb. 5, 1889.



Witnesses:

Fred Haynes  
O. Sundgren.

Inventors:

Alfred S. Bolton  
Thomas Bolton  
by attorneys  
Brown & Griswold

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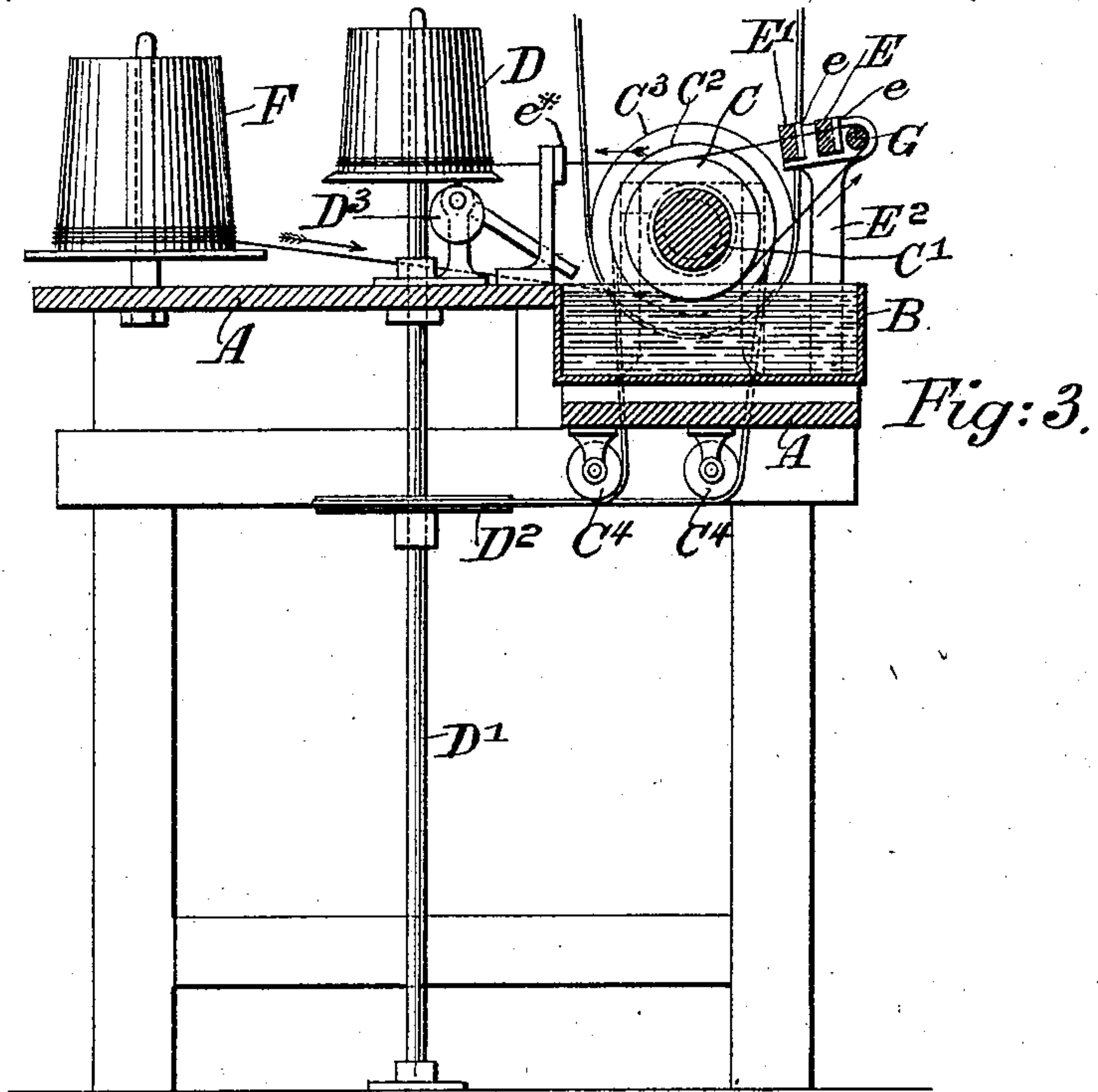


Fig: 3.

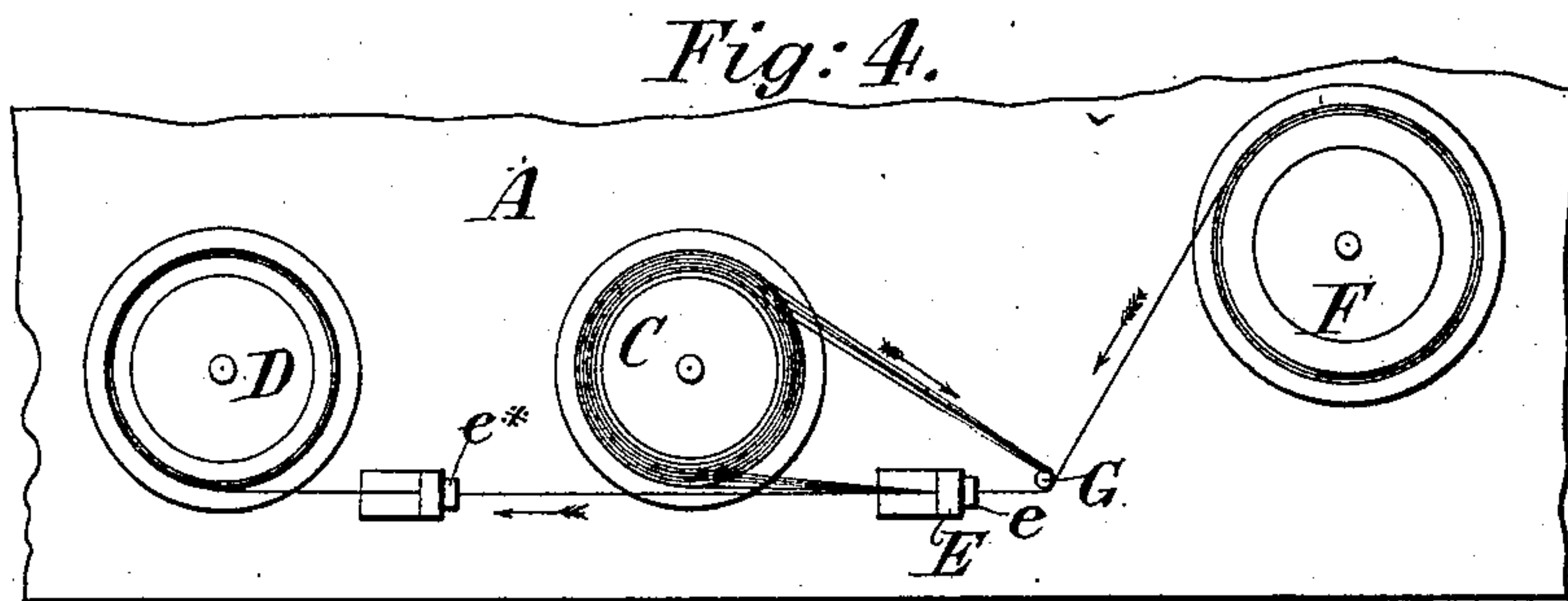


Fig: 4.

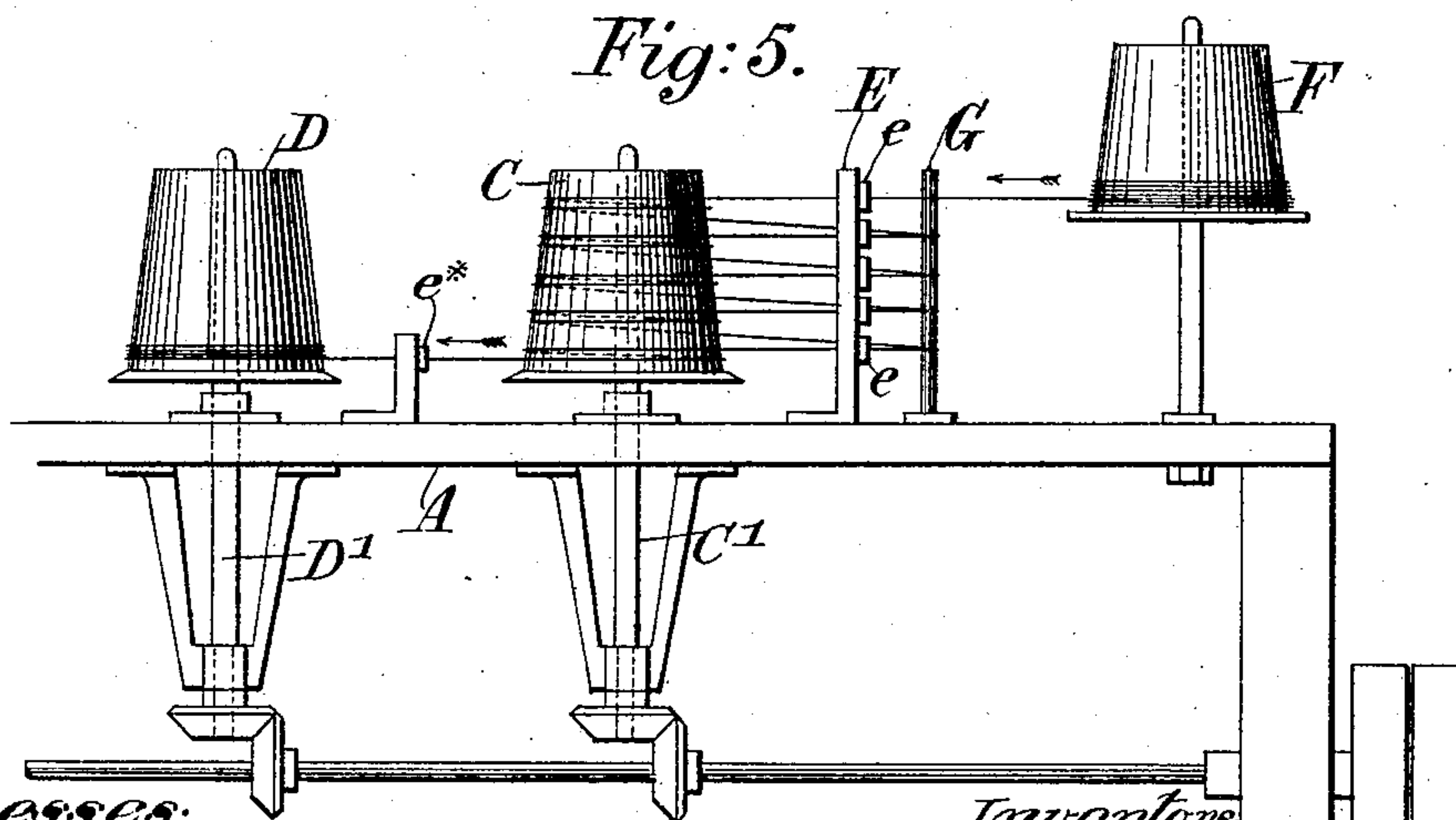


Fig: 5.

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# UNITED STATES PATENT OFFICE.

ALFRED S. BOLTON AND THOMAS BOLTON, OF OAKAMoor MILLS, NEAR  
CHEADLE, COUNTY OF STAFFORD, ENGLAND.

## APPARATUS FOR DRAWING WIRE.

SPECIFICATION forming part of Letters Patent No. 397,272, dated February 5, 1889.

Application filed September 17, 1888. Serial No. 285,606. (No model.) Patented in England June 6, 1887, No. 8,133; in France July 21, 1887, No. 184,923, and in Belgium July 25, 1887, No. 78,343.

*To all whom it may concern:*

Be it known that we, ALFRED SOHIER BOLTON and THOMAS BOLTON, copper and brass manufacturers, both of Oakamoor Mills, near  
5 Cheadle, in the county of Stafford, England, have invented a certain new and useful Improvement in Apparatus for Drawing Wire, (for which we have obtained patents in England, No. 8,133, dated June 6, 1887; in France,  
10 No. 184,923, dated July 21, 1887, and in Belgium, No. 78,343, dated July 25, 1887,) of which the following is a specification.

This invention is more particularly intended for performing a process of drawing wire  
15 in which the varying rates of draft to suit the elongation of the wire are attained automatically, reliance being had on the slip of the wire on the blocks or pulling-surfaces by which the wire is drawn through the successive dies, as described in our application for  
20 United States Letters Patent, Serial No. 242,725, filed June 28, 1887. We now propose, in carrying out such a process, instead of arranging the dies in each draw-bench one behind the other in a line and interposing between them driven blocks or pulleys, as described in our above-mentioned patent, to arrange the dies in a group, the number of dies  
30 in the group depending on the nature of the material to be drawn, and instead of a series of blocks, we provide a driven shaft or cylinder, which serves, like the blocks, to draw the wire through all the dies but the last of the series. A lubricating-trough is provided,  
35 where practicable, for the cylinder or shaft to rotate in, and the driven shaft transmits motion to the spindle which carries the finishing or take-up block.

In the accompanying drawings, Figure 1 is  
40 a plan view of a draw-bench arranged to work according to our invention. Fig. 2 is a front elevation of the same; and Fig. 3 is a sectional elevation, taken in the line 1 2 of Figs. 1 and 2, showing the course of the wire  
45 through the drawing apparatus. Fig. 4 is a plan view, and Fig. 5 a side elevation, of a common draw-bench arranged to work according to our invention.

A, Figs. 1, 2, and 3, is a bench having two  
50 levels and resting upon suitable under fram-

ing. Fitted to the lower level of this bench is a lubricating-trough, B, in which runs the draft-drum C, (represented in this example of my invention as a cylinder,) the same being fitted to or forming part of a shaft, C', which  
55 turns in plumber-blocks carried by the bench. Keyed to this shaft is a pulley, C<sup>2</sup>, for driving the spindle of the finishing or take-up drum D.

E E' are two transverse bars supported by  
60 standards E<sup>2</sup>. Their use is to carry groups of dies  $\epsilon$ , varying in number according to the size of the wire to be drawn and the material to be operated upon. The drawings show ten dies, that being a suitable number for draw-  
65 ing copper or brass wire. These dies are, it will be seen, arranged in two parallel lines, the dies of the one row being set opposite the spaces of the other row.

F is a reel supported on a stud fixed to the  
70 bench and serving to carry the wire to be drawn. G is a guide-bar standing in front or forward of the die-bars, for the purpose to be presently explained.

The cylinder C serves to draw the wire  
75 through all the dies but the last of the series.

The wire taken from the reel F is passed under or lapped around the cylinder C, which is partially immersed in a suitable lubricant in the trough B. The wire then passes forward to the guide-bar G, around which it is lapped to bring it opposite the first of the series of dies carried by the die-bar E, to receive the first drawing. The wire thence passes through an opening in the die-bar E'  
85 back to the cylinder C, around which it is lapped one or more times to enable the cylinder to take a firm bite of the wire. From the cylinder the wire is led forward again to the guide-bar G, whence it passes back (through  
90 an opening in the die-bar E) to the first of the second series of dies carried by the die-bar E', and so to the driven cylinder, as before, to be again in like manner led over the guide-bar  
95 G and passed to the third or next succeeding die. In this way each die of the series is brought to act upon the wire in turn, the cylinder giving the wire the requisite draft until it reaches the last die of the series,  $\epsilon^*$ . This die has an independent support situate in  
100



advance of the cylinder to bring it opposite the finishing or take-up drum D.

The shaft of the cylinder C is fitted with fast and loose pulleys C<sup>3</sup>, for receiving a band 5 from overhead or other driving-gear. The surface speed imparted by this band to the cylinder C will be equal to or in excess of the maximum rate of travel intended to be imparted to the wire, and the like surface speed 10 will be imparted to the finishing or take-up drum, which completes the drawing of the wire.

It will be observed that the surface speed of the drum or cylinder C being sufficient to effect the drawing of the wire through the last 15 die but one of the series, where the wire has been elongated to nearly the maximum length, the said speed is more than sufficient to effect the drawing through the preceding dies of the series. This excess of speed is compensated 20 for by the slip of the wire on the drum or cylinder.

A band from the pulley C<sup>2</sup> passes down to and under guide-pulleys C<sup>4</sup>, and thence to the 25 pulley D<sup>2</sup> on the spindle D' of the take-up drum D. When a group of machines is arranged according to our invention, the spindles of the take-up drum may all be driven from a vertical spindle placed at the back of the 30 continuous bench, thus enabling the draft-cylinder C and lubricating-trough to be continuous for several machines.

To throw the draw-bench out of action, we provide (when driving the take-up drum by 35 friction of contact) means for lifting the drum out of close contact with its coned spindle, which will then rotate without acting upon the drum. For this purpose we mount immediately below the drum D an eccentric, D<sup>3</sup>, 40 the pin of which is carried by a short standard on the bench and is fitted with a hand-lever. By turning this eccentric to bring its longer radius under the drum the drum will be lifted on its coned spindle, and thereby 45 raised out of frictional contact therewith. If thought desirable, we may use a draft-drum of conical form, instead of one of cylindrical form, to effect the draft of the wire through the dies, their diameter increasing in proportion 50 to the elongation of the wire.

In adapting our invention to draw-benches of the common construction we employ the arrangement shown at Figs. 4 and 5. In these 55 figures, A is the bench or framing. C is the draft-drum, which is of conical form, like an ordinary wire-block, driven in the usual manner from a longitudinal shaft below the bench and fitted with miter-wheels, which gear into miter-wheels carried by the shafts C' D'. D is 60 another such conical drum or wire-block mounted on the shaft D' and constituting the

take-up drum. F is a reel mounted upon a stud-axle standing up from the bed of the draw-bench. Between the draft-drum C and the reel F we insert a standard, E, which is 65 bolted firmly to the bench and serves to carry a group of dies, *e*, of which five are shown, but which may vary in number according to the depth of the draft-drum used and the number of drafts desired to be given to the 70 wire. These dies are set one above another in a vertical line corresponding to the position of the draft-drum C, and between the group of dies and the reel a vertical guide-bar, G, is set up for directing the course of the 75 wire under treatment. When it is desired to employ more dies than can be placed in a vertical position within the depth of the draft-drum, two upright die-holders and guide-bars 80 may be used, after the manner of the horizontal arrangement of Figs. 1, 2, and 3. *e*\* is the last or finishing die set between the draft-drum C and the take-up drum D, but to one side thereof, or in a line drawn from the periphery of the cylinder to that of the take-up 85 drum. In working with a draw-bench thus arranged the wire is led from the reel F past the guide-bar G, preferably to the uppermost die *e*, whence it passes to the draft-drum C, around which it is lapped. The wire then 90 returns to the guide-bar G and passes through the second die *e* of the set, thence to the draft-drum, as before, and back to the guide-bar. In this way it is led through all the dies *e* of the set, and passes eventually from the drum 95 C to the finishing-die *e*\*, and thence to the take-up drum D.

Having now described our invention, we declare that we claim—

1. In a wire-drawing apparatus, a row or 100 rows of dies arranged between and parallel with a fixed guide-bar and a rotary draft cylinder or drum, such cylinder or drum serving to impart to the wire under treatment rates of draft varying with the elongation of the 105 wire, as and for the purpose above described.

2. In a wire-drawing apparatus, a row or rows of dies arranged between and parallel with a fixed guide-bar and a rotary draft cylinder or drum, in combination with a lubricating-trough into which the draft cylinder or drum dips for the purpose of lubricating the passing wire under treatment preparatory to each successive drawing. 110

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