(No Model.) 2 Sheets—Sheet 1.

J. M. BUISSON.

WIRE DRAWING APPARATUS.

No. 543,465. Patented July 30, 1895.

Fig. 3

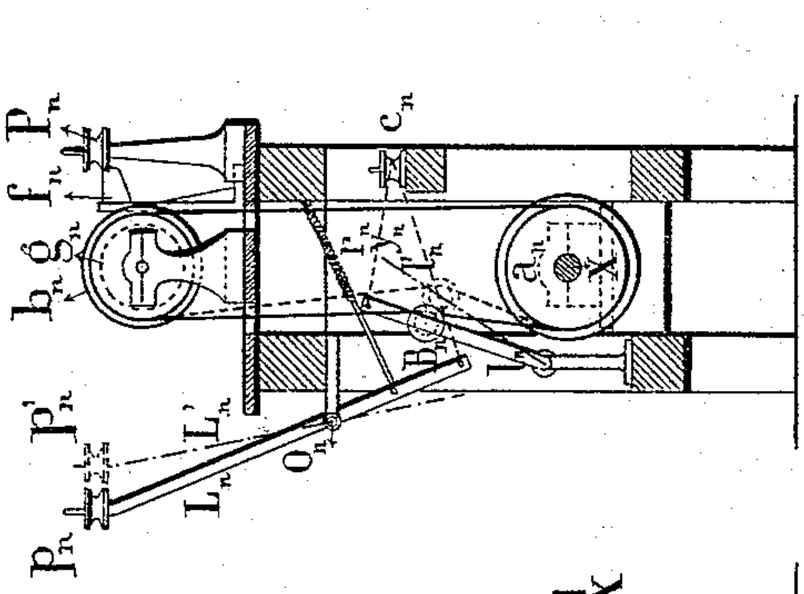


Fig. 4

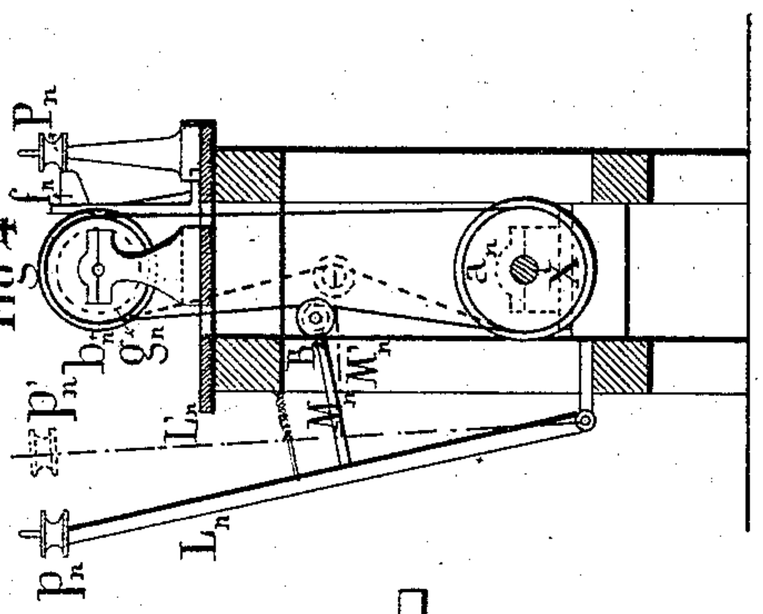


Fig. 1

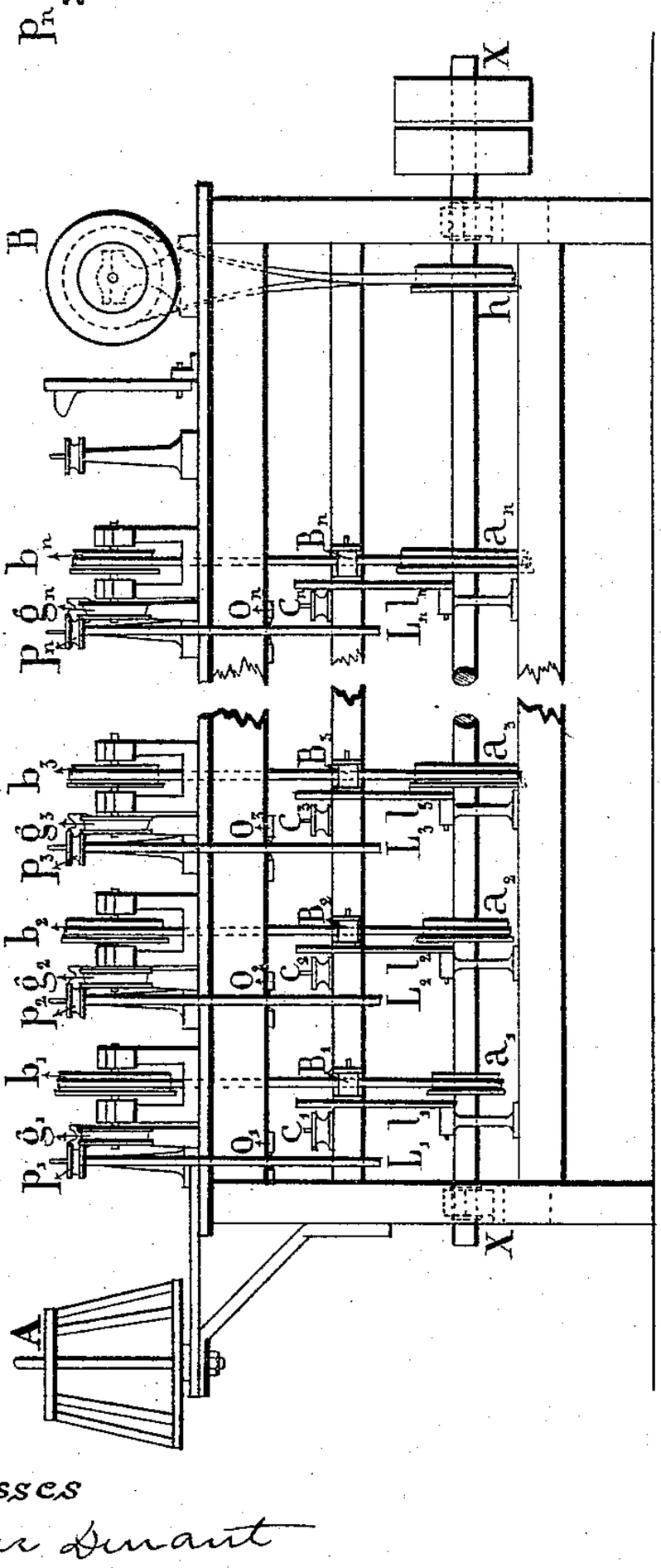
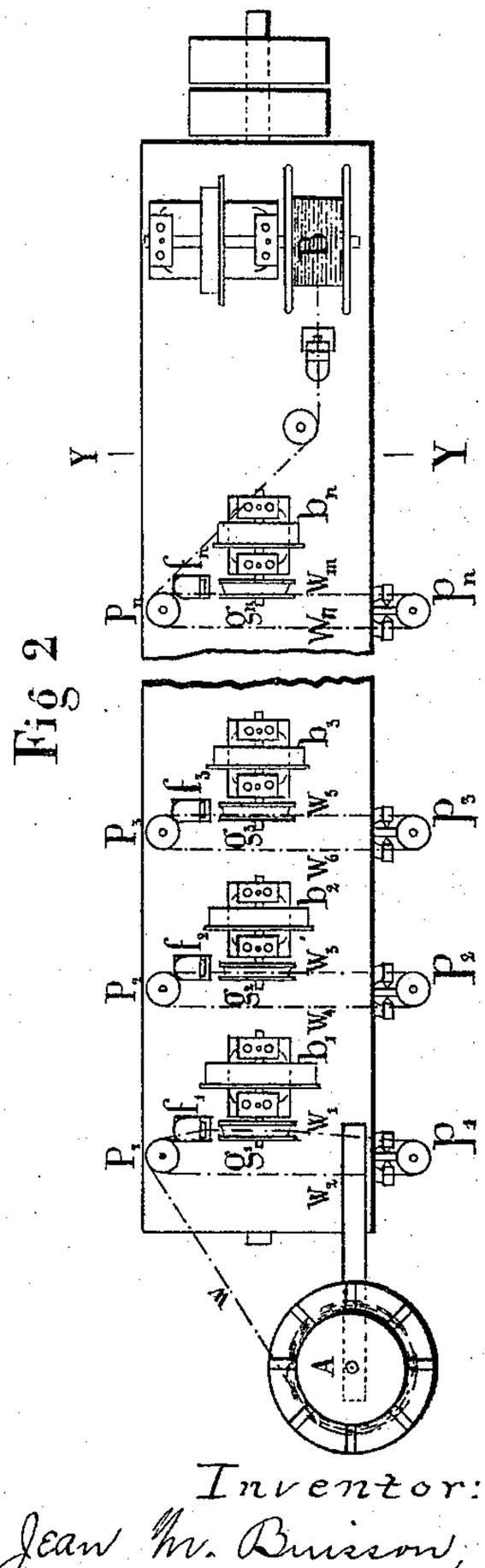


Fig. 2



Witnesses
Thomas Durant
Wallace Murdock

Inventor:
Jean M. Buisson,
by Church & Church
his Attys

(No Model.) 2 Sheets—Sheet 2.

J. M. BUISSON.

WIRE DRAWING APPARATUS.

No. 543,465. Patented July 30, 1895.

Fig. 7.

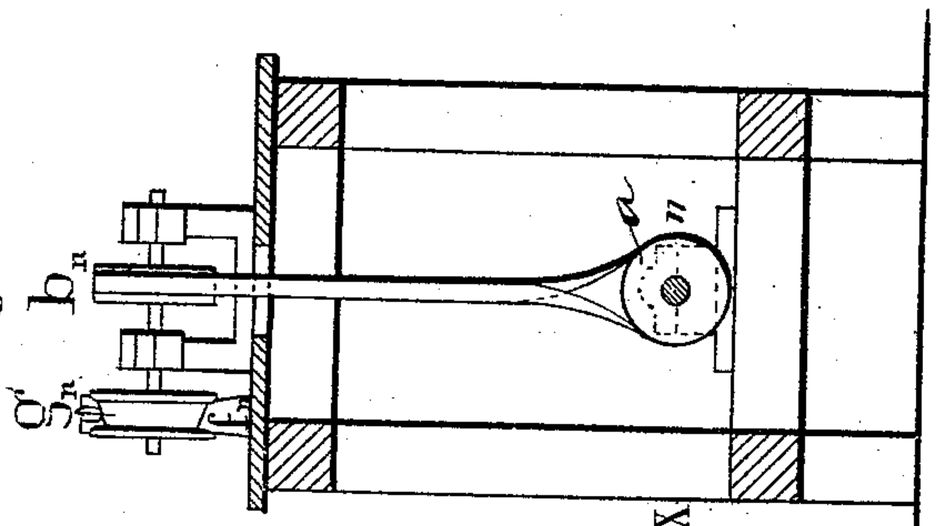


Fig. 5.

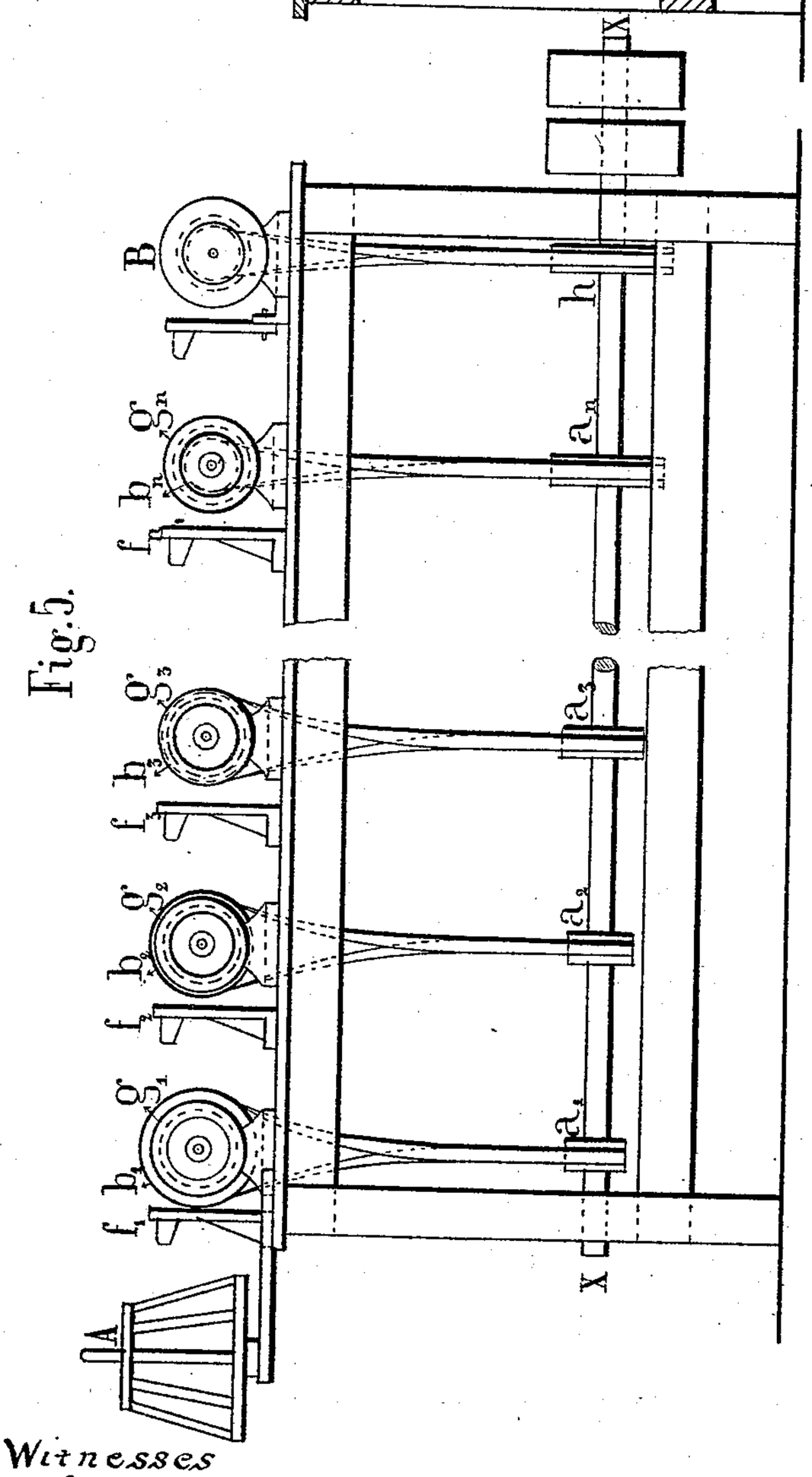
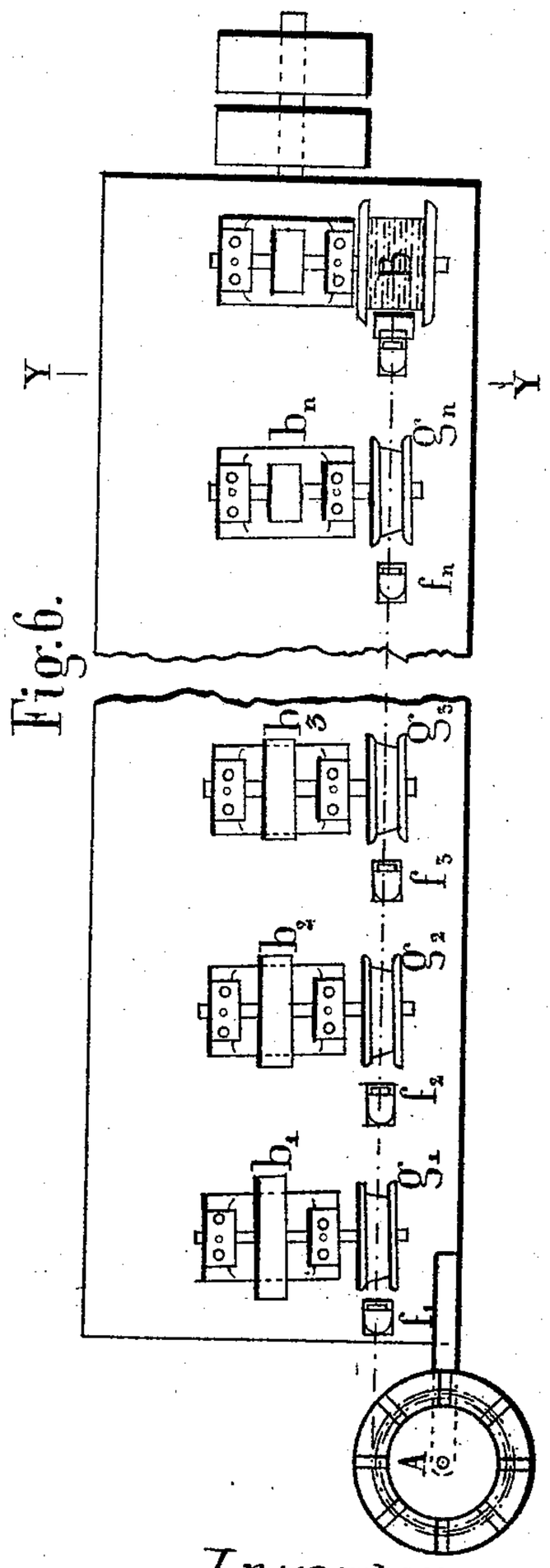


Fig. 6.



Witnesses
Thomas Durant
Wallace Pinckney

Inventor
Jean M. Buisson,
by Church & Church
his Attys

UNITED STATES PATENT OFFICE.

JEAN MARIE BUISSON, OF LYONS, FRANCE.

WIRE-DRAWING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 543,465, dated July 30, 1895.

Application filed January 10, 1893. Serial No. 457,915. (No model.) Patented in England September 20, 1890, No. 14,898; in Belgium September 22, 1890, No. 92,060; in Austria-Hungary August 17, 1891, No. 11,896, and in France March 18, 1892, No. 212,182.

To all whom it may concern:

Be it known that I, JEAN MARIE BUISSON, a citizen of the Republic of France, residing at Lyons, France, have invented certain new and useful Improvements in Wire-Drawing Apparatus, (for which I have obtained patents in England, No. 14,898, dated September 20, 1890; in Belgium, No. 92,060, dated September 22, 1890; in Austria-Hungary, No. 11,896, dated August 17, 1891, and in France, No. 212,182, dated March 18, 1892,) of which the following is a specification.

This machine is composed, essentially, of a series of draw-plates placed one after the other and pierced with holes which become smaller and smaller. The metallic wire which is intended to be drawn passes successively and without interruption through all these draw-plates from the head of the machine and is only rolled up on one vertical or horizontal drum or roller at the other end of the machine. After each draw-plate there is a conical double-flanged cooling-pulley, around which the wire makes one or more turns before it passes through the following draw-plate.

In many cases it is important that the speed at the circumference of the cooling-pulleys be as exactly equal to the speed of the wire as possible in order to avoid friction between the wire and the pulley and the strain which would in consequence be put upon the wire. The exact regulation of the different degrees of speed is obtained in these machines by the different degrees of pressure exercised on the belts or cords driving the shafts of the cooling-pulleys. This pressure can be regulated automatically by the tension of the wire that is being worked or by hand.

In the first case it is only possible to render this regulating action efficacious and practical if the operation of the various parts of the machine performing such regulating action be uniform and free from any concussion. It is therefore necessary that the action of the wire upon this regulating or controlling device shall be as direct as possible, so as to be instantaneous; that, furthermore, the mechanism exercising pressure upon the straps or cords shall be as simple as possible, and that its intermediate parts, if any, be flexible, (consisting, say, of cords, chains, springs, leather straps, &c.,) so as to avoid shocks. Figures 3 and 4 illustrate two arrangements fulfilling these conditions.

In the cases both of automatic or hand regulation an increase of pressure on the belts produces an increase of speed and a diminution of pressure a slackening in the speed or even a complete stoppage of the corresponding pulleys.

The accompanying drawings will make the working of these machines clearly understood.

Fig. 1 is an elevation of the machine; Fig. 2, a plan, and Fig. 3 a transverse section on the line Y Y. Fig. 4 is a similar section showing a modification of the regulating or controlling devices, and Figs. 5, 6, and 7 are modifications with the automatic regulators omitted.

A horizontal driving-shaft X X, Fig. 1, carries pulleys a' a^2 a^3, and so on, driving by belts or endless cords other pulleys b' b^2 b^3, fixed on short horizontal shafts carrying the conical double-flanged cooling-pulleys g' g^2 g^3. As the speed at the circumference of these pulleys ought to increase in proportion as the size of the wire diminishes the driving-pulleys a' a^2 a^3 increase, and the driven-pulleys b' b^2 b^3 decrease, in diameter from the head to the tail of the machine for the purpose of obtaining for the cooling-pulleys g' g^2 g^3 degrees of speed augmenting approximately as the speed of wire and in order to reduce the work of the regulators to a minimum. The wire W W' W^2 W^3, Fig. 2, to be drawn, which is carried on a drum A, passes round a guide-pulley P to the draw-plate f, then to the conical cooling-pulley g and a regulating friction-roller p, to pass from there in the same order through successive series of similar devices P^2 f^2 g^2 p^2, and so on. At the other end of the machine the drawn wire is rolled round a drum or roller B, which receives its movement from a pulley h on the driving-shaft X X.

I will now describe the play of the regulator as shown in Figs. 3 and 4. Fig. 3 is a cross-section of Figs. 1 and 2 on line Y Y. Fig. 4 is a similar section showing a modification of the regulating or controlling devices. It will be noticed that the corresponding parts

in Figs. 3 and 4 are referred to by the same letters to facilitate comparison. The last-mentioned arrangement, Fig. 4, being the simpler of the two, I shall proceed to describe it first. When the tension of the wire increases, for example, in one part $W^n W^m$, thus risking its breakage at that place, the regulating friction-roller p^n, corresponding to that part and fixed on a suitable lever L^n, changes its position to p'^n, (being drawn over by the tightened wire,) so that the lever L^n comes into the dotted position L'^n and M′ into the dotted position M'^n, pressing thus more strongly on the belt or cord driving the pulleys b^n and g^n. As the cooling-pulley g^n increases in speed, the tension at $W^m W^n$ instantaneously diminishes. The reverse effect is produced when the part $W^m W^n$ is too slack. A spring r^n bringing the lever $L^n M^n$ back again, the speed of the pulley g^n diminishes and the tension of $W^m W^n$ is brought back to its normal value. In Fig. 3 the lever L^n, instead of pressing upon the strap direct, acts by its oscillations upon a second lever l^n, to which it is connected by a flexible link, such as a cord, a chain, a leather strap, a spring, &c. Should the wire be submitted to an excessive strain at $W^m W^n$, L^n will pass on to L'^n and l^n to l'^n, thereby producing the required pressure upon the strap or band. A spring r^n carries the levers L^n and l^n back in the opposite direction, if it be found that the tension of the spring at $W^m W^n$ is insufficient. It will, therefore, be seen that the mode of operation is identical in both the arrangements, Figs. 3 and 4. Either of them insures an instantaneous and smooth action of the wire upon the speed-regulator, thus fulfilling the requirements indicated above, and rendering the control of speed effective and valuable in practice.

Each of the regulating systems p L p^2 L^2 p^3 L^3, &c., operates in the same manner, and a uniform tension is obtained constantly in the whole length of the wire, thus almost completely avoiding the breakage of the wire which is under operation.

When the wire is very regular, and especially in case of fine wire, the oscillations of the regulating-levers become almost nominal, and regulating by hand can be substituted for the automatic regulators, which are operated when the machine is set in motion in the same manner—that is to say, in bringing the pressure on the belts or cords to the required degree, for example—by the management of a simple screw-nut operating on a lever which presses on the belts. In this case the regulating friction-rollers p' p^2 p^3 are suppressed and replaced by simple guide-pulleys, as P′ P^2 P^3.

When no automatic regulation is required, the arrangement of the machine can be modified, as shown in Figs. 5, 6, and 7. In this case the guide-rollers P′ P^2 P^3 and regulating friction-rollers p' p^2 p^3 are not required. The horizontal shafts carrying the cooling-pulleys g' g^2 g^3 are all placed so as to make, with the direction of the driving-shaft X X, an angle of less than ninety degrees. Hand-regulators acting in this case on half-crossed belts may be placed on this machine according to the same principle as on the machine shown by Figs. 1 to 4.

I claim—

1. In a machine for drawing wire, the combination with the series of draw-plates and the series of cooling pulleys alternating with said draw plates, of a common drive shaft, belts and pulleys forming connecting gearing directly between the shaft and cooling pulleys, independent belt tighteners controlled by the wire passing between the cooling pulleys and draw plates, and cooperating with the said belts to control the speed of the pulleys, whereby the speed may be varied instantaneously from zero to the maximum, and vice versa, substantially as described.

2. In a machine for drawing wire, the combination with the series of draw plates and alternating cooling pulleys, of a common drive shaft, belts and pulleys forming connecting gearing directly between the drive shaft and each cooling pulley and a belt tightener moved by variations in the tension of the wire adjacent each pulley, whereby the speed of said pulleys may be varied instantaneously from minimum to maximum, and vice versa and the tension throughout the machine maintained; substantially as described.

3. In a machine for drawing wire, the combination with the series of draw plates, and alternating cooling pulleys around which the wire passes from the draw plates, of a common drive shaft belting directly uniting the drive shaft and cooling pulleys, independent belt tighteners, belts and pulleys forming connecting gearing one for each pulley for varying instantaneously the speed of the corresponding pulley from zero to the maximum or vice versa, and an operating lever for each of said tighteners having a pulley thereon around which the wire from the cooling pulley controlled thereby passes, substantially as described.

In witness whereof I have hereto set my hand in the presence of the two subscribing witnesses.

JEAN MARIE BUISSON.

Witnesses:

COUNILLE BIÉTRIX,

GEO. D. FAIRFIELD.