June 27, 1933. C. H. EARNSHAW 1,915,722

WIRE DRAWING MACHINE

Filed Sept. 11, 1930 3 Sheets-Sheet 1

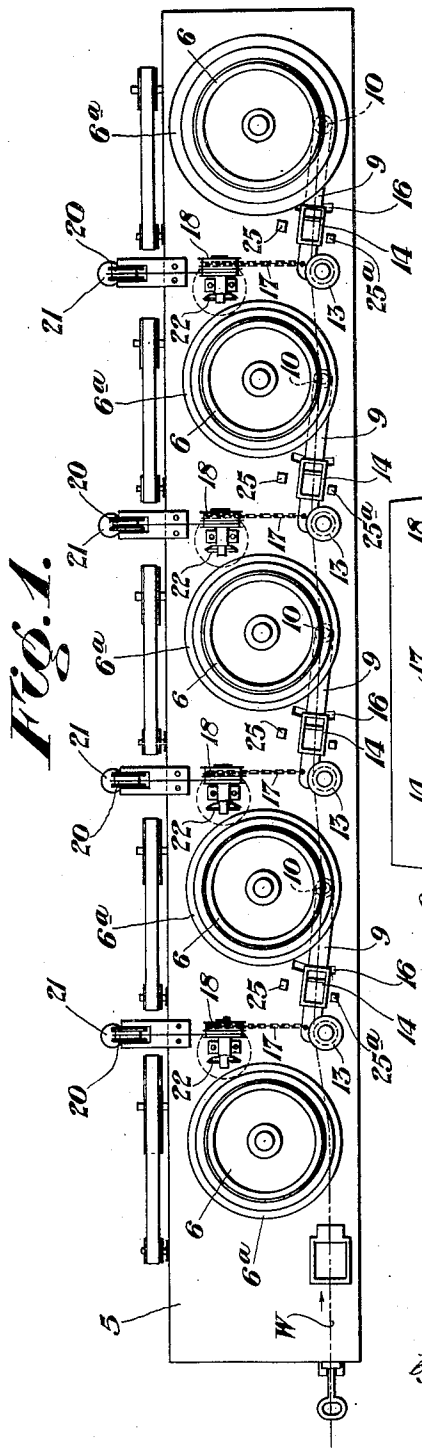


Fig. 1.

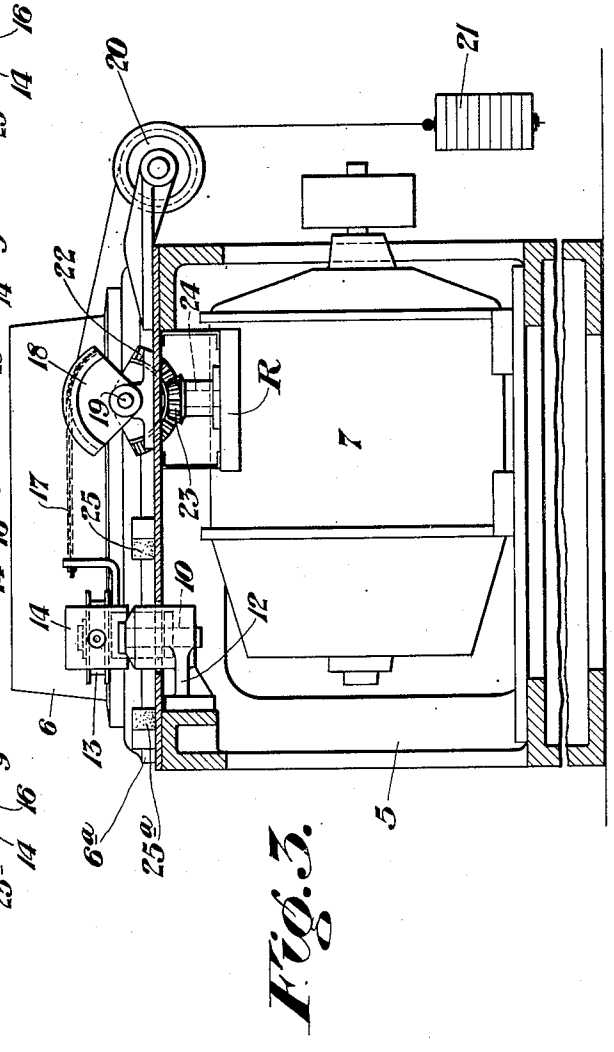


Fig. 3.

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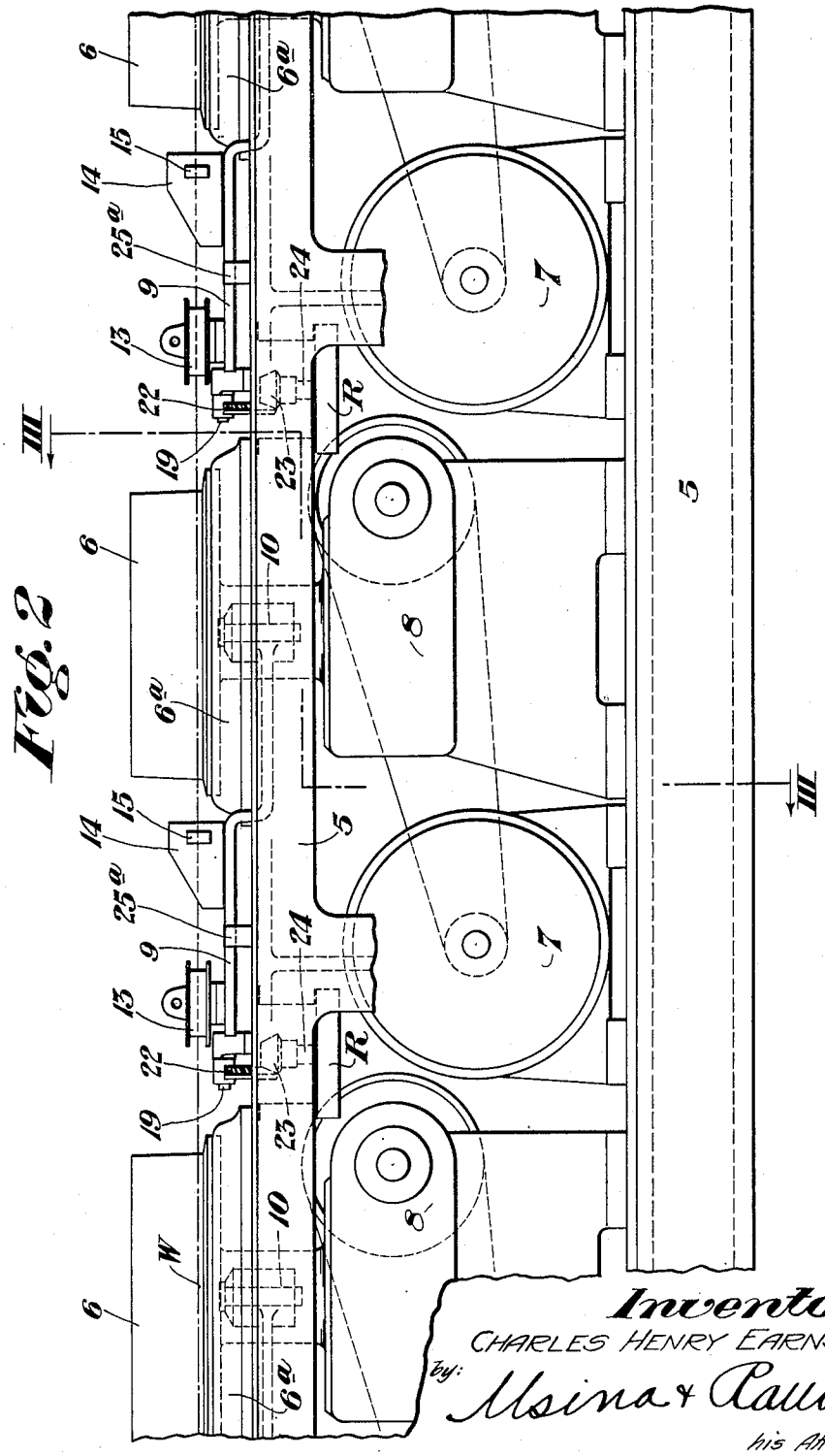


Fig. 2

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WIRE DRAWING MACHINE

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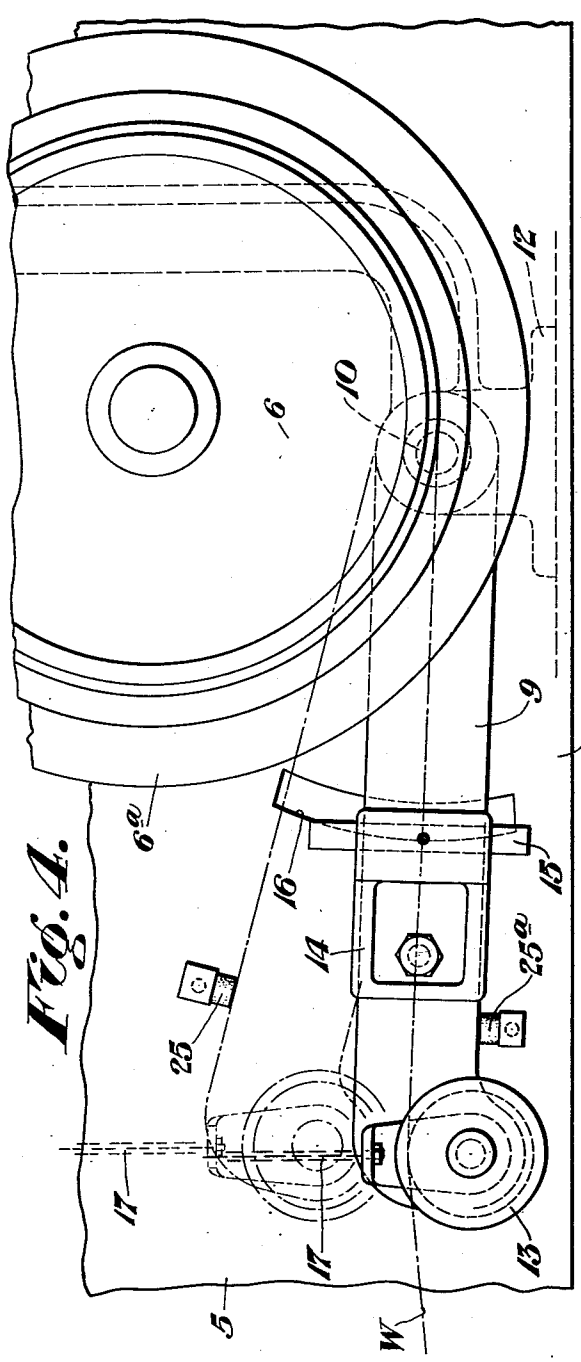


Fig. 4.

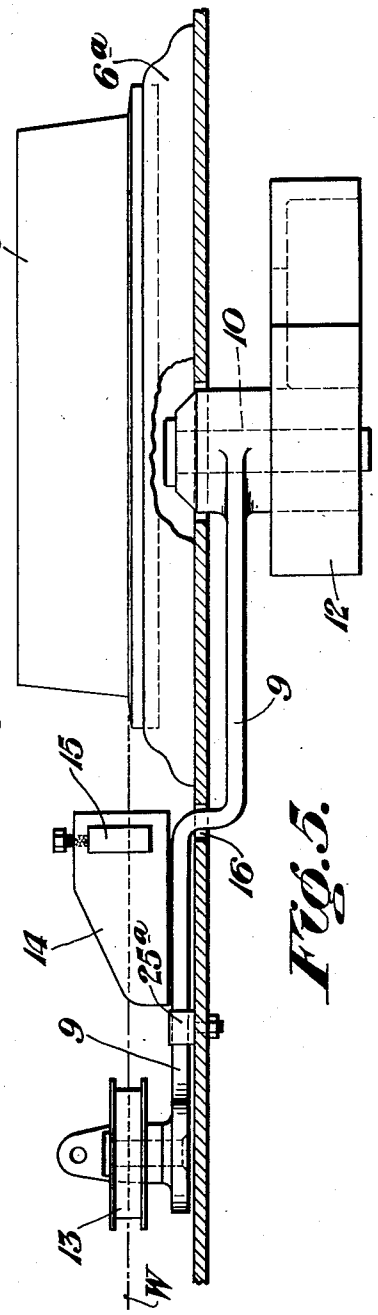


Fig. 5.

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UNITED STATES PATENT OFFICE

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WIRE DRAWING MACHINE

Application filed September 11, 1930. Serial No. 481,294.

This invention relates to wire drawing machines and is particularly, but not necessarily, adapted to wire drawing machines of the continuous type wherein compensating devices are used for varying the speeds of the drawing drums or blocks in accordance with the reduction in diameter and increase in length of the wire as the drawing operation progresses. In machines of this type, if the drawing drums, at any instant, are not rotating at a given ratio of speed, the lengths of wire between the successive drums veers from a straight line and bends just before passing through the die sufficiently to produce sharp bends or kinks which are detrimental to the wire.

An object of the present invention, therefore, is to provide a particular type of die-holding mechanism whereby the bending or kinking action above referred to is effectively eliminated.

Another object of the invention is to provide a simple and effective type of speed-control means for the wire drawing drums in conjunction with the die-holding mechanism.

With the foregoing and other objects and advantages in view, the invention consists in the preferred construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

In the drawings:—

Figures 1 and 2 are, respectively, broken views in plan and side elevation of a wire drawing machine embodying the features of the invention;

Fig. 3 is a view in end elevation thereof; and

Figs. 4 and 5 are, respectively, enlarged detail views in plan and side elevation of the die-holding mechanism shown mounted in operative relation with a wire-drawing block.

The machine illustrated is of the continuous type in which means are provided for varying the speed of rotation of the wire drawing drums or blocks as the wire or rod is gradually reduced in cross-sectional diameter, each block being separately driven in the instance shown by an electric motor whose speed is controlled by means such as a rheostat, diagrammatically illustrated at R.

The reference numeral 5 generally designates the frame of the machine, having rotatably mounted thereon the usual wire drawing drums or blocks 6, which are independently driven by electric motors 7 through the medium of interposed gearing as at 8. An annular guard member or ring 6^a is mounted on the deck of the machine around each drum 6, to prevent lime, dust and the like from falling onto the parts below.

A feature of the invention resides in a method of mounting the die whereby the wire line from a given point through the die and onto the drawing drum is maintained perfectly straight and tangent to the periphery of the drum. This die-mounting structure will now be described.

An arm 9, note particularly Figs. 4 and 5, is pivotally mounted at one extremity as at 10 in a bearing bracket 12, which may be secured to the top frame structure or deck of the machine. The pivotal axis of this arm 9 is preferably located so that it is tangent with the periphery or wire-drawing surface of the drawing drum 6.

The opposite extremity of the arm 9 has a guide sheave or pulley 13 rotatably mounted thereon. This swinging arm 9 also has mounted thereon the die box or carrier 14 which carries the die 15, the wire, indicated at W, passing over the sheave 13, then through the die 15 and onto the periphery of the drawing drum 6. The die carrier 14 is shown as being pivotally mounted, to facilitate the stringing operation, the die being easily swung outwardly when the wire is pulled through the die to be attached to the pincers, as will be understood. The deck or top frame portion of the machine is slotted at 16 and the lever 9 has movement in said slot.

The speed control mechanism for the drawing drums which operates in conjunction with the die holding structure will now be described.

The swinging extremity of the arm 9 has connected thereto to the one end of a chain or analogous flexible member 17, which is passed over a segmental gear 18, note Fig. 3, keyed on a gear shaft 19, and then over a

sheave or pulley 20, and has attached to its opposite end a counter-weight 21. The shaft 19 also has keyed thereon a segmental bevel gear 22 in mesh with a bevel pinion 23 which is secured on a stub shaft 24, the latter being connected to or forming part of the rheostat-control arm for the rheostat R.

Adjustable stop members 25 and 25*a* are mounted on the deck of the machine on each side of the arm 9, to adjustably define the speed range of the driving motors 6.

The operation of the machine will be obvious from the foregoing description and drawings. The wire W is passed over the guide sheaves 13, through the dies 15 and attached to the pincers of the drums 6. Should the wire have a tendency to slacken and bend or accumulate in front of the die between the drums, the counterweighted extremity of the arm 9 will be permitted to swing and through chain 17, gears 18, 22 and 23 operate the control rheostat R, speeding up the motor of the succeeding drum and compensating for the slack. In no instance, however, will the wire veer from a straight line between the pulley or sheave 13, through the die 15 and onto the drum 6, and this line will always be tangent to the periphery of the drum, thus effectively eliminating any chance of sharp bends or kinks occurring in the wire due to bending of the latter just before passing through the die.

What is claimed as new is:—

1. In a rod or wire drawing machine, a plurality of wire drawing blocks, a motor for rotating each of said blocks, individual rheostats for regulating the speed of each of said motors, arms pivotally mounted adjacent each of said blocks, said arms having a pivotal axis tangent with the wire drawing surface of the block adjacent which it is pivoted, a die carried by each of said arms, a guide sheave on each of said arms on the entering side of the die, said dies having their openings substantially in alinement with the wire contacting surfaces of the guide sheave on the arm and the adjacent block, means for normally urging said arms in one direction of their movement, said means including a counterweight for each of said arms, flexible members forming a connection between the respective counterweights and arms, means for limiting the movement of said arms, a control arm on each of said rheostats and means including segmental gears operable by the movement of said flexible members forming the connections between said counterweights and said arms for operating said control arms on the rheostats to control the speed of said motors for operating said blocks, each rheostat and its operating guide sheave and intermediate connections serving to control the speed of the motor for the next succeeding block.

2. In a rod or wire drawing machine, at least one drawing block, a motor for rotating said block, a rheostat for regulating the speed of said motor, an arm pivotally mounted adjacent said block and swinging in a path transverse to the line of travel of the wire being drawn, said arm having its pivotal axis tangent with the wire drawing surface of the block, a die carried by said arm, a guide sheave on said arm on the entering side of the die, said die having its opening substantially in alinement with the wire contacting surfaces of the guide sheave on the arm and the block, means for normally urging said arm in one direction of its movement to take up slack in the wire being drawn, said means including a counterweight and a flexible member forming a connection between said counterweight and said arm, a control arm on said rheostat and means including a segmental gear operable by the movement of said flexible member forming the connection between said counterweight and said arm for operating said control arm on said rheostat to control the speed of said motor for operating said block.

In testimony whereof, I have hereunto set my hand.

CHARLES H. EARNSHAW.