

H. L. THOMPSON.
WIRE DRAWING MACHINE.
APPLICATION FILED MAR. 11, 1904.

935,564.

Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

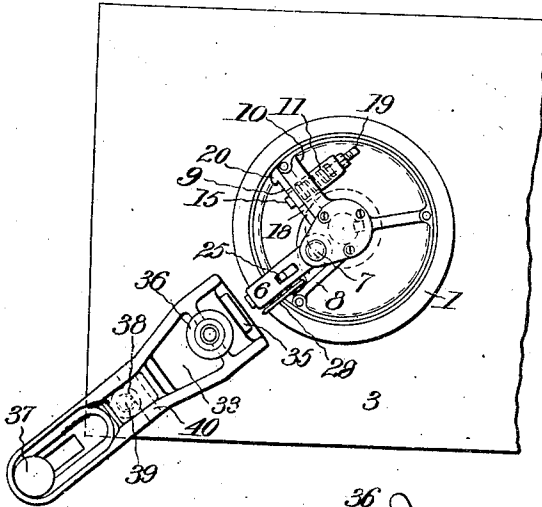


Fig. 3.

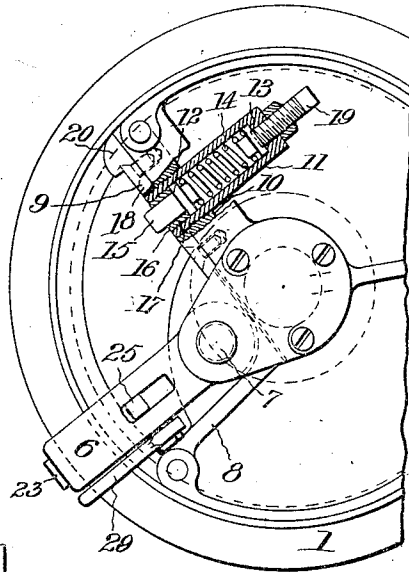


Fig. 2.

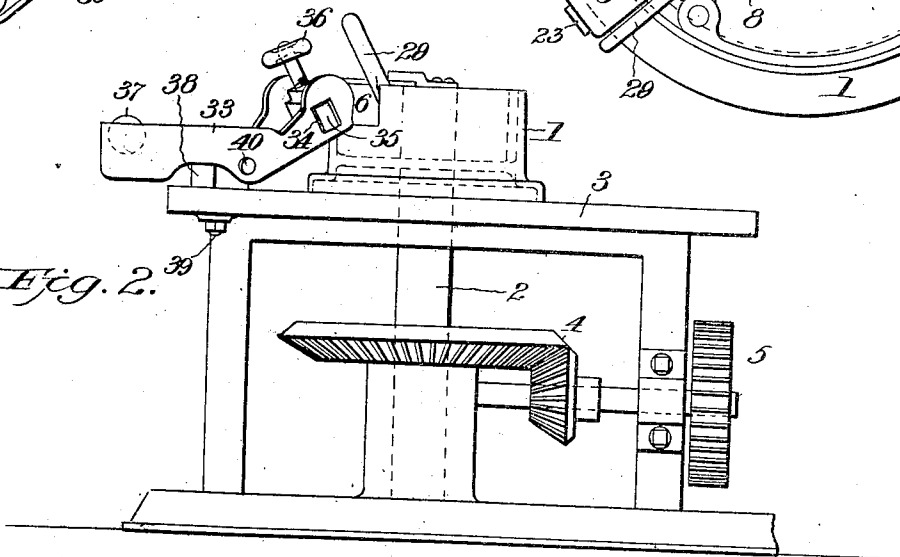
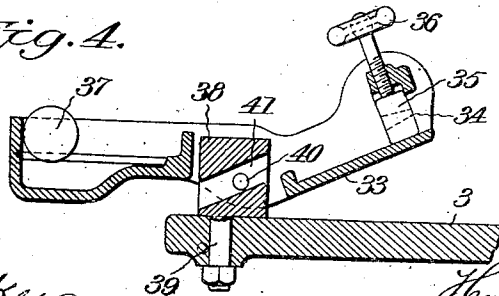


Fig. 4.



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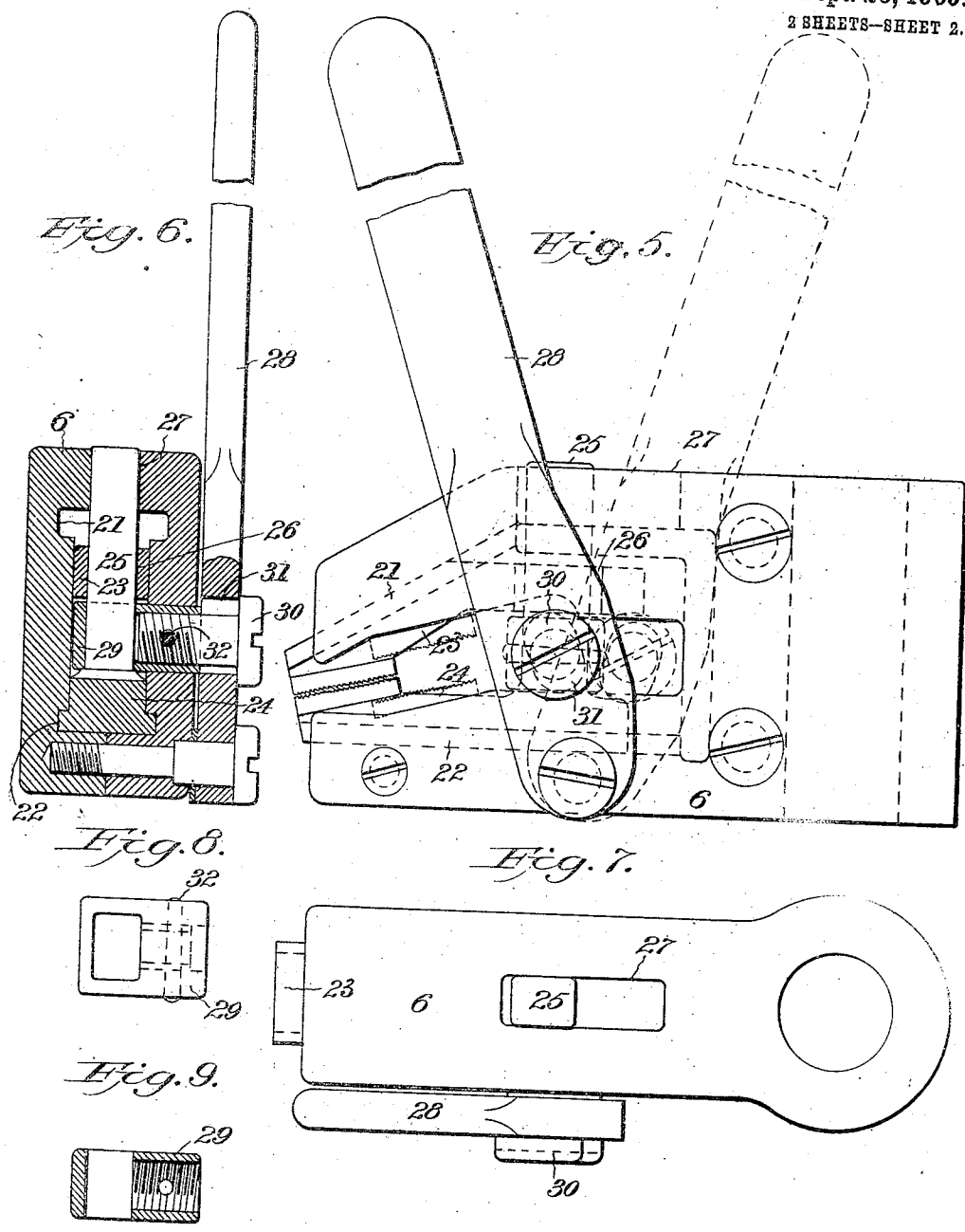
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UNITED STATES PATENT OFFICE.

HUGH L. THOMPSON, OF WATERBURY, CONNECTICUT.

WIRE-DRAWING MACHINE.

935,564.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed March 11, 1904. Serial No. 197,698.

To all whom it may concern:

Be it known that I, HUGH L. THOMPSON, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Wire-Drawing Machines, of which the following is a full, clear, and exact description.

My invention relates to improvements in wire drawing devices. My object being to provide improved means for connecting the wire directly with the rotary drawing block, without the necessity of the employment of a separate draw-out attachment and also so that said block may be started at its maximum speed of rotation, while the wire drawing operation shall have a relatively slow beginning, increasing gradually until it reaches the maximum velocity. By this means the shock of starting is eliminated, or so greatly reduced that the speed of starting the wire drawing machine may be materially increased.

In wire drawing machines commonly in use, the shock of starting, and the consequent strain on the wire, are important factors in the limit of the initial speed of the machine, and consequently affect the total output of the machine. It consequently follows that by providing means whereby the machine may be started at once at its maximum speed without a shock or jar to the wire, the efficiency and total output of the machine are greatly increased.

My invention also comprises means whereby the block shall start with a minimum resistance exerted by wire; said resistance or work being gradually increased as the block moves through the first ninety degrees or more of its rotation, so that the danger of snapping the wire by starting the block at its maximum speed is overcome by an extremely simple, durable and efficient mechanism. As a minimum power is required for starting the block at full speed of rotation, it follows that the greatest total efficiency is thus secured for such mechanism.

I am aware that attempts have been made to provide means for the gradual starting of the block's rotation by changeable gears, friction devices and the like. It has been attempted to provide means for gradually increasing the speed of the wire drawing operation by a one-speed block, by means of link chains and cams and the like; but so far as I am aware these methods have been more or

less complicated, cumbersome and unsatisfactory. It has been my object to attain the desired results by the simplest and most substantial mechanism possible. That is, a mechanism comprising the fewest possible parts and said parts of a heavy and durable construction.

My invention comprises improvements in the die holder mechanism and also in other details of construction.

As a convenient embodiment of my invention I provide a block having a sector-shaped recess in its face, and a gripping member, or vise, pivotally secured in said recess, having the axis of its rotation near the axis of rotation of the block and extending, in its initial position, radially from said axis of rotation of the block. In this position the gripping member may project beyond the periphery of the block so that the end of the wire to be drawn shall be secured thereto. As the block rotates, the gripping member travels through the sector-shaped recess assuming a somewhat withdrawn position, as to its outer end, so as to lay the wire upon the periphery of the block.

My invention also comprises means for preserving a sufficient curve between the gripping device and the periphery of the block. I also provide means for neutralizing the impact between the gripping member and the margin of the sector-shaped recess, to prevent jar to the wire, when the gripping member reaches the limit of its travel in the sector-shaped recess.

I accomplish my object by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a plan view of my wire drawing mechanism. Fig. 2 is a side elevation of same on an enlarged scale. Fig. 3 is a fragmentary plan view of the block showing the spring buffer mechanism section. Fig. 4 is a vertical section of the die holder mechanism. Fig. 5 is a side elevation of the gripping member, or vise on an enlarged scale. Fig. 6 is a vertical cross-section of same. Fig. 7 is a plan view of same. Fig. 8 is a plan view of member 29 and Fig. 9 is a vertical section of same.

Similar numerals refer to similar parts throughout the several views.

The block.—Referring to Figs. 1 and 2, the rotating block is mounted upon a spindle which is driven in any suitable way, gears

4, for instance, being shown in Fig. 2. The block 1 is provided with a sector-shaped recess in its upper face to receive the gripping member 6, which is pivotally secured at 7, to the block mechanism, near its axis of rotation. Said gripping member or vise 6 is so mounted as to lie when in the initial position radially with respect to said block, and to have a relative movement through an arc of approximately ninety degrees. The said relative movement of the vise is limited in one direction by the wall 8 of said recess, and in the other direction by the wall 9. When the end of the wire is secured between the jaws 23 and 24 of the vise, in the specific mechanism illustrated, the block is rotated in the counterclockwise direction, while the member 6 remains in nearly stationary position until it comes into engagement with the wall 9. It is also to be noted that, in the initial position, member 6 projects slightly beyond the periphery of the block, as shown in Figs. 1 and 3; and in this position, the point of wire connection with the vise, the axis of pivot 7, and the axis of the block 2 are all in alinement. It will also be noted that wall 8 is shorter than wall 9 and the location of pivot 7 is such that when the wall 9 has come into engagement with gripping member 6, the gripping member has been withdrawn so as to lie entirely within the circumference of the block. To wall 9, I also provide the rounded lug 20 which projects over the end of gripping member 6, when the same is in contact with said wall 9, so as to prevent the wire being laid upon the block by the gripping member 6, at too sharp an angle; that is, so as to secure a sufficient curve of the wire from the gripping member to the periphery of the block to prevent danger of breaking said wire.

It may sometimes be desirable to relieve the impact between vise member 6 and wall 9. For this purpose I provide a buffer 15, spring pressed in the usual way, the spring 14 being seated in the cylinder 11 and having means of adjustment comprising the screw 19 and lock-nut cooperating therewith. Any other suitable spring means for easing the engagement between member 6 and wall 9 may obviously be used with similar results.

Vise.—Various forms of vise or gripping device may be employed. My preferred form being shown most clearly in Figs. 5, 6, 7 and 8, in which the serrated jaw members 23 and 24 are seated in the convergent T-shaped grooves 21 and 22 of member 6. To jaw member 24 is connected the post 25, extending vertically therefrom and within the vertical slot 27, of member 6, and also through a vertical opening in jaw member 23. To this post 25 is secured an operating lever 28 by means of the coupling 29 and screw 30, secured thereto, which projects

through slot 31 in member 6. This lever 29 is pivotally secured at its lower extremity to the outside of member 6. By this construction it is obvious that by the movement of the lever to the left as shown in solid lines in Fig. 5, the jaws 23 and 24 are brought together, to secure the wire. By the movement to the right, into position shown by dotted lines in Fig. 5, the jaws are drawn apart to release the wire. It will also be noted that the arrangement and proportions of the various elements of this gripping mechanism, especially the inclination of the ways for the jaws, and the length of the lever 28 as compared with the distance between its fulcrum and the pivot connection 30, afford an extremely efficient gripper or vise, which is especially important for a very gradual start of the wire drawing operation.

Die holder.—My preferred form of die holder is shown in Figs. 1, 2 and 4. The die 35 is of the usual form and is secured in the die seat 34 of holder member 33. The hand operated screw 36 is for securing the same in position. This die holder is secured to member 38 by the trunnions 40, while the swivel member 38 is secured to the framework of the machine by the vertical post 39, so that it will be seen the die holder has a two-way pivotal or universal movement, to enable the die to assume the desired position with respect to the direction of the wire being drawn. This die holder 33 may be counterbalanced as by the ball 37, or by any other suitable means, to maintain the die normally in the desired initial position. The swivel member 38 is also provided with an incline opening or passage way 41, to permit the wire to pass there-through to the die 35. This also tends to preserve the die member in the desired position with respect to the direction of the wire.

Operation.—In operation the several parts are brought into the initial position as shown in Fig. 1, that is to say, the gripping member or vise 6 is brought into position against the wall 8 of the sector-shaped recess in the block. It is also brought into alinement with the pivot 39 of the die holder and the die holder is brought into alinement with the die in line between the axes of the die holder and of the block, that is all the parts are arranged in alinement radially with respect to the block. The wire having been pointed by swaging, this point is threaded into the die 35 as far as it will go and the projecting point is then secured firmly between the jaws of the vise in the manner above described. The block is then started off full speed by any suitable clutch mechanism between it and the source of power. In the device illustrated in the drawings for example, the block is adapted to move in a

counterclockwise direction, and during nearly the first quarter of the block's rotation there is an extremely slight movement of the vise relatively to the die. The beginning of this movement is almost imperceptible. The movement of the wire through the die, secured by this slight movement of the vise, during the first quarter of revolution of the block, is amply sufficient to start the metal flowing, so that it is ready to take the full maximum peripheral speed of the block, by the time the vise reaches the wall 9 and lays the wire on the block's periphery. It will be understood, from an inspection of Fig. 1, that, as the block moves through approximately its first quarter revolution, the die holder and vise will remain in alinement, and in position substantially radial with respect to the block, the vise moving slightly away from the die as its pivot 7 travels in the arc of a small circle around the axis of the block. No matter what the initial maximum speed of the block, it follows that, in view of the initial slight movement of the vise it is practically impossible to communicate any shock or jar to the wire which will cause its breaking. This radial or zero start therefore makes possible the starting of the block at maximum initial speed of rotation, without endangering the wire. This obviously also greatly reduces the resistance to the starting of the block at maximum speed.

What I claim is:—

1. The combination of a rotary wire block, a vise movably connected therewith, a die and a movable support therefor, the parts so proportioned and arranged that the drawing of the wire shall start with the die holder and vise in a position radial to the axis of the block.

2. The combination of a rotary wire block, a vise movably connected therewith, a die and a movable support therefor, the parts so proportioned and arranged as to secure the beginning of the wire drawing operation with the die holder and vise in a position radial to the axis of the block.

3. The combination of a rotary wire block, a wire gripping means movably connected therewith, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

4. The combination of a rotary wire block, a vise movably connected therewith close to the axis of the block, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

5. The combination of a rotary wire block, a wire gripping means movably connected therewith, a hand lever for controlling the

gripping elements, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

6. The combination of a rotary wire block, a wire gripping means movably connected therewith, power multiplying means for controlling the gripping elements, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

7. The combination of a rotary wire block, a vise movably connected therewith, a stop for limiting the relative movement between vise and block, a die and movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

8. The combination of a rotary wire block, a vise movably connected therewith, a stop for limiting the relative movement between vise and block, spring means for gradual engagement between vise and stop, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

9. The combination of a rotary wire block, a vise movably connected therewith adapted to project beyond the periphery of the block in its initial position and afterward to be withdrawn within said periphery, a die and a movable support therefor, the parts so proportioned and arranged that the drawing operation of the wire shall begin with the wire directed substantially radially to the block.

10. In a wire drawing device, the combination of a rotatable block having a sector-shaped recess, a gripping member located therein pivoted to the block nearer the axis than the circumference thereof and a die for cooperating therewith.

11. In a wire drawing device, the combination of a rotatable block, a gripping member pivoted to the block nearer the axis than the circumference thereof and so as to swing in an arc about said pivotal attachment, a die member for cooperating therewith, and means for limiting the independent rotative movement of the gripping member with respect to the block after the block has traveled from its initial position through approximately ninety degrees of rotation.

12. In a wire drawing device, the combination of a rotatable block, a gripping member pivoted to said block close to its axis of rotation and so as to swing in an arc about said pivotal attachment, means for limiting the independent pivotal movement between

- the gripping member and the block, and a pivotally supported die member for cooperating therewith, the said block, gripping member and die member being so proportioned and positioned relatively as to require a rotative movement of the block through approximately one hundred and forty degrees before the maximum speed of wire drawing is attained.
13. In a wire drawing device, the combination of a rotatable block, gripping means pivotally secured thereto, a die and cooperating die supporting means comprising a trunnion member having a vertical axis of movement, and a die holder secured thereto having a horizontal axis of movement, the trunnion member provided with a channel in the direction of a line through the axis of the trunnions and the die.
14. In a wire drawing device, the combination of a rotatable block, a gripping member pivotally secured thereto provided with convergent ways, cooperating jaws slidably seated in said ways, a post having operative connection with said jaws and a hand lever pivoted at its lower extension to said member and having operative relationship with said post.
15. In a wire drawing device, the combination of a rotatable block, a gripping member pivotally secured thereto and provided with a recess having convergent ways, cooperating slidable jaws seated in said ways, a post or lug projecting from one jaw having slidable engagement with the other jaw, and a hand lever pivoted to said gripping member and having operative relationship with said post or lug.
16. The combination with a rotary wire drawing block, having a drawing face on its periphery, of a vise pivoted directly to the block and arranged to turn on its pivot, so that the holding faces of the jaws will take a radial position with reference to the block and swing to carry the wire onto the drawing face, a die, a die holder pivoted at a point more remote from the block than the die to allow the die holder to move from a line with the opening of the die, directed substantially toward the axial line of the block to a line tangential to the periphery of the block.
17. The combination in a wire drawing machine of a rotary block, having a drawing face on its periphery, a vise pivoted on the block and located at one side of the drawing face, and arranged to have the gripping jaws swing to the radial line of the block, a die and die-holder pivoted at a point to swing from a line, with the axis of the die directed toward the axis of the block and the vise, to a position with the axis of the die directed tangential to the block and the drawing face.
18. The combination in a wire drawing machine of a rotary block, having a drawing face on its periphery, a vise pivoted directly on the block and located at one side of the drawing face and arranged to have the gripping jaws swing to the radial line of and project beyond the face of the block and swing to carry the wire onto the periphery of the block, a die and a die-holder pivoted to swing from a point with the die contiguous to, and in line with the jaws when in radial position, to a point with the axial line of the die directed tangentially on the drawing face of the block.
19. In a wire drawing machine, the combination of a rotary drawing block, having a vise pivoted directly thereon to swing to a radial position, with reference to the block, and swing to carry the wire onto the periphery of the block, a die and a die-holder arranged to permit a movement of the die from a position contiguous to, and in line with the vise, when in radial position, to a line directed tangentially on the periphery of the block.
20. The combination in a wire drawing machine of a rotary drawing block, a vise pivoted directly on the block between the circumference and the axis of the block and adapted to swing to carry the wire onto the periphery of the block, and a swinging die-holder, all three arranged so that the axis of the block, the pivot of the vise and the opening of the die may be brought into the same line.
- In testimony whereof I have hereunto set my hand this 9th day of March A. D. 1904.
- HUGH L. THOMPSON.
- Witnesses:
CAROLINE S. CHURCH,
WILLIS M. HALL.