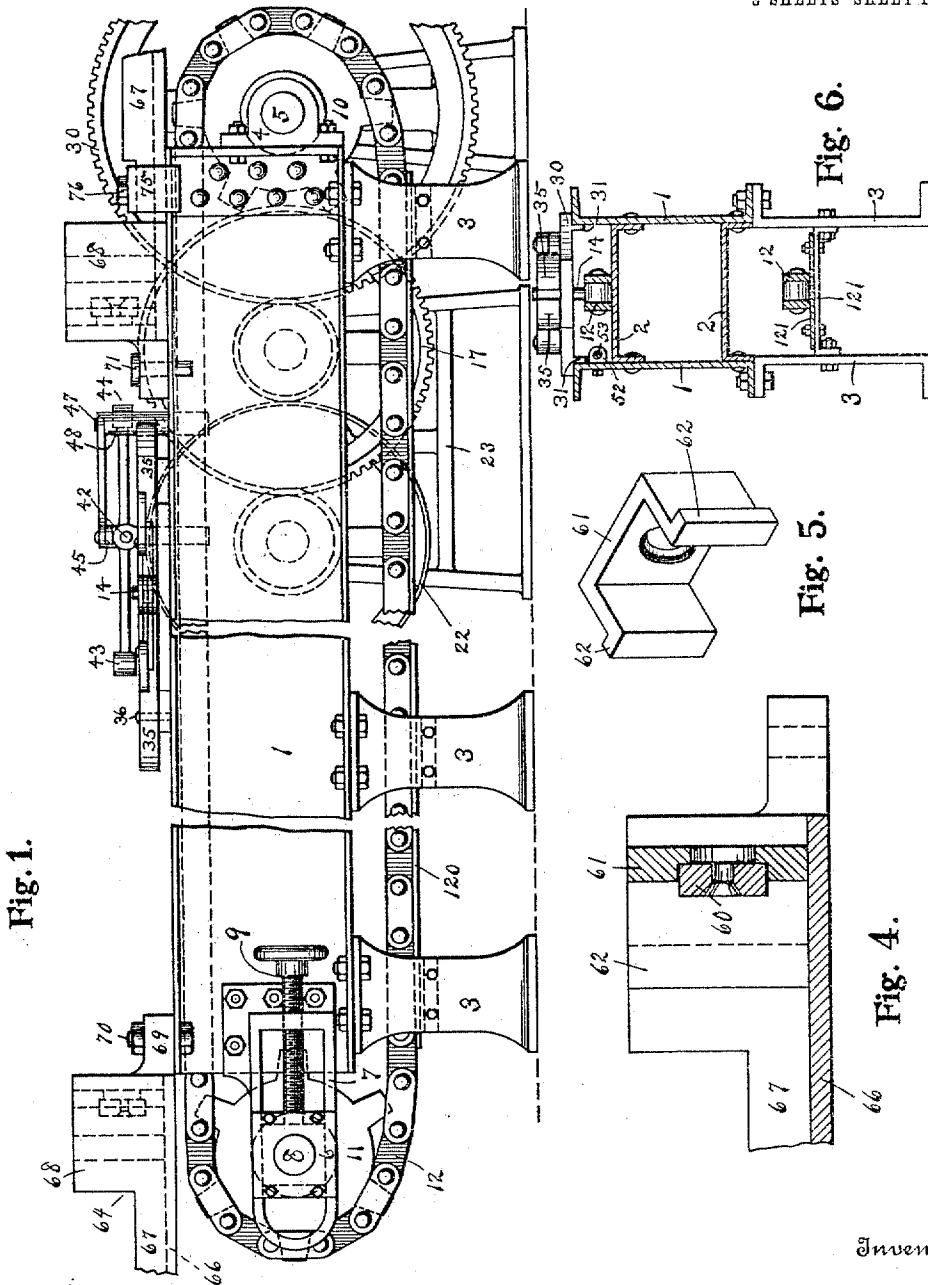


C. J. PERRY.
DRAWING MACHINE.
APPLICATION FILED MAR. 18, 1910.

981,304.

Patented Jan. 10, 1911.

3 SHEETS—SHEET 1.



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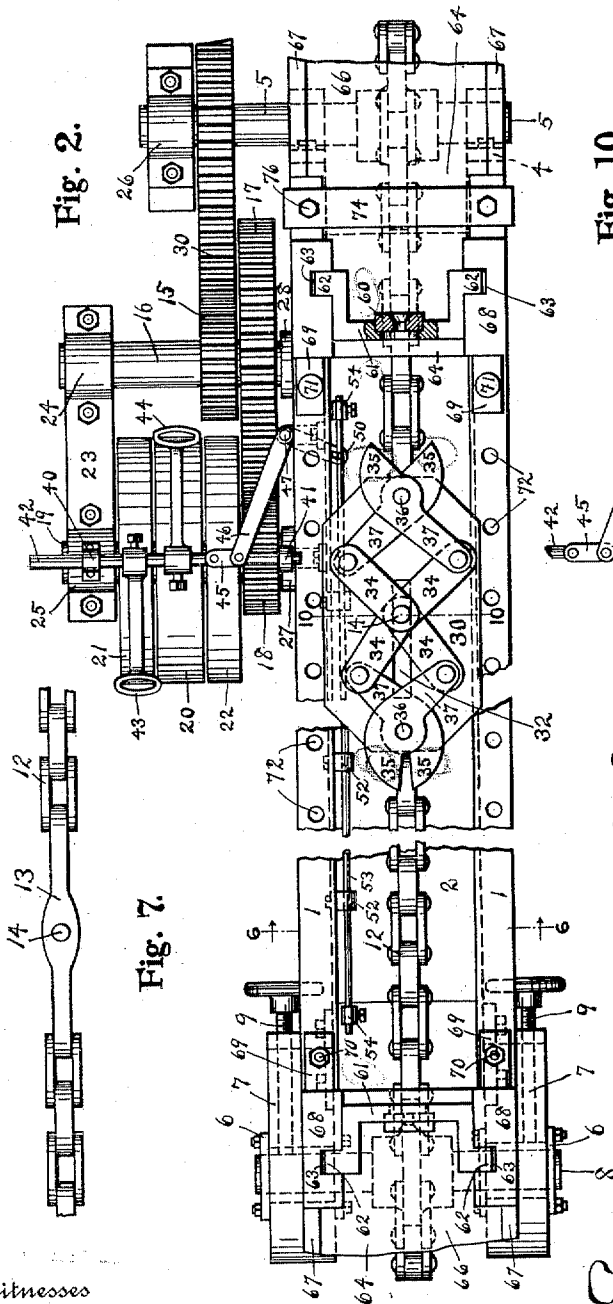


Fig. 2.



Fig. 7.

Fig. 10.

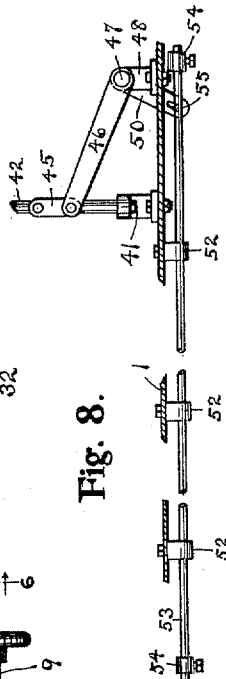


Fig. 8.

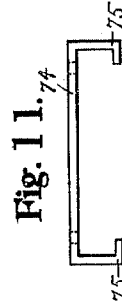


Fig. 11.

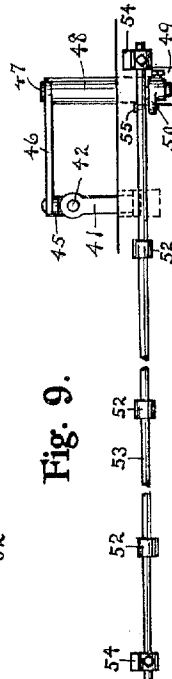


Fig. 9.

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3 SHEETS-SHEET 3.

Fig. 3.

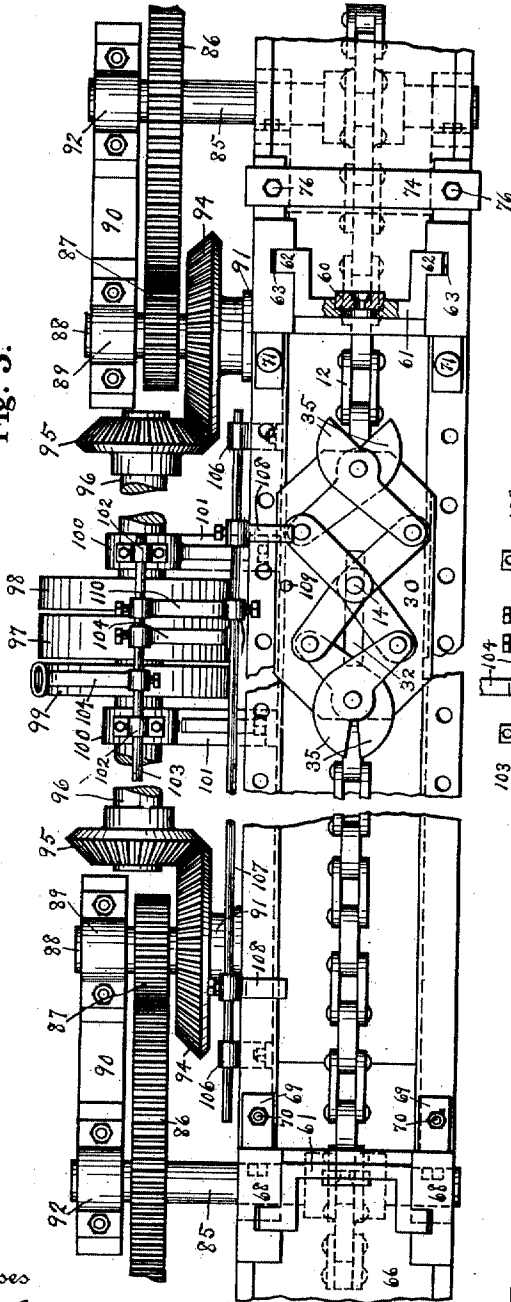
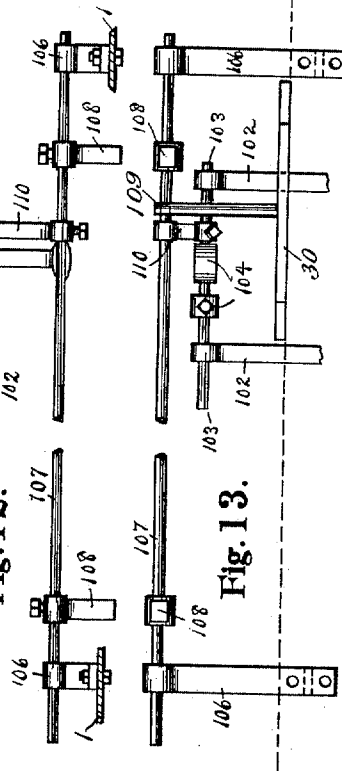


Fig. 12.



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UNITED STATES PATENT OFFICE.

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DRAWING-MACHINE.

981,304.

Specification of Letters Patent.

Patented Jan. 10, 1911.

Application filed March 18, 1910. Serial No. 550,203.

To all whom it may concern:

Be it known that I, CHARLES J. PERRY, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Drawing-Machine, of which the following is a specification.

This invention relates to machines for reducing the diameters of tubes and rods by drawing the same through dies, and the object of my improvements is to provide automatically-reversing machines which shall be adapted to draw a tube or rod through the dies at each stroke, which machine shall be powerful, simple and easily operated.

In the accompanying drawings, Figure 1 is an elevation of one type of my improved drawing-machine. Fig. 2 is a plan of the same. Fig. 3 is a plan of a slightly modified type of this machine. Fig. 4 is a vertical cross section of the drawing-die and the head for the same. Fig. 5 is a perspective view of the die-chuck. Fig. 6 is a vertical cross section on the lines 6—6 of Fig. 2. Fig. 7 is a plan of a portion of the main chain. Fig. 8 is a plan of the reversing mechanism of the machine shown in Figs. 1 and 2. Fig. 9 is an elevation of the same. Fig. 10 is a vertical cross section on the line 10—10 of Fig. 2. Fig. 11 is an elevation of the clamp for holding an adjustable drawing-die head. Fig. 12 is a plan of the reversing mechanism of the machine shown in Fig. 3. Fig. 13 is an elevation of the same.

Similar reference characters refer to like parts throughout the several views.

This construction comprises a heavy frame, preferably of steel beams, legs to support the same, sprocket wheels at each end of the frame, a sprocket chain of great strength passing around the wheels, a powerful driving mechanism for the sprocket wheels, reversing means for the driving mechanism so that the chain can be caused to run in opposite directions, and a duplex gripping device for engaging the tubes or rods, which gripping device is connected to the chain and moves backward and forward between the dies.

The frame may be of any desired construction, but is preferably formed with channel bars 1, separated and connected by other channel bars 2, all supported by legs 3. In Fig. 1, the bearings 4 at the right end carry the main driving shaft 5, while the bearings

6 at the left end are adjustable in guides 7 and carry the tail-shaft 8. The chain is held at a proper tension by means of the screw 9. Sprocket wheels 10 and 11 are secured to the shafts 5 and 8 respectively, and on them is mounted a chain 12 which has a long intermediate link 13 from which a pin 14 projects upwardly.

Secured on the shaft 5 is a main driving gear 30 which meshes with the pinion 15 secured to the shaft 16. A gear 17 secured to this shaft meshes with a pinion 18 secured to the shaft 19, to which shaft is also secured a tight pulley 20, and on which shaft are mounted the oppositely-running loose pulleys 21 and 22. A frame 23 supports the bearing 24 for the shaft 16, and bearing 25 for the shaft 19. A bearing 26 supports the outer end of the shaft 5, a bearing 27 may be secured to the frame to carry the inner end of the shaft 19, and a similar bearing 28 to carry the inner end of the shaft 16.

Slidable to and fro on the top of the side beams 1 is a plate 30 having downwardly extending guide flanges 31. This plate has a slot 32 through which the pin 14 on the bar 13 of the chain extends, which pin extends through holes in the inner ends of the links 34 of the toggle mechanism of the jaws 35. These jaws are pivoted on the pins 36 projecting upward from the plate 30 and have rear arms 37 which connect to the links 34. When the pin 14 moves to the right end of the slot, as shown in Fig. 2, the jaws at the left end of the plate will close and the jaws at the right end of the plate will open, while a movement of this pin toward the left end of the slot 32 will close the jaws at the right end and open those at the left end of that plate.

Upwardly extending from the bearing 25 and projecting upward from the side of the frame are guides 40 and 41 shown in Figs. 2, 8 and 9. Mounted in these guides 40 and 41 is a slidable rod 42 to which are connected the belt shifters 43 and 44. A link 45 connects to this rod 42 and to the crank arm 46 mounted on the upper end of the vertical shaft 47, which shaft is mounted in the bearing 48 secured to the side of the frame. The side channel of the frame has an opening 49 through which a crank arm 50 extends, which crank arm is secured to the lower end of the shaft 47. At proper intervals along the inside of the frame are secured the blocks 52 in which is slidable a

rod 53 which has secured to it the collars 54. A pin 55 on this rod extends through a slot in the arm 50. These collars 54 project upward into the path of the adjacent flange 31 on the plate 30 and will be engaged by the same near each end of its stroke.

Any desired drawing-die 60 may be employed with this drawing-machine. As the capacity of the machine depends upon the time required for each operation, the distance between the dies should be no longer than necessary and adjustable by the operators. The die 60 is preferably mounted in a removable chuck 61, having lateral flanges 62 adapted to slide down in grooves 63 in the uprights 68 of the heads 64. These heads may be provided with flat aprons 66 and upwardly extending sides 67. Lugs 69 projecting inward from these uprights may be secured to the frame by means of the bolts 70.

If the head is to be movable, pins 71 adapted to fit in holes 72 in the flanges of the channel beams 1 may be employed instead of the bolts 70. When the pins 71 are pulled out, the head can be shifted to any position on the frame. For the purpose of holding down the rear end of the movable head, a clamp 74 having jaws 75 extending down around the upper flanges of the channels 1 may be employed. Bolts 76 hold this clamp in position. The size of the frames will depend entirely upon the dimensions of the tubes or rods to be drawn and will usually be from twenty-four feet upward in length.

The operation of the machine is as follows: Two operators are desirable with this machine, one standing at each end. The articles to be reduced are placed with ends lying on the aprons 66, the diameters of these being reduced sufficiently in any desirable manner to extend through the holes in the dies 60. The collar 54 at the right end of the machine (Fig. 2) will be so positioned that the jaws 35 will approach the chuck 61 at that end sufficiently close to grasp the end of the rod or tube when they close at the beginning of the reverse movement of the driving mechanism. If desired, a knob 78 (Fig. 10) may project upward from each pin 36 so that it can be grasped by the operator and moved toward the die in order to cause the jaws to immediately grasp the end of the rod or tube. When the jaws move away from the die, firmly grasping the end of a rod or tube, the rod or tube will be drawn through the die, reducing its diameter. Just as the full stroke has been completed, the flange 31 will engage the collar 54 at the left end of the machine and carry the rod 53 with it, swinging the crank-arm 46 outward and shifting one belt from the tight pulley onto the loose pulley 21 and the oppositely running belt

from the loose pulley 22 onto the tight pulley 20 to the positions shown in Fig. 2 thus causing the chain to reverse its movement and travel in the opposite direction. Just at the beginning of this movement in the opposite direction, the rod or tube which has been drawn through the die is released and can be lifted off the machine by the operator who placed it in position. The operator then takes up another rod or tube and shoves its reduced end through the die ready to be grasped by the jaws 35 when they are again closed through the reverse action of the chain. The form of the gripping faces of the jaws will depend upon the work to be done.

In the construction just described, the shaft 8 and the sprocket wheel 11 serve as an idler, and when the jaws are moving to the left in Fig. 1, the lower side of the chain is pulling around this idler 11. To avoid this very heavy strain, a double driving mechanism, such as shown in Fig. 3, may be employed. The plate 30, the jaws 35, the chain 12 and its sprocket wheels will be the same as just described as will also the dies 60, the chucks 61 and the heads. At each end of the frame will be mounted a shaft 85, similar to the shaft 5 in the other form of machine. To each shaft 85 is secured a gear wheel 86 which meshes with a pinion 87 on the shaft 88. This shaft 88 is mounted in the bearing 89 carried by the frame 90 and the bearing 91 secured to the frame. A bearing 92 on the frame 90 supports the outer end of the shaft 85. A beveled gear 94 secured to the shaft 88 meshes with the beveled pinion 95 secured to the shaft 96. On this shaft 96 is secured a tight pulley 97 and are mounted the loose pulleys 98 and 99. The shaft 96 is mounted in any suitable bearings 100 carried in brackets 101 connected to the main frame of the machine. Slidable in small brackets 102 which project upwardly from the bearings 100, is a shaft or rod 103, to which are connected the arms 104 for shifting the oppositely running belts. Mounted in sleeves 106 projecting from the side of a channel beam 1, is a rod 107 which has connected to it the arms 108 which extend into the path of the pin 109 projecting upwardly from the plate 30, and the arm 110 also connected to the rod 103.

The parts are shown in such position that the plate 30 will be moving toward the right. When the pin 109 strikes the arm 108 on the right end of the rod 107, said rod will be moved toward the right and both belts will be shifted, one from the pulley 97 to the loose pulley 98, while the oppositely running belt will be shifted from the loose pulley 99 to the tight pulley 97, resulting in a reverse movement of the driving mechanism, a closing of the jaws 35 at the

right end of the plate 30, an opening of the other jaws, and a movement of the plate 30 to the left until the pin 109 engages the other arm 108 and again causes a reversing of the mechanism.

When the mechanism shown in Fig. 3 is employed, the length of the chain 12 becomes immaterial, although for convenience the ends should connect underneath the machine. In the construction shown in Figs. 1 and 2 however, the chain should be quite tight, and for that reason the adjustable bearings 6 are desirable. To support the chain beneath the frame, a longitudinal extending plate 120 carried by brackets 121, between the legs 3, may be employed. Many changes in the construction and proportions of the machine may be made within the scope of the appended claims without departing from the spirit of my invention. The reversing device shown is one commonly used on machine tools and any other desired device may be employed to control the driving mechanism for moving the jaw-carrying plate backward and forward along the top of the frame. The type of chain shown may be replaced by any other jaw moving device of sufficient strength to do the work.

Having now explained my improvement what I claim to be my invention and desire to secure by Letters Patent is:—

1. In a drawing-machine, the combination of a frame, a jaw-carrier slidable thereon, a pair of jaws mounted at each end of the carrier, means to move the jaws and jaw-carrier back and forth along the top of the frame, a drawing-die mounted on the frame at each end of the path of the jaw carrier, and automatically-reversible driving mechanism for the movable parts.

2. In a drawing-machine, the combination of a frame, a jaw-carrying plate slidable thereon, a pair of jaws pivotally mounted at each end of the plate, a chain mounted in the frame below the plate, a pin projecting upward from the chain through a slot in said plate, toggle-links connecting the pin and the jaws, actuating gears for the chain, and an automatically-reversible driving mechanism for turning the gears.

3. In a drawing-machine, the combination of a frame, a die-carrier and die rigidly connected to one end of said frame, a movable die-carrier and die also mounted on said frame, a jaw-carrying plate slidable on said frame between the die-carriers, a chain mounted in the frame below said plate, automatically-reversible driving mechanism for pulling the chain back and forth, a pin projecting upward from said chain through a slot in said plate, pairs of jaws pivotally

mounted on said plate, and toggle-links connecting said pairs of jaws and the pin on said chain.

4. In a drawing-machine, the combination of a frame comprising parallel beams and legs to support the same, bearings mounted at the ends of the frame, horizontal shafts mounted in the bearings, sprocket wheels mounted on said shafts, a chain running over said wheels, an automatically-reversible driving mechanism for said chain, a jaw-carrier connected to said chain, jaws mounted on said carrier, and a drawing-die mounted on said frame at each end of the path of said jaw-carrier.

5. In a drawing-machine, the combination of a frame comprising parallel beams and legs to support the same, bearings mounted at the ends of the frame, horizontal shafts mounted in the bearings, sprocket wheels mounted on the shafts, a chain running over said wheels, a plate slidably mounted on the frame, a pin projecting upward from said chain through a longitudinal slot in said plate, a pair of jaws pivoted to each end of the plate, each jaw having an inwardly extending arm, a toggle-link connecting the inner end of each arm to said pin on the chain whereby the pair of jaws at the rear end of the plate when in motion will be closed and the pair at the front end will be opened, a drawing-die, die-chuck and die-head mounted on the frame at each end of the path of the plate, and automatically-reversible driving means for said chain.

6. In a drawing-machine, the combination of a frame, a horizontal revoluble shaft mounted at each end of the frame, a sprocket wheel mounted on each shaft, a chain connected to said wheels, an automatically-reversible driving mechanism for said shafts, a plate slidable on said frame, jaws mounted at each end of said plate, connections between the plate and jaws and said chain, and dies mounted on the frame at the ends of the path of said plate.

7. In a drawing-machine, the combination of a frame, a chain mounted within the frame, reversible means to drive said chain, a plate slidable on said frame, a pair of jaws pivoted to each end of said plate, and connections between the jaws and chain whereby the movement of the chain opens and closes the jaws.

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

CHARLES J. PERRY.

Witnesses:

EDWARD N. PAGELSEN,
J. H. DOUGHERTY.