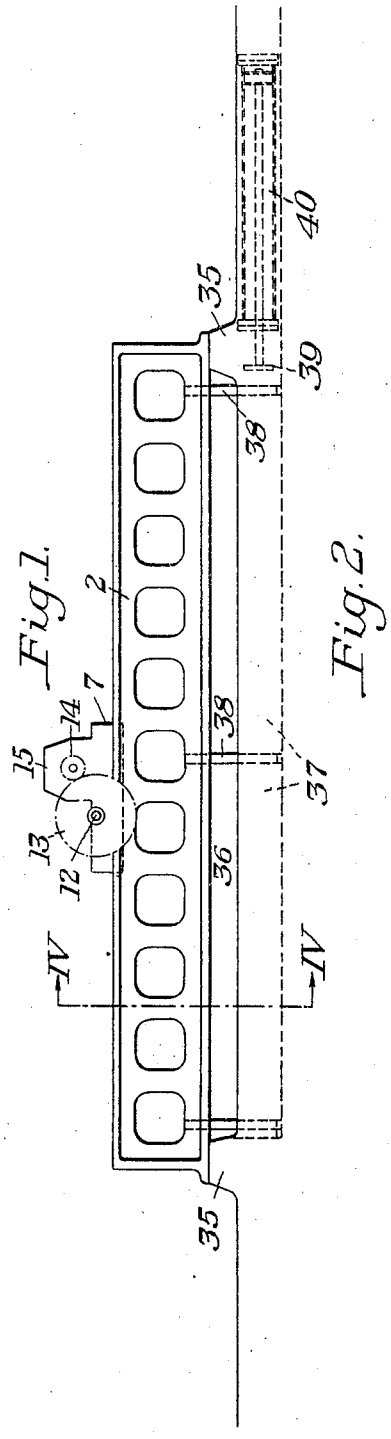
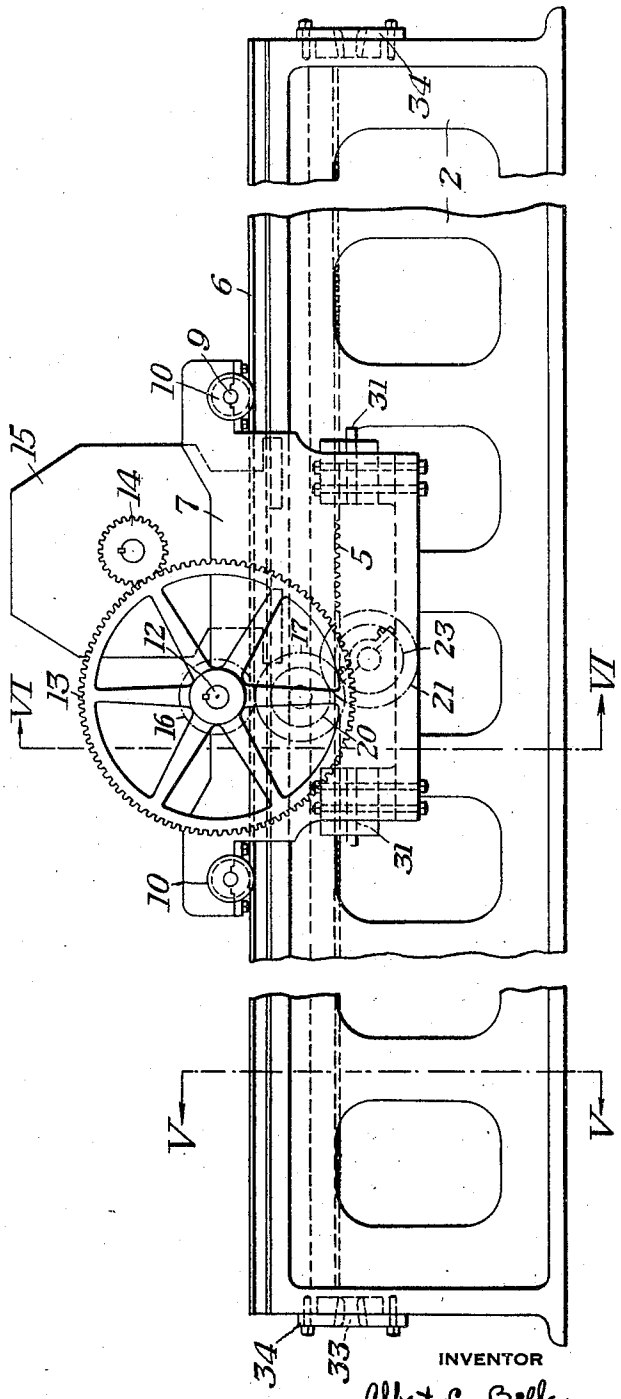
June 17, 1930. A. C. BELLES 1,765,047

DRAWING MACHINE

Filed Sept. 8, 1926 3 Sheets-Sheet 1





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DRAWING MACHINE

Filed Sept. 8, 1926 3 Sheets-Sheet 2

Fig. 3.

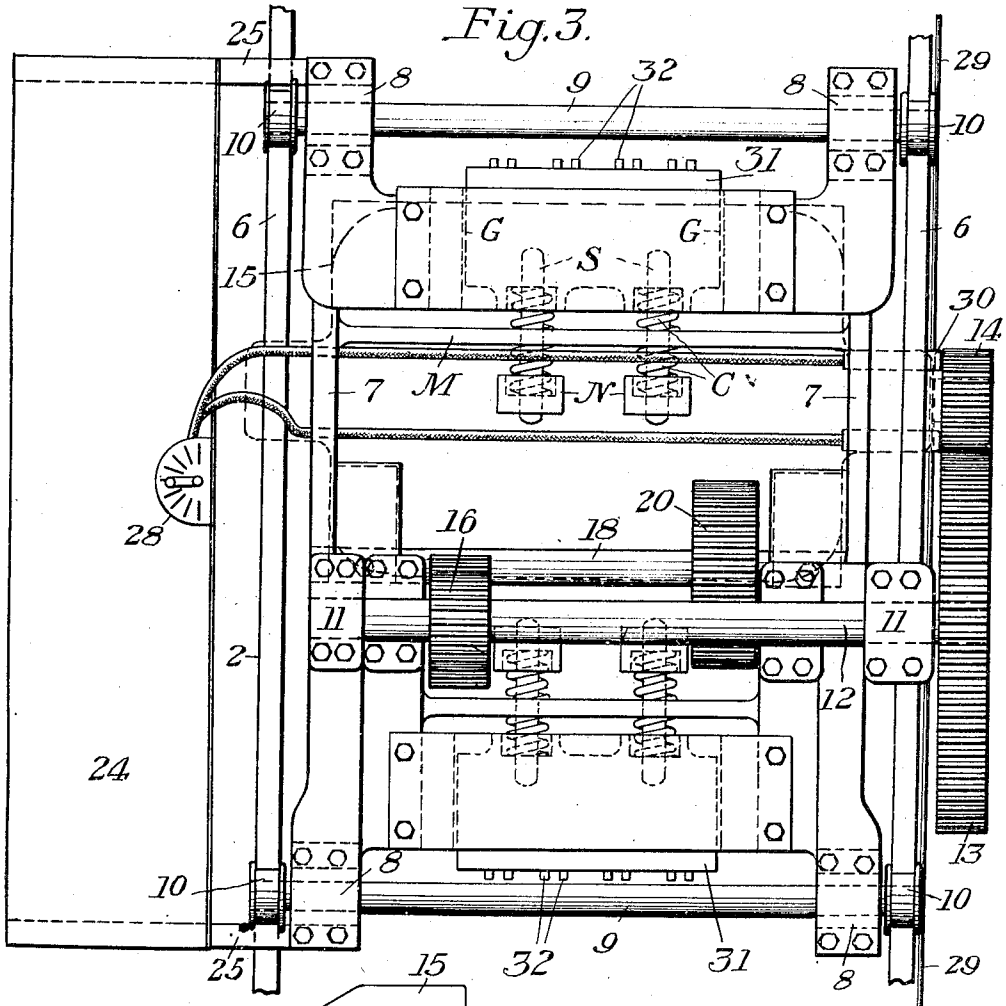
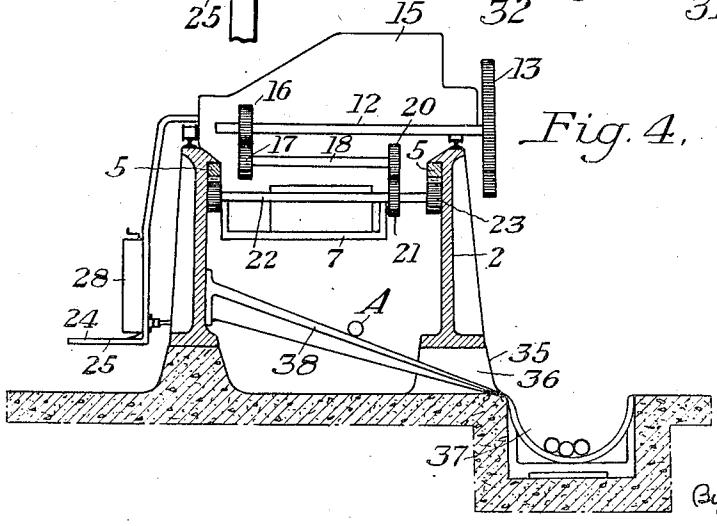


Fig. 4.



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DRAWING MACHINE

Filed Sept. 8, 1926 3 Sheets-Sheet 3

Fig. 6.

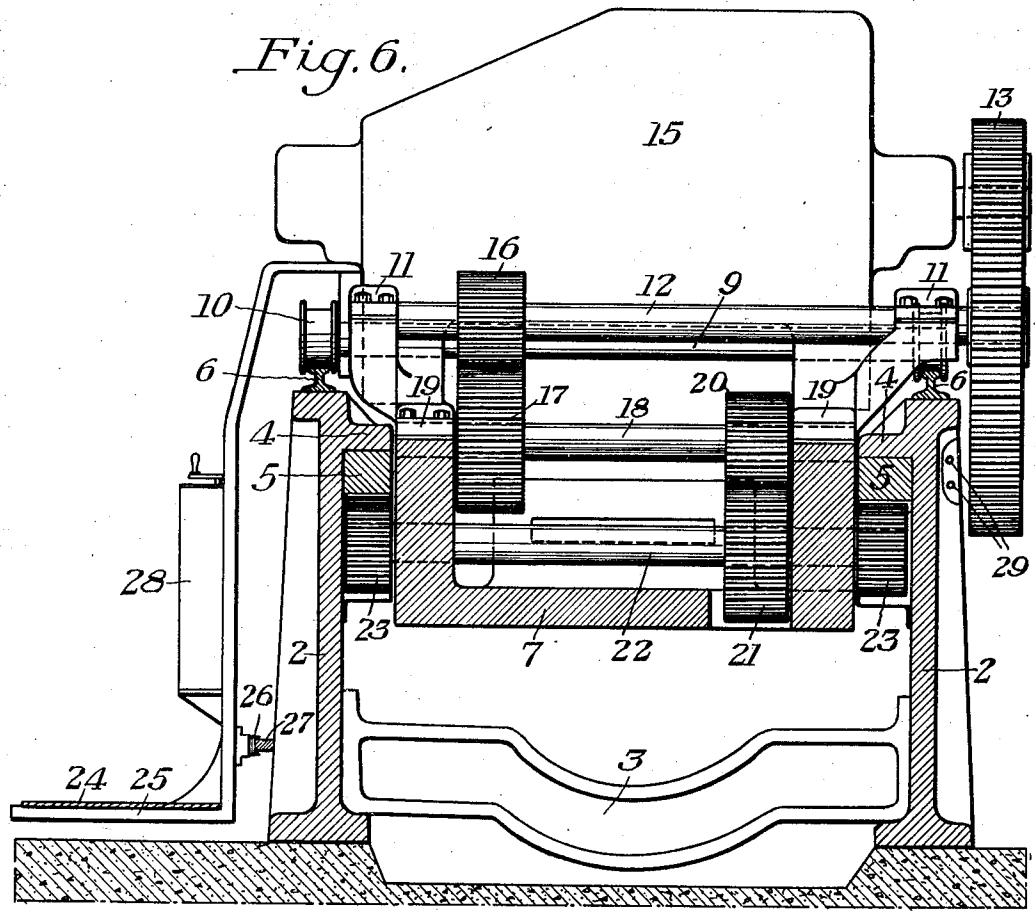
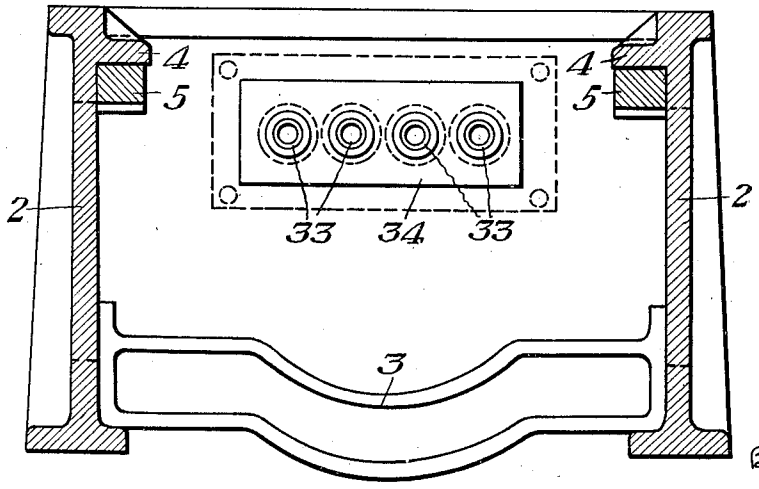


Fig. 5.



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UNITED STATES PATENT OFFICE

ALBERT C. BELLES, OF NEW BRIGHTON, PENNSYLVANIA, ASSIGNOR TO UNION DRAWN STEEL COMPANY, OF BEAVER FALLS, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

DRAWING MACHINE

Application filed September 8, 1926. Serial No. 134,179.

The present invention relates broadly to metal working machines and more particularly to machines of this character suitable for the drawing of metallic rods, bars or other shapes as well understood in the art.

At the present time it is customary in the art to which the present invention relates to provide drawing machines of a number of different types, a large number of commercial machines embodying a draw chain continuously travelling in the same direction. I have found that constructions embodying chains are objectionable from a number of standpoints which it is one of the objects of the present invention to overcome.

With most chain installations a considerable amount of floor space is required and the capacity of such machines limited. The chains develop slack during use, and even when tight have a slight tendency to buckle or kink when subjected to the drawing load. With carriages as ordinarily utilized this buckling has not infrequently resulted in non-uniform drawing and die wear. The present invention provides a machine occupying a minimum amount of floor space and effective for uniformly drawing articles.

Another object of the present invention is to provide a drawing machine of maximum capacity, effective for drawing in opposite directions. While it has heretofore been proposed to provide reversible chain installations wherein the carriage controls the reversal of the parts, such machines have not been altogether satisfactory due not only to the inherent objections to the use of a chain, but also because of the necessity with a given setting of the apparatus of drawing only articles having substantially the same length. In accordance with the present invention the travel of the carriage is variable throughout the capacity of the machine, the control thereof being effected by an operator carried by the carriage so as to be able at all times to carefully watch and control its operation.

A further object of the invention is to provided a self propelled drawing carriage, positively guided, movable in opposite directions, and including an operator's platform.

A still further object of the invention is to provide improved means for the discharge of drawn articles together with means for equalizing the ends thereof.

In the accompanying drawings there is shown for purposes of illustration only, a preferred embodiment of my invention, it being undestrood that the drawings do not define the limits of my invention, as changes in the construction and operation disclosed therein may be made without departing either from the spirit of my invention or the scope of my broader claims.

In the drawings:

Figure 1 is a diagrammatic side elevational view of a drawing machine installation embodying the invention;

Figure 2 is a side elevational view, on an enlarged scale and partly broken away, of the drawing machine itself;

Figure 3 is a top plan view of a portion of the drawing machine showing the carriage and its associated parts, the motor being indicated in outline only;

Figure 4 is a transverse sectional view on the line IV—IV of Figure 1 looking in the direction of the arrows;

Figure 5 is a transverse sectional view on the line V—V of Figure 2 looking in the direction of the arrows; and

Figure 6 is a transverse sectional view on the line VI—VI of Figure 2 looking in the direction of the arrows.

In carrying out the present invention there may be provided a suitable supporting frame of any desired construction, preferably comprising side members 2 tied together adjacent the ends only by transverse braces 3 as shown in Figures 5 and 6. This leaves the space between the side members substantially unobstructed throughout the length of the machine, thereby facilitating the discharge of the drawn articles as will be hereinafter more fully described.

Adjacent the upper edges of the side members they are provided with inwardly projecting flanges 4 below which there are received rack bars 5. Mounted upon the upper edges of the side members are guiding and supporting rails 6.

Adapted to travel between the side members on the rails 6 is a carriage 7 having bearings 8 adjacent each end for the axle shafts 9 carrying the flanged supporting and guiding wheels 10. At its intermediate portion the carriage is provided with bearings 11 for a shaft 12, this shaft having secured to one end thereof a gear 13 with which meshes the pinion 14 on the armature shaft of a driving motor 15. On its opposite end the shaft 12 carries a gear 16 meshing with a similar gear 17 on an intermediate shaft 18 journaled in bearings 19. This intermediate shaft carries a gear 20 meshing with a gear 21 on the pinion shaft 22. The pinion shaft extends transversely of the carriage and through the sides thereof in such manner that its ends underlie the rack bars 5, the ends carrying pinions 23 which continuously mesh with the teeth of the rack bars.

It will be apparent to those skilled in the art that the motor 15 is itself mounted directly on the carriage 7 so that the carriage constitutes a self propelled unit. Such a construction has been found highly desirable as it makes it unnecessary to provide any projecting power shafts or driving pulleys which not only require considerable room but also materially increase the hazards incident to operation. The carriage also supports an operator's platform 24 preferably suspended at one side of the carriage on suitable brackets 25. These brackets may each be provided with a guide roller 26 adapted to cooperate with a rail 27 extending lengthwise of one of the side members for giving increased rigidity to the platform during its travel.

Conveniently located relative to the platform is a controller 28 connected to the motor 15 in known manner, and receiving current from power cables 29 through contact shoes 30. This construction enables an operator to travel continuously with the carriage and control its operations whereby the amount of travel and the direction thereof may be varied at will.

Since a reversible carriage is desired, a direct current reversible mill type motor is preferably used, as this obviates the necessity of any special reversing gearing. Each end of the carriage is provided with a gripper 31 of suitable construction in substantially the plane of the racks and having the respective pairs of gripping jaws 32 so located as to extend in accurate alinement with the dies 33 in die blocks 34 one of which is secured to each end of the machine frame. By reason of this construction the carriage is effective upon movement in one direction for drawing articles through one set of dies, the operator being in complete control throughout of the carriage movement. In the opposite direction the carriage draws articles through the dies in the die block on the opposite end of the machine. The accuracy of alinement between the grippers and the dies is continuously maintained during the entire operation by the combination of the wheels 10 and the pinions 23. These prevent any possibility of tilting or twisting of the carriage and insure uniformity of drawing of successive articles as well as uniformity of wear of the dies. This uniformity has not been possible with chain type drawing machines in which the grippers have been carried by the chain so as to be influenced by each change in its path of travel, or by machines in which the carriage has not been so supported and guided as to prevent any possibility of deviation from a predetermined path of travel.

The gripper 31 is preferably maintained against lateral motion by suitable guiding portions G. Drawing force is preferably transmitted to the gripper 31 by a yielding connection which absorbs the shocks incidental to starting and stopping the draw. Suitable studs S passing through a cross member M secured to the carriage 7, are fastened to the gripper 31, and yieldingly secure the gripper 31 to the member M through opposed coil springs C which encircle the studs S. Nuts N at the outer ends of the studs may be used to apply sufficient compressive force to the opposed springs to hold the gripper and nuts N free of the member M, thereby permitting motion of the gripper 31 in either direction relative to the member M. Thus I provide for absorbing longitudinal shocks which may arise when starting or terminating the draw.

As clearly illustrated in Figures 1 and 4 of the drawings, the side members are preferably supported on piers 35 located adjacent opposite ends of at least one of the side members to provide an unobstructed discharge opening 36 between the piers and below such side member. Formed adjacent the machine to receive drawn articles through the discharge opening is a pit 37, the articles A being guided into the pit as they are released from the grippers, by means of inclined guides 38 suitably supported by one of the side members and extending transversely between the same and terminating adjacent one edge of the pit.

It is desirable from a practical standpoint to even up or equalize the ends of the drawn articles. As the pit provides effective supporting and alining means for the articles, I preferably provide a ram 39 adjacent one end of the machine and in line with the pit, the ram being operated in any convenient manner as by a fluid pressure cylinder 40. The ram may be periodically operated to engage the ends of the articles and properly position the same with respect to lengthwise projection.

Certain advantages of the present machine arise from the provision of a drawing ma-

chine having a self propelled carriage, and particularly from a carriage of this type supporting an operator's platform.

Other advantages of the invention arise from the use of a reversible drawing means, preferably in the form of a self propelled carriage, so guided that deflection from a predetermined accurate path of travel is made impossible. By reason of such a construction the capacity of the machine is increased as an idle between is not necessary, and the quality of the articles is improved and absolute uniformity together with uniform die wear is insured.

Further advantages arise from the construction of the machine and manner of supporting the same whereby drawn articles may be easily discharged therefrom and laterally relatively thereto.

Still further advantages of the invention arise from the provision of means for evening up or equalizing the ends of the drawn articles.

I claim:

1. In a drawing machine, a supporting frame having two parallel side members, transverse brace members connecting the side members to each other and spaced apart a distance equal to the length of the longest article to be drawn, a guide on the upper portion of each of the side members, a rack on each side member below the guide thereon, a carriage supported on the guides between the racks and extending below the racks, a transverse shaft on the carriage below the racks, a gear on each end of the shaft on the exterior of the carriage and below the racks, each of said gears meshing with the teeth of one of the racks, a motor on the carriage, gearing connecting the motor and said shaft for moving the carriage, a die support connected to the side members of the frame in substantially the plane of the racks, and a gripper on the carriage in line with a die when mounted in the die support.

2. In a drawing machine, a supporting frame having two parallel side members, transverse brace members connecting the side members to each other and spaced apart a distance equal to the length of the longest article to be drawn, a guide on the upper portion of each of the side members, piers for supporting one of the side members, said piers being spaced apart a distance equal to the length of the longest article to be drawn, a carriage supported on the guides, a rack on each side member parallel with and below the guides, a transverse shaft on the carriage, gears on the shaft below the racks meshing with the racks, a motor on the carriage, gearing connecting the shaft and motor, means for supporting a die on the frame between the side members in substantially the plane of the racks, and a gripper on the carriage in line with a die when held by the die supporting means.

In testimony whereof I have hereunto set my hand.

ALBERT C. BELLES.