To all whom it may concern:

Be it known that I, Chester Prouty, a citizen of the United States, residing at Ridgway, in the county of Elk and State of Pennsylvania, have invented certain new and useful Improvements in Metal-Rolling Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in machines for rolling and shaping metal; and its objects are to provide means for readily adjusting one or more of the housings upon their bed-plates; to provide a simple and positive top and bottom adjustment for the rolls which will adjust the pass therebetween and whereby the top and bottom rolls may be adjusted equally at the same time or independently of each other; to secure passes of desired thickness and in proper relation to each other until changed, and to provide means of novel construction whereby the passes may be adjusted either at one or both ends of the rolls.

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

In the drawings, Figure 1 is a view of a two-high mill having means for adjusting the housings on their bed. Fig. 2 is a view on line y y, Fig. 1. Fig. 3 is an end view of a screw-clamp meshing with a screw therein. Fig. 4 is a detail view of the rocking nut thereof detached. Fig. 5 is an end elevation of a mill having one form of top and bottom adjusting mechanism therein. Fig. 6 is an elevation of an adjusting-screw, showing in section the gear mounted thereon and a clamp for binding said gear to the screw. Fig. 7 is a top plan view of said gear and clamp. Fig. 8 is a side elevation of a three-high mill with another form of adjusting mechanism therein. Fig. 9 is a section through a portion of the shaft of said adjusting mechanism and showing the gear thereon and a clamp for holding said gear rigidly to the shaft. Fig. 10 is a top plan view of said clamp and shaft.

Refriring to the figures by characters of reference, A A in Fig. 1 are rolls of suitable form, and these are journaled in housings D and may be moved in unison by gears C thereon protected by flanges D', which project inward from the housings D. The upper portions of the housings are enlarged, as at a, so that a slot a' and seat a'' for adjustable bearing-boxes b of the rolls may be formed therein without weakening the housings. The flanges D' serve to strengthen the housings, and they are further strengthened by downwardly-extending portions D'', which are located upon the bottoms of the housings and between the bed-plates and are for the purpose hereinafter described.

The downwardly-extending reduced portion D' of the housing D, before referred to, is adapted to fit between two lugs I, formed upon the upper surface of my improved screw-clamp, as shown in Figs. 1 and 3, which is used in connection with other mechanism for adjusting the housing, said downwardly-projecting portion D' being drilled and threaded to receive a bolt or bolts I', passing through said lugs I. Each of said lugs I is formed of two plates i, adapted to hinge upon said bolt or bolts I'. These plates are formed with and extend upward from the two halves F of the clamp, which halves are each provided with a threaded groove running longitudinally of their inner surfaces, as at z, said threads adapted to mesh in with a threaded screw F' when the clamp is in a closed position and to be removed from mesh therewith when the clamp is opened. Extending downward from each half of the threaded body of this clamp is a projection z', so connected as to receive a rocking nut t, substantially as shown in Fig. 4, within its outer surface, said nut t being secured therein by means of plates v', which, together with said projection z', form a rocking bearing for the arms of the rocking nut t. These plates v' may be secured by means of bolts, as shown in Figs. 1 and 3, or in any other suitable manner. The clamp is opened and closed by means of a reverse-screw I', running through and working with the two rocking nuts v', so that when it is turned in one direction the
clamp will be opened and when turned in the opposite direction the clamp will be closed, said nuts rocking upon their arms in order to prevent the screw from binding or springing when opening or closing the clamp. As before stated, this clamp is adapted to mesh with a running screw. This screw is preferably mounted below the lower end of the housing D and below the bed-plate D, as shown in Figs. 2 and 3. The screw may be rotated by any suitable friction devices, and it may be turned either to the right or to the left and when not in engagement with its driving devices will stand still. In cases where there are five or six housings D on one bed-plate either one or all of said housings can be moved upon said bed-plates in either direction desired. The clamps of all the housings are normally open, and when it is desired to move one or more of them independently of the remainder in order to change rolls or make repairs, &c., it is only necessary to turn the clamp of the housing to be moved into mesh with the screw and then cause the power devices to turn that screw in the direction the operator may desire. The housings of these mills are preferably cored out to receive roll-adjusting mechanism of peculiar construction, as shown in Figs. 5, 6, and 7, for the adjustment of the pass or passes between the rolls. Said mechanism consists of a vertical shaft J running through each of the housings D, and both having at their lower ends long cog-wheels of small diameter, which mesh with large cog-wheels upon the lower adjusting-screws of the lower roll A. Mounted upon these shafts J above the housings D are cog-wheels, similar in form to the cog-wheels, and these cog-wheels mesh with cog-wheels J, secured to the upper adjusting-screws J'. The cog-wheels J and J are preferably held tightly on the adjusting-screws by means of friction-clamps, as shown in Figs. 5, 6, and 7. In forming these clamps it is necessary to reduce the end of the adjusting-screw to form a friction-shoulder upon which the inner surface of cog J' or J will bear. Upon the outer surface of this cog-wheel is placed a friction-plate J, which is keyed to the outer reduced part J of said adjusting-screw. Upon this friction-plate is placed a nut, screwed upon the outer threaded end of the adjusting-screw, and said nut when tightened forms a friction-grip upon both sides of said cog, causing it to be fixed and revolve with the adjusting-screw. Preferably upon the upper end of each of the shafts J in the housings D is mounted a bevel-pinion K, on the centers of both of which are secured swivel bearings, upon which are mounted shaft-bearings k, similar to those shown in Fig. 1. A horizontal shaft is mounted in said bearings and extends between and over each of the housings D, it having keyed or otherwise secured thereon pinions k', which mesh with the said bevel-pinions K of the shafts J. Said horizontal shaft is formed of two pieces L and L'. These are detachably secured together by means of a clutch L', which is rigid with one portion L of said shaft and is adapted to detachably engage the opposite portion L of the shaft. The advantage of having a clutch of this character upon the shaft is that it enables the operator to move the adjusting mechanism in one of the housings with or independently of the adjusting mechanism in the other housing. It also allows the housings to be moved apart or toward each other in order to receive rolls of greater or less length without causing any displacement of the parts of the adjusting mechanism and without necessitating the use of another horizontal shaft. This shaft is preferably provided at each end with a suitable hand-wheel K', whereby the adjusting mechanism can be operated from either housing. From this description of the adjusting mechanism it will be readily seen that by loosening the clutch K' upon the shaft one side of the mill can be adjusted separately and independently of the other or by loosening the grip of the friction-plate J' upon either of the large cog-wheels J' or J the upper or lower rolls can be adjusted independently of each other.

In Figs. 8, 9, and 10 I have shown a slightly modified form of adjusting mechanism. This differs from the form herebefore described, inasmuch as the pinion K on the shaft of the hand-wheel K' meshes with bevel-teeth formed upon the pinion of the upper adjusting-screw J', while the smooth teeth of said pinion J' mesh with the long gear J, which is mounted near the upper end of the shaft J, running through the housing D. This shaft is reduced at each end and is provided near its upper end, as in the mechanism heretofore described, with a second long gear J of small diameter, which gear meshes with the gear J upon the lower adjusting-screw J'. Each of these long gears J is provided at its inner end with a nut l', which is keyed to the reduced end of the shaft J, as shown in Figs. 8 and 9. The end of each of the reduced portions of the shaft J is threaded to receive a second nut l', adapted to screw against the outer end of the long gears J or J, which are loosely mounted upon the reduced ends of said shaft and clamp the same against the opposite or inner nuts l, thereby producing sufficient friction to prevent said gears from turning upon the shaft J and permitting them to transmit an even motion from the top to the bottom adjusting-screws. It is obvious that by loosening the nuts l' the upper or lower boxes can be adjusted independently of each other.

In the foregoing description I have shown the preferred forms of my invention; but I do not limit myself thereto, as I am aware that modifications may be made therein without
departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for rolling metal the combination, with the upper and lower boxes, of the adjusting mechanism comprising the shaft, a gear mounted on each end thereof, adjusting-screws secured to said upper and lower boxes, large gears loosely mounted on said screws, and meshing, respectively, with the upper and lower gears on said shaft, and means for clamping either or both of said large gears to their adjusting-screws, whereby said boxes may be adjusted together or independently of each other, substantially as described.

2. In a machine for rolling metal the combination of the cored housing, the shaft extending therethrough, a gear mounted on each end of said shaft, a bevel-pinion also secured to the upper end thereof, boxes slidably mounted in said housing, an adjusting-screw mounted in each end portion of the housing and each secured to one of said boxes, a shoulder formed near one end of each screw, a gear loosely mounted on said screw and adapted to bear against said shoulder, the upper and lower gears meshing, respectively, with the upper and lower gears of the shaft, a plate on the outer face of each of the gears on said adjusting-screws, said plate fixed against revolution upon said screw and adapted to bear upon said plate, and thereby clamp the gear between said plate and shoulder, whereby said boxes may be adjusted together when the gears are clamped, or independently of each other when the nuts are loose, substantially as described.

3. In a machine for rolling metal, the combination, with the housing, of a hinged clamp secured to the lower end thereof, threads formed upon the inner surfaces of the halves of said clamp, a screw mounted in said clamp, the threaded portions of said clamp adapted, when closed together, to mesh with the threads on said screw, and free of said threads when open, substantially as described.

4. In a machine for rolling metal, the combination, with the housing, of a clamp comprising the halves hinged together at the upper edge, a threaded groove formed on the inner face of each half, a threaded rocking nut mounted within each half near the lower end thereof, and a reversely-threaded screw engaging with said rocking nuts, whereby said clamp is opened and closed, a screw passing through said clamp and meshing with the threads in the grooves therein when said clamp is closed, and free of said threads when the clamp is open, substantially as described:

In testimony whereof I affix my signature in presence of two witnesses.

CHESTER PROUTY.

Witnesses:

HARRY N. SHERWOOD,
E. H. OWLETT.