Jan. 23, 1951 S. S. RICKLEY 2,539,205

PEENING MACHINE

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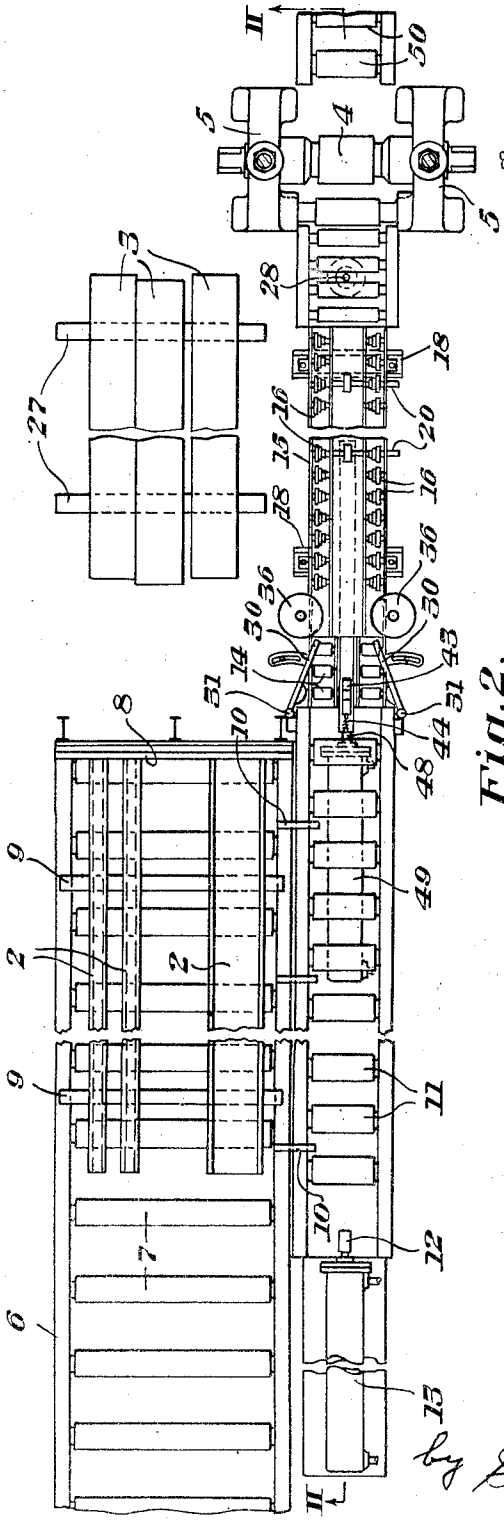

Fig. 1.

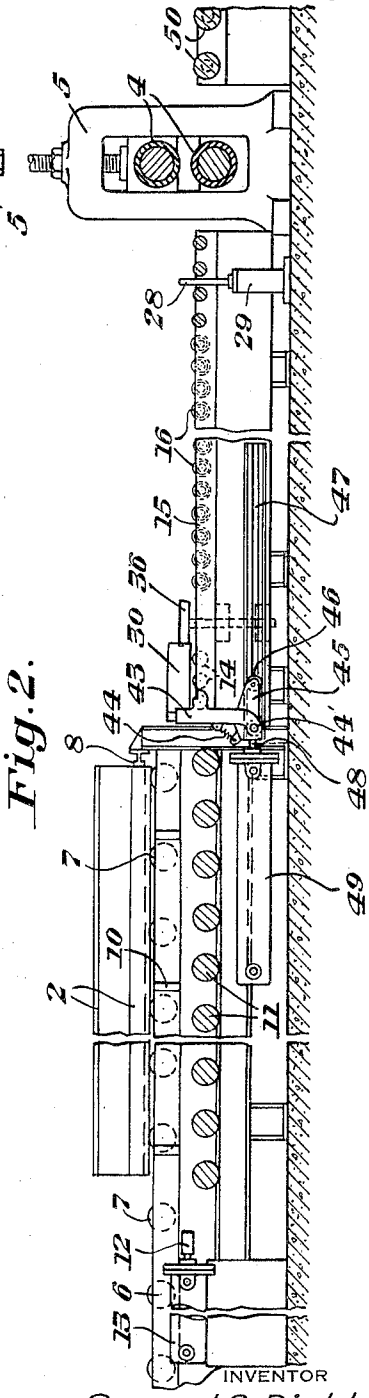

Fig. 2.

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PEENING MACHINE

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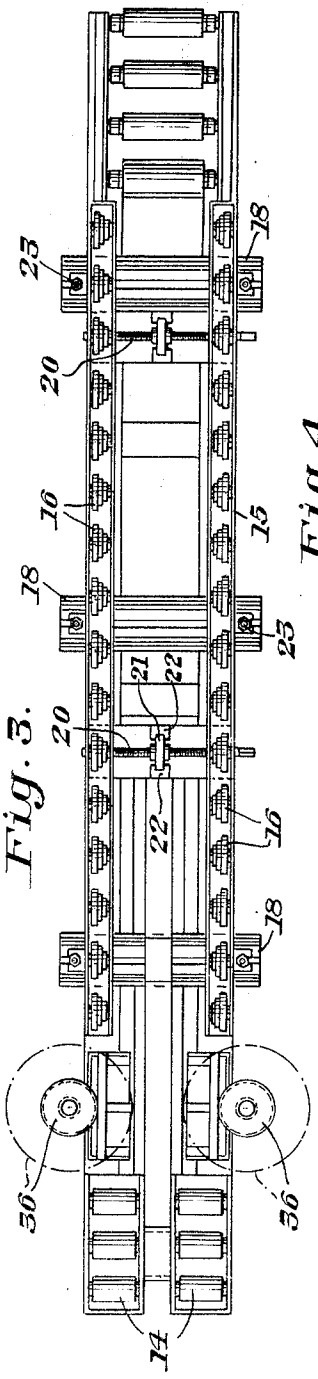

Fig. 3.

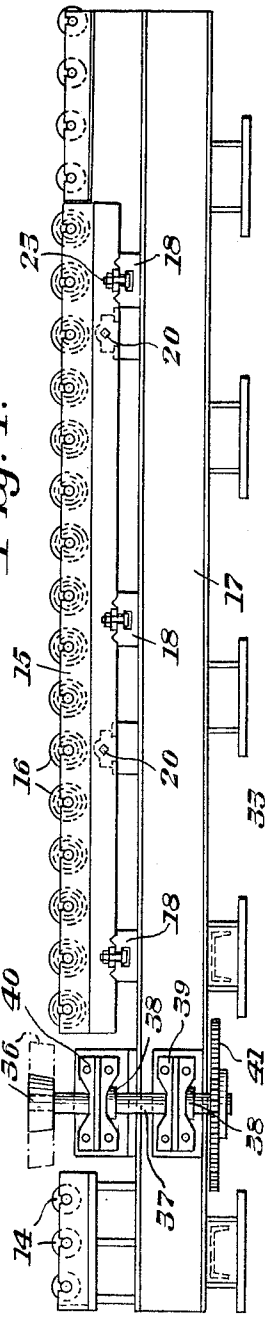

Fig. 4.

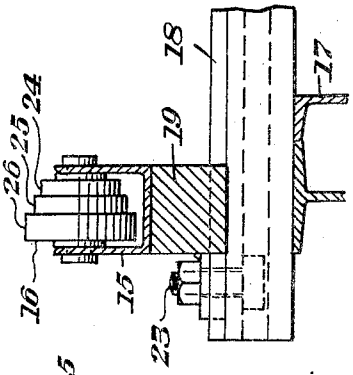

Fig. 7.

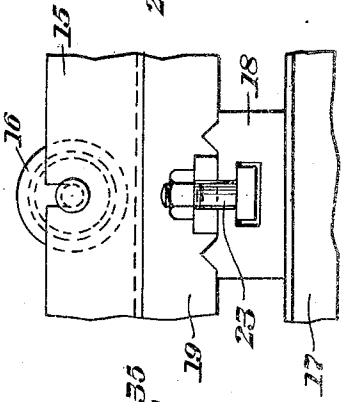

Fig. 6.

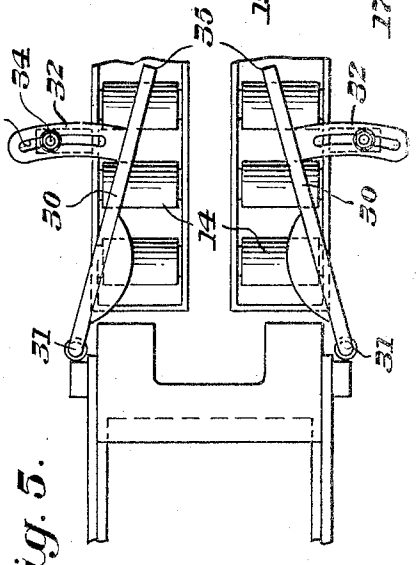

Fig. 5.

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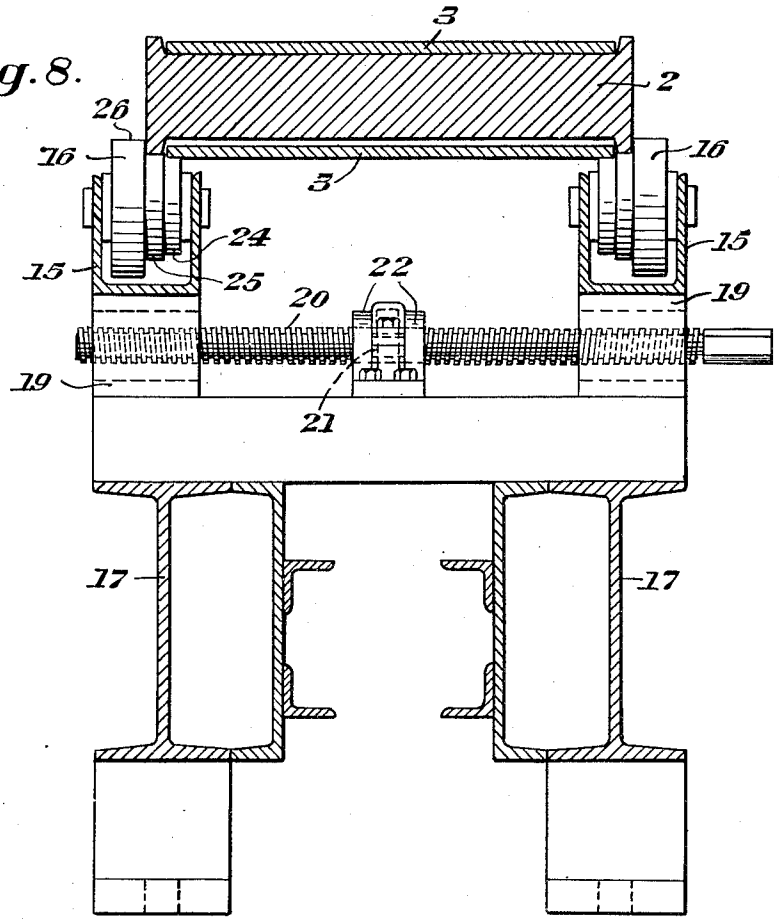
Fig. 8.



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PEENING MACHINE

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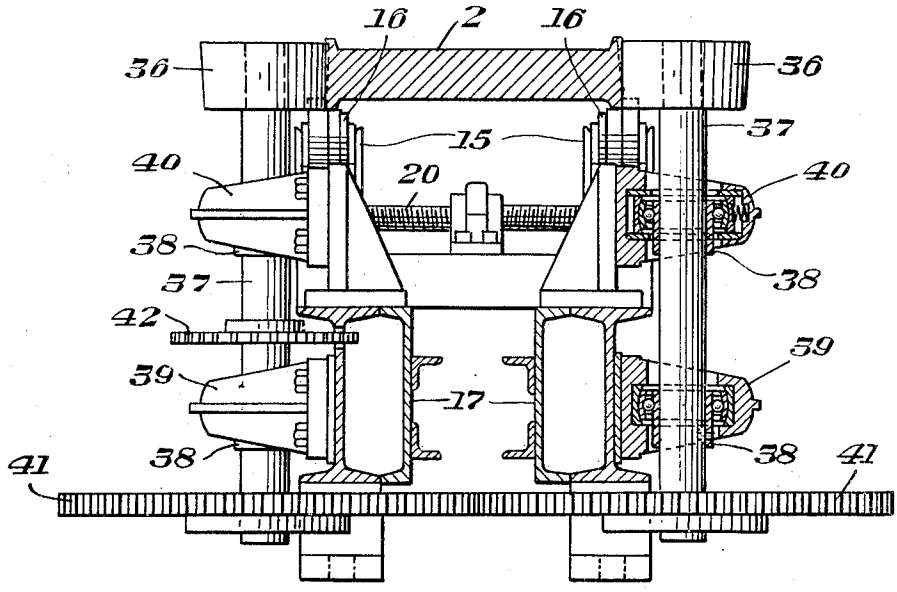
Fig. 9.



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Patented Jan. 23, 1951 2,539,205

UNITED STATES PATENT OFFICE

2,539,205

PEENING MACHINE

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Application November 12, 1947, Serial No. 785,467

4 Claims. (Cl. 153—10)

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This invention relates to a peening machine and particularly to a machine for peening together billet components or the like. The invention has to do particularly with the means for controlling and advancing the work to the peening station.

The invention is applicable inter alia to the peening together of billet components such as backing and facing components in the making of bimetallic billets. For example, there may be provided a backing component having flanges and facing components adapted to lie against the backing component between flanges at opposite faces thereof, the flanges being adapted to be peened over to hold the facing components in place against the backing component. Bimetallic billets thus formed are rolled into bimetallic strip which has a wide variety of uses.

The present invention is in the nature of an improvement over the invention of Patent No. 2,450,987. In that application there is disclosed a peening machine including peening rolls for peening together billet components or the like and means for controlling and moving the work through the machine. While the machine of the Potter application is entirely satisfactory I have found that superior results from the standpoint of economy and uniformity of product can be obtained by somewhat differently handling and moving the work prior to its entry into the peening rolls.

The peening machine is of considerable size and involves a substantial outlay. I provide opposed sets of supporting and guiding rollers for supporting and guiding work being fed to the peening rolls, which sets of rollers may be adjustably positioned in different spaced apart relations to accommodate billet components of different widths, thereby avoiding the necessity of substituting an entirely new roller table for each billet width. I shape the supporting and guiding rollers differently than heretofore to provide for more accurately positioning the billet components relatively to each other. I provide guide means for guiding billet components as they enter the roller table. I provide improved means for impelling billet components including a ram for positively pushing them forward to the guide table and pinch rolls for advancing them on the guide table. The pinch rolls are mounted for resilient movement toward and away from the work and are normally pressed into contact with the work. They are contoured to most effectively engage the work despite irregularities in the work.

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Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawings I have shown a present preferred embodiment of the invention, in which

Figure 1 is a plan view with portions cut away of a peening machine;

Figure 2 is an elevational view with portions cut away of the peening machine shown in Figure 1;

Figure 3 is a detail plan view to enlarged scale of a portion of the peening machine shown in Figures 1 and 2;

Figure 4 is an elevational view of the mechanism shown in Figure 3;

Figure 5 is a fragmentary plan view to enlarged scale of a portion of the peening machine shown in Figures 1 and 2;

Figure 6 is a fragmentary elevational view to enlarged scale showing the means for adjustably positioning the work supporting and guiding rollers;

Figure 7 is a view partly in elevation and partly in vertical cross-section of the structure shown in Figure 6;

Figure 8 is a detail transverse cross-sectional view to enlarged scale showing billet components being advanced toward the peening rolls; and

Figure 9 is a view partly in elevation and partly in vertical transverse cross-section to scale somewhat smaller than Figure 8 showing the pinch rolls for advancing billet components on the roller table.

Referring now more particularly to the drawings, the specific form of peening machine shown is for peening together flanged backing components and flat facing components to form bimetallic billets. In the drawings the backing components are designated generally by reference numeral 2 and the facing components are designated generally by reference numeral 3. Each backing component consists of a generally rectangular body portion with flanges projecting beyond its principal faces at its opposed longitudinal edges as shown in Figure 8 wherein the backing component 2 appears in transverse cross-section. The facing components are flat rectangular metal plates shown in plan in Figure 1 and in transverse cross-section in Figure 8. The backing and facing components may be of any desired metals, the backing components normally being of carbon steel and the facing components normally being of metal other than carbon steel,

as, for example, stainless steel, copper, gilding metal, cupro-nickel, etc.

In forming a bimetallic billet a backing member 2 and two opposed facing members 3 are advanced through peening rolls which peen over the flanges of the backing member against the edges of the facing members as explained in Patent No. 2,450,987. The peening rolls of the present invention may be the same as the Potter peening rolls, being designated generally by reference numeral 4. They are not shown in detail because the present invention does not relate to the conformation of the peening rolls but to the means for controlling and feeding the billet components to the feeding rolls. The peening rolls are mounted in roll housings 5 and may be positively driven or turned by contact of the work therewith. The peening rolls are shaped to engage the flanges of the backing member and peen the same down over the edges of the facing members.

The backing members 2 are preferably rolled sections which are delivered to the peening machine on a roller table 6. The rollers 7 of the table 6 may be driven or such rollers may be idlers and the backing members may be pushed thereover by hand or otherwise. Preferably the rollers 7 are driven by means not shown.

The backing components 2 are delivered on the roller table 6 on edge until they strike a stop 8. They are then moved laterally by walking beams 9 and are delivered from the rollers 7 over guides 10 onto idler rollers 11 forming a roller table on which the backing members are adapted to be advanced to the right, viewing Figures 1 and 2. When the backing components are disposed upon the idler rollers 11 they are resting on their sides, i. e., upon flanges at opposite edges of a principal face.

There is provided a ram 12 carried by a piston within a cylinder 13, the piston being adapted to be fluid operated to move the ram axially of the cylinder. The ram is for pushing toward the right, viewing Figures 1 and 2, backing components 2 lying upon the idler rollers 11. The ram has an important advantage in insuring positive movement of the backing components even when they are relatively short and contact only two or three of the rollers 11. When driven rollers are employed they do not have maximum effectiveness on short billet compopents which engage only two or three rollers at a time, and they are relatively ineffective when the billet components are being delivered from the end of the conveyer.

From the rollers 11 the backing components pass over intermediate rollers 14 and onto a roller table designated generally by reference numeral 15 and which comprises opposed sets of supporting and guiding rollers 16 for supporting and guiding the billet components being fed to the peening rolls. The roller table 15 is mounted upon an under frame 17 carrying transverse guides 18. Mounted upon the guides 18 and adapted for transverse sliding movement thereon are two roller supports 19, one for each of the two opposed sets of rollers 16. There are provided screws 20 spaced apart longitudinally of the roller table 15, each of the screws 20 having oppositely threaded ends and a circular plate 21 at the center thereof. The circular plate 21 of each of the screws 20 is adapted to turn within guides 22 carried by the frame 17 so that the screw is maintained against axial displacement. The oppositely threaded ends of each screw thread through the respective supports 19. Thus it will

be seen that when the screws 20 are turned simultaneously in one direction the supports 19 move toward each other while when the screws are turned in the opposite direction the supports move away from each other. The effect of this is to position the opposed sets of supporting and guiding rollers 16 in different spaced apart relations.

Each of the supports 19 is adapted to be bolted to the guides 18 by bolts 23 when in any adjusted position. When it is desired to relatively move the supports 19 by turning the screws 20 the bolts 23 are loosened; and when the opposed sets of rollers 16 have attained their desired new adjusted position the bolts 23 are tightened to hold them in that position. Thus the roller table consisting of the supporting and guiding rollers 16 is adapted to support and guide to the peening rolls billet components or other work pieces of different widths, eliminating the necessity of substituting a different roller table or different sets of supporting and guiding rollers for the handling of work pieces of different widths.

Each of the rollers 16 has stepped portions for engaging the bottom and side faces of each of two superimposed components as shown in Figure 8. Each roller has a portion of relatively small diameter 24, a portion of intermediate diameter 25 and a portion of relatively large diameter 26. A facing component 3 is adapted to rest upon the portions 24 and to be guided by the shoulders between the portions 24 and 25. A backing component 2 is adapted to rest upon the portions 25 and to be guided by the shoulders between the portions 25 and 26 as illustrated in Figure 8. This insures proper relative positioning of the components and renders easier the initial positioning on the rollers 16 of the lower facing component 3 which may be placed on the rollers by hand. Since it is guided laterally by the shoulders between the portions 24 and 25 of the rollers 16 it may easily be properly positioned by hand without the necessity of being carefully centered to provide for subsequent introduction thereover of the corresponding backing component 2.

Before a backing component is advanced to the right from the rollers 11 a facing component is taken from skids 27 and placed by hand upon the portions 24 of the rollers 16 of the roller table 15. Thereafter the backing component which is to be peened to that facing component is advanced from the rollers 11 to a position atop the lower facing component as shown in Figure 8. The components may be properly positioned endwise by a stop 28 movable to and from operative position by hydraulic fluid operating in a cylinder 29. When the lower component 3 is placed upon the rollers 16 its right hand end, viewing Figures 1 and 2, may be disposed against the stop 28. When the corresponding backing component is advanced into cooperative relationship with that facing component it too is advanced until it strikes the stop 28.

Means are provided for insuring proper entry of the backing components onto the rollers 16. Such means comprise pivoted side guides 30 adapted to swing about vertical pivots 31 in a horizontal plane substantially coinciding with the plane occupied by the backing component as it is advanced through the machine. Each of the pivoted side guides 30 carries a lug 32 containing an arcuate slot 33 through which passes a bolt 34 for bolting the lug to the frame and thereby holding the corresponding guide in fixed position. The guides 30 are adapted to be

adjusted in conformity with the adjustment of the opposed sets of rollers 16 to insure proper entry of each backing component onto the rollers. The guides 30 are designed so that in any normal adjusted position they converge in the direction of advance of the work and their relatively adjacent extremities 35 will be spaced apart a distance very slightly greater than the width of backing components being handled, the respective portions 35 being equidistant from the central axis of the machine. Likewise, the opposed sets of rollers 16 will be adjusted so that the shoulders between the portions 25 and 26 of the rollers of the opposed sets will be spaced apart a distance slightly greater than the widths of the backing components being handled. Thus the inclined pivoted side guides 30 will insure proper entry of each backing component upon the roller table 15.

The backing components 2 are advanced along the roller table 15 into engagement with the stop 28 by pinch rolls 36. Several sets of interchangeable pinch rolls 36 may be kept on hand, the rolls of the respective sets being of different diameters, rolls of relatively great diameter being used for billets of relatively small width and vice-versa. In Figures 3 and 4 pinch rolls 36 of relatively small diameter are shown in solid lines and pinch rolls 36 of relatively great diameter are indicated by chain lines. Each of the pinch rolls is keyed to a generally vertical shaft 37 which is mounted in bearings 38. Each of the lower bearings 38 is mounted to turn through a limited angle in the plane of the paper, viewing Figure 9, within a bearing box 39. Each of the upper bearings 38 is mounted within a bearing box 40 and is resiliently urged inwardly or toward the center line of the machine by spring means not shown. Thus the pinch rolls 36 are resiliently urged toward each other and hence toward the work. The pinch rolls 36 are of conical contour so that they will have their maximum effectiveness when their shafts are tilted slightly outwardly. The resilient pressing of the pinch rolls against the work insures firm engagement of the rolls with the work despite irregularities in the work. Preferably when the shafts 37 are in their innermost or vertical positions the opposed face portions of the pinch rolls 36 are somewhat closer together than the transverse dimensions of the backing components being handled so that when a backing component enters the bite of the pinch rolls 36 it will spread those rolls slightly apart and at the same time turn them angularly so that the roll faces lie substantially flush against the edges of the work.

Keyed to each shaft 37 is a gear 41. The two gears 41 mesh with each other. They insure synchronous operation of the pinch rolls 36. The gears 41 are disposed close to the bearing boxes 39 so that they partake of much less amplitude of angular movement than the pinch rolls 36 when a backing component 2 enters the bite of the pinch rolls. The teeth of the gears 41 are shaped to allow for limited relative angular movement of the shafts 37 while maintaining operative mesh.

One of the shafts 37 has fixed thereto a sprocket 42 adapted to be driven by a sprocket chain not shown. The pinch rolls 36 are thus driven through the sprocket 42 and the gears 41.

There is provided a pusher 43 pivotally mounted at 44' upon a carriage 45 having wheels 46 riding in tracks 47, the carriage being pushed

along the tracks by a piston rod 48 carried by a piston in a cylinder 49. The pusher 43 is normally maintained in upright position by a coil spring 44 but is adapted to be pushed down out of the path of a backing member when the backing member is advanced toward the right over the pusher. After the backing member has passed the pusher the spring 44 returns it to vertical position. The pusher is used for pushing the assembled backing and facing members into the bite of the peening rolls 4. The pusher may be the same as the pusher disclosed in the Potter application and does not per se constitute the present invention.

The operation of the peening machine will now be described. At the beginning of each cycle of operations a facing member 3 is placed by hand upon the rollers 16 against the stop 28, which is then up in its operative position, and simultaneously a backing member is delivered by the walking beams 9 onto the rollers 11. The facing member 3 rests upon the portions 24 of the rollers 16 as shown in Figure 8. The ram 12 is operated to push the backing member toward the right. The side guides 30 guide the backing member so that it properly enters the rollers 16, the lower flanges riding upon the portions 25 and the backing member being guided by the shoulders between the portions 25 and the portion 26 of the rollers.

As the backing member passes over the pusher 43 it moves the pusher down against the action of the spring 44 into inoperative position as above described. The front end of the backing member is forced into the bite of the pinch rolls 36, slightly spreading those rolls in the manner above described. The pinch rolls positively move the backing member forward until it engages the stop 28. When the rear end of the backing member has passed over the pusher 43 the spring 44 returns the pusher 43 to its vertical position. After the backing member has come to rest against the stop 28 the upper facing member 3 (see Figure 8) is placed upon the top of the backing member between the opposed upper flanges thereof. It also is positioned with its right hand end, viewing Figures 1 and 2, against the stop 28. Thereupon the stop 28 is withdrawn downwardly to inoperative position and the pusher 43 is operated to push the assembled backing member 2 and upper and lower facing members 3 into the bite of the peening rolls 4 which as above explained peen over the flanges of the backing member onto the edges of the facing members to form a bimetallic billet. If the peening rolls 4 are driven, as is preferred, the pusher 43 need advance the assembled components only until they are in draft with the peening rolls, whereafter the peening rolls both advance the components and perform the peening function. The peened billet is delivered from the peening rolls upon rollers 50.

While I have shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. In a peening machine having peening rolls for peening together billet components or the like, opposed sets of supporting and guiding rollers for supporting and guiding components being fed to the peening rolls, each of opposed rollers having stepped portions for engaging the

bottom and side faces of each of two superimposed components.

2. In a peening machine having peening rolls for peening together billet components or the like, opposed sets of supporting and guiding rollers for supporting and guiding components being fed to the peening rolls, each of opposed rollers having corresponding portions of relatively small diameter for supporting a component, corresponding portions of larger diameter for supporting a second component in superimposed relation to the first mentioned component and corresponding portions of still larger diameter for engaging the side faces of the second mentioned component.

3. In a peening machine having peening rolls for peening together billet components or the like, opposed sets of supporting and guiding rollers for supporting and guiding components being fed to the peening rolls, each of opposed rollers having corresponding portions of relatively small diameter for supporting a component, corresponding portions of larger diameter for supporting a second component in superimposed relation to the first mentioned component and corresponding portions of still larger diameter for engaging the side faces of the second mentioned component and opposed guide means converging in the direction of feed disposed to guide work into proper cooperative relationship with the rollers, the relatively adjacent portions of the guide means being spaced apart a distance approximating the distance between the roller portions for engaging the side faces of the second mentioned component.

4. In a peening machine having peening rolls for peening together billet components or the like, opposed sets of supporting and guiding rollers for supporting and guiding components being fed to the peening rolls, each of the opposed rollers having corresponding portions of relatively small diameter for supporting a component and corresponding portions of larger diameter for supporting a second component in superimposed relation to the first mentioned component, and means for guiding the second mentioned component onto the second mentioned portions of the rollers.

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