L. F. DIETER.

METHOD OF AND DEVICE OR MEANS FOR RECEIVING AND POSITIONING WORK PIECES OR FINISHED ARTICLES, &c.

APPLICATION FILED NOV. 22, 1916.

1,243,053.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

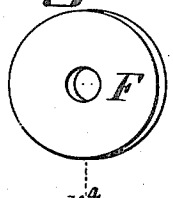


Fig. 2.

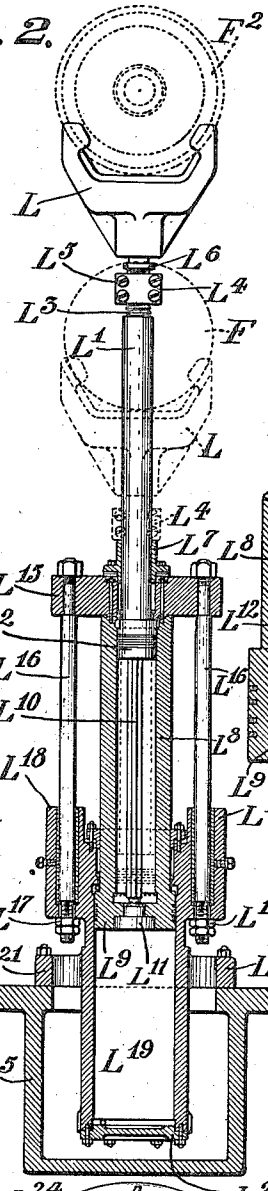


Fig. 3.

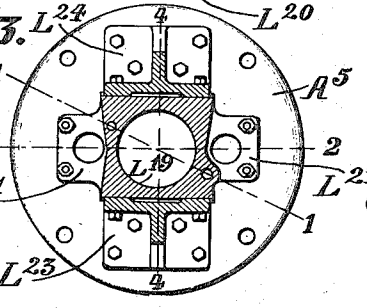


Fig. 4.

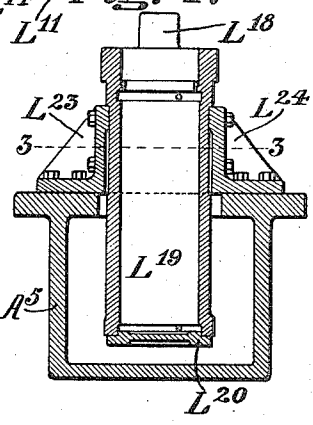


Fig. 5.

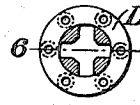


Fig. 6.

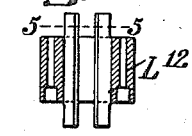


Fig. 7.

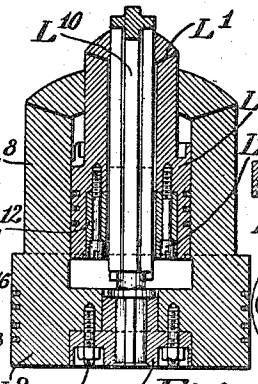


Fig. 8.

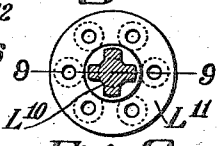


Fig. 9.

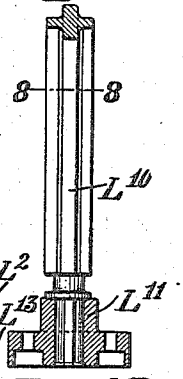
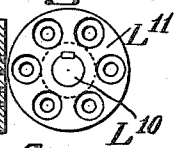


Fig. 10.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 11.

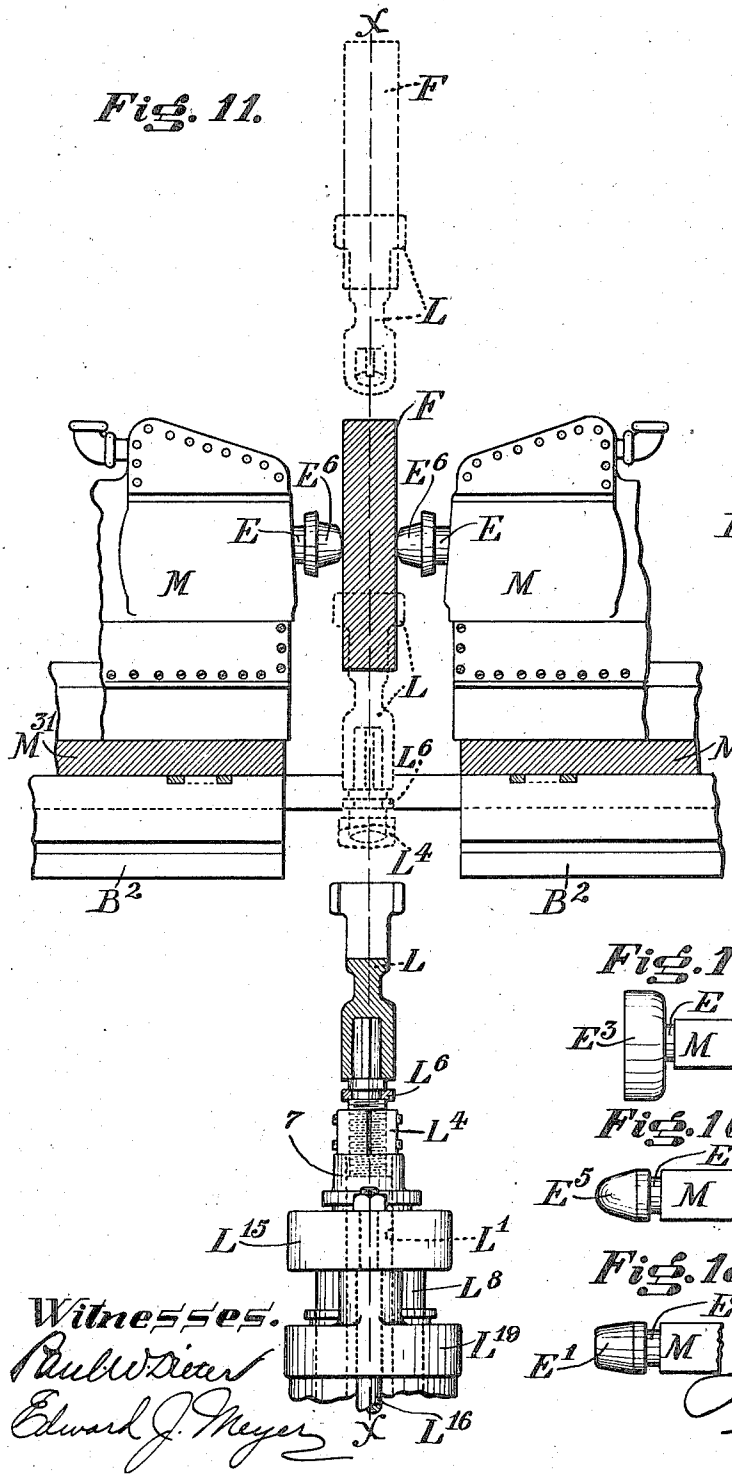


Fig. 13.

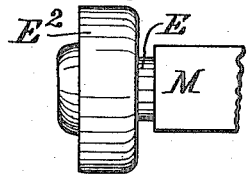


Fig. 12.

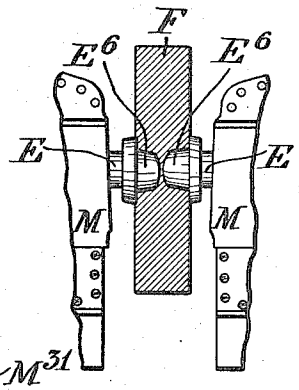


Fig. 14.

Fig. 15.

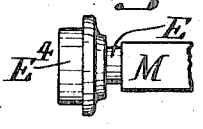


Fig. 16.

Fig. 17.

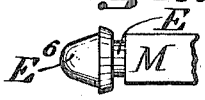


Fig. 18.

Witnesses.

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UNITED STATES PATENT OFFICE.

LOUIS F. DIETER, OF BUFFALO, NEW YORK.

METHOD OF AND DEVICE OR MEANS FOR RECEIVING AND POSITIONING WORK-PIECES OR FINISHED ARTICLES.

1,243,053. Specification of Letters Patent. Patented Oct. 16, 1917.

Original application filed June 15, 1911, Serial No. 633,343. Divided and this application filed November 22, 1916. Serial No. 132,815.

To all whom it may concern:

Be it known that I, LOUIS F. DIETER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a novel and useful method of and device or means for receiving and positioning work-pieces or finished articles in an apparatus or mill for rolling or forming car-wheels or other circular bodies, of which the following is a specification, accompanied by two sheets of drawings.

The features of my invention claimed herein are a part of the invention of my original application filed June 15, 1911, Serial No. 633,343, which original application, in accordance with the requirements of the Patent Office, has been divided. This application is a division of said original application and, the parts of an apparatus or mill shown in the accompanying drawings are illustrative of parts of my said original application.

The subject matter of the present invention is also described in and certain features of the invention herein described, but not herein claimed, are claimed in my application for patent filed June 15, 1911, Serial No. 633,343, allowed January 23, 1917, of which this application is a division, and this invention is also described or partly described in and certain features thereof herein described, but not herein claimed, are claimed in the following co-pending applications filed by me, viz: application for patent filed October 10, 1916, Serial No. 124,921; application for patent filed November 20, 1916, Serial No. 132,372, and application for patent filed January 10, 1917, Serial No. 141,558.

This invention relates to the manufacture of car wheels, disk-wheels, or other circular bodies in an economical, commercial, expeditious and efficacious manner, whereby the whole car wheel, disk-wheel, or other circular or approximately circular body may be completely rolled and otherwise operated upon in a simple and thoroughly practicable manner, various examples of which are for instance described in my said original application and, this invention has particular reference to a method of and device or means for receiving and positioning, or for raising, lowering and retaining work-pieces in an apparatus or mill for rolling car wheels or other circular bodies and, for taking the work-piece or the finished article or product out of the apparatus or mill, and for putting the properly heated ingot, bloom, blank or other work-piece into the apparatus or mill and temporarily retaining the same in such position wherein its outer portion or periphery is central or coaxial, or approximately so with the piercers, or work-supporting centers, or work-supporting means to permit of its being centrally operated on, or centered, or pierced and centered in the center, or approximately in the center of its outer portion or periphery with said piercers, or work-supporting centers, or work-supporting means. It also has particular reference to the method for lowering the receiving or positioning means of said device away from said work-piece, and for retaining said receiving or positioning means of said device in said lowered position away from the work-piece until said work-piece or finished article or product is to be taken out of the apparatus or mill.

One of the objects of my invention is the provision of a method of and means for rapidly receiving, centrally positioning and temporarily retaining a work-piece so as to permit of centrally piercing, or centering, or otherwise operating upon the work-piece.

Another object is to provide rapidly operating means for temporarily supporting a work-piece in proper position to permit of its being centered or pierced or penetrated in the center of its outer portion or periphery.

This invention further contemplates a novel method of and device or means which greatly assists in the manufacture of car wheels or other circular bodies whereby such bodies or articles may be made in a rapid, continuous, economical and commercial manner.

Further objects of my invention will hereinafter appear.

By the use of this invention, the apparatus or mill can be rapidly operated, thus

reducing the cost of operation in the manufacture of car wheels and other circular bodies. The production of car wheels and other circular objects is thereby greatly cheapened and the output increased.

The invention consists in the novel method or process herein described and more particularly pointed out in the claims; and it also consists in the novel device or mechanism or means, in the arrangement of devices and in the novel features of construction and also in the arrangement and combination of parts herein described and more particularly pointed out in the claims.

In the accompanying drawings, in which I illustrate devices or means I prefer to employ in carrying out my invention:

Figures 1 to 10 inclusive show in details this raising, lowering and retaining device, or receiving and positioning mechanism.

Fig. 11 diagrammatically illustrates the herein named receiving and positioning member or head piece of this device in its upper, central and lower positions and also portion of an apparatus or mill such as I prefer to employ for rolling or forming car wheels or other circular bodies and also upper parts of said device. In this Fig. 11 is shown, for instance, a work-piece lowered into the apparatus or mill and retained in central position, said work-piece having been lowered by this device from the upper position shown in dotted lines. In this central position the work-piece is shown in solid lines and said head piece of the device in dotted lines. In this position the outer portion or periphery of the work-piece is coaxial with said piercers or work-supporting means and, in this position the work-piece is ready to be pierced or centered. In this Fig. 11 said head piece L of this device is also shown in solid lines in its lower position away from the work-piece. In Fig. 12, is shown said work-piece pierced or centered and supported and ready to be rolled or otherwise operated on.

Figs. 13 to 18 inclusive, illustrate a few more of said herein named piercers, or work-supporting centers, or work-supporting means and also part of the herein named work-supporting axles and work-supporting heads.

This invention, as hereinbefore said, is a division of my aforesaid original application and, the parts of an apparatus or mill shown in the accompanying drawings are illustrative of parts of my said original application. It is, of course, understood that I do not intend to limit myself to the use of the particular parts shown nor to the direction of movements of said device, as other means may hereafter be devised for carrying out my invention or method in a practicable manner.

Similar characters of reference indicate corresponding parts throughout the several views, and also indicate the corresponding parts in my said original application.

A^5 is the foundation box or support arranged in a fixed position for supporting said herein named raising, lowering and retaining device.

B^2 and B^2 are parts of the bed plate of an apparatus or mill for rolling or forming car wheels or other circular bodies.

E, E are the spindles or axles named herein the work-supporting axles which also serve other purposes. At one end of said axles are removably fastened thereto said herein named piercers, or work-supporting centers, or work-supporting means, for instance E^1, E^1 or E^2, E^2 or E^3, E^3 or E^4, E^4 or E^5, E^5 or E^6, E^6 &c. These piercers, or work-supporting centers, or work-supporting means may also be differently formed to serve other purposes such for instance as forming dies &c. There is practically no limit to the forms or shapes that said piercers, or work-supporting centers, or work-supporting means may have.

F represents the ingot, bloom, blank or other work-piece to be taken into the apparatus or mill and rolled or otherwise operated upon. F^2 represents the finished work-piece rolled or otherwise formed to the shape of a car wheel or other circular body and ready to be removed from the apparatus or mill.

Said piercing or work-supporting means are located one at each side of the blank or work-piece, and preferably revolve with the work-piece, and during the operating or forming process, or during the piercing or penetrating or centering process are moved longitudinally toward each other or away from each other, or are moved as the case may require or as may be desired.

By the words "centering, or piercing or penetrating and centering" used herein, I mean that the ingot, bloom, blank or other work-piece is centered, or pierced, or penetrated and centered in the apparatus or mill, by forcing either one or both said piercers or work-supporting means into or against said work-piece by their pressure means operatively connected therewith as and in the manner fully shown and described in my said original application.

M, M are the herein named work-supporting heads which carry and rotatably support said axles E, E. Each of said axles E, E has one of said herein named piercers or work-supporting means for instance E^1 or E^2 or E^3 or E^4 or E^5 or E^6 &c., at one of its ends. These piercers or work-supporting means are interchangeable and are also differently formed to serve also other purposes such for instance as forming dies &c. Said heads M, M are longitudinally movable in guides M^{31}, M^{31} which are fas-

tened to the bed plate B^2, B^2 and are moved, with their axles E, E and piercers or work-supporting means for instance E^6, E^6, in line with the axis of the work-piece by means of pressure cylinders not shown herein (see my said original application) or by any other equivalent means. When, for instance, piercing, or penetrating, or centering, or otherwise operating upon a work-piece, said supporting heads M, M with their said axles E, E, and piercers or work-supporting means for instance E^6, E^6 are moved toward and from each other as for instance illustrated in Figs. 11 and 12 or are moved as the case may require or as may be desired. In Fig. 11 a work-piece F is shown for instance lowered with this device (hereinafter fully described) into an apparatus or mill and positioned into a position between and central with the piercers or work-supporting means for instance E^6, E^6 and in which position the outer portion or periphery of the work-piece is coaxial, or approximately coaxial with said piercers or work-supporting means and is ready to be pierced or centered; and in Fig. 12 said work-piece F is shown pierced or centered and supported by said piercers or work-supporting means for instance E^6, E^6 and ready to be rolled or otherwise operated upon.

In Figs. 1 to 10 inclusive, I have illustrated in details the herein named receiving and positioning mechanism, or the herein named raising, lowering and retaining device or means for taking the finished article or product out of the apparatus or mill and for putting the properly heated ingot, bloom, blank or other work-piece into the apparatus or mill and retaining the same in such position wherein its outer portion or periphery is central or coaxial, or approximately so with said herein named piercers or work-supporting means to permit of its being centered, or pierced and centered in the center, or approximately in the center of its outer portion or periphery, or otherwise operated upon with said herein named piercers or work-supporting means. Said Figs. 1 to 10, inclusive, also illustrate the means for lowering said receiving and positioning member of said device away from said work-piece, either after said work-piece is so centered, or pierced and centered, or otherwise operated upon, or at the beginning or during any of said operating processes, and for retaining said receiving or positioning member of said device in said lowered position away from said work-piece until said work-piece or finished article or product is to be taken out of the apparatus or mill, as will hereinafter be more fully described.

The said device herein shown consists mainly of a vertically disposed outer cylinder L^{19} with a piston L^9 and piston-rod L^8, which piston-rod L^8 forms a smaller cylinder, itself fitted with a piston L^2 having piston-rod L^1 which is provided at its upper end with said head piece L which serves as the work-receiving or positioning member.

Fig. 2 is a sectional elevation on line 2—2, Fig. 3 showing the device in its upper position and carrying, for instance, a finished car wheel F^2 shown in dotted lines, at which point it is taken away by any suitable means, and another properly heated ingot, bloom, blank or other work-piece put in place of it. The device with the newly placed ingot, bloom, blank or other work-piece resting on said head piece L is then lowered by means of said inner piston until it comes against an adjustable stop whereby the center or axis of said ingot, bloom, blank or other work-piece F, shown in dotted lines, will be brought in line, or approximately in line with the centers or axes of said piercers or work-supporting means, as is more clearly illustrated in Fig. 11, which piercers or work-supporting means will then center or pierce and center said ingot, bloom, blank or other work-piece and support the same as shown in Fig. 12. After said work-piece is so centered or pierced and centered, or at the beginning of or during said centering or piercing and centering process, said outer piston of said device is then lowered to the position shown in Fig. 1, whereby said head piece L is lowered away from said work-piece F the distance for instance indicated by the dotted line y^4—y^4 in said Fig. 1, or as for instance indicated in Fig. 11 by the distance between the work-piece F shown in solid lines and said lower position of said head piece L shown in solid lines. Said head piece L is retained in said lowered position away from the work-piece F until said work-piece or the finished article or product is to be taken out of the apparatus or mill. Said piercers or work-supporting means will remain in the ingot, bloom, blank or other work-piece and will support said ingot, bloom, blank or other work-piece, as shown in Fig. 12, and will revolve with it until it is rolled to the form or shape of the car wheel or other circular article and until it is dished or undished, if dishing or undishing of the work-piece is desired. After completion of such operation and with the inner piston kept in its lower position, the said outer piston is again raised until the adjustable stops L^{17}, L^{17} are against the lower ends of the lugs or guides L^{18}, L^{18}, when said head piece L will be again in the middle position shown by dotted lines in Fig. 2, and will receive the finished wheel or other finished article and with it will again be raised to the upper position shown in Fig. 2, when said finished

wheel, designated by the character F^2, is taken away and another properly heated ingot, bloom, blank or other work-piece put in place of it, and so on.

In the said raising, lowering and retaining device, L is the said head piece which receives the ingot, bloom, blank or other work-piece, temporarily retaining the same when centering, or piercing and centering the same, and also receiving and delivering the finished wheel or other article. Said head piece L may be made in various shapes and sizes such as may be required for different sizes and shapes of wheels or other articles, or as may be required for other purposes, and therefore it is made so it can easily be pulled off from the end of the piston-rod and replaced by another, but it is prevented from turning on its rod by a feather or feathers. L^1, L^2 are the inner piston-rod and piston preferably made in one piece, the piston-rod L^1 being provided near its outer end with a thread L^3 on which is placed a nut L^4 made in halves and fastened together and to the rod by screws L^5 as shown. When the inner piston L^2 is lowered and the nut L^4 comes against the stuffing box extension L^7, the inner piston L^2 with its rod L^1 and the said head piece L with its load thereon comes to a stop. The down stroke of the inner piston can be regulated by adjusting the nut L^4 on the rod L^1 and when said nut L^4 is moved to its uppermost position against the collar L^6, the inner piston will be permitted to travel to its lowermost position, in which position it is spaced a certain distance from the lower end wall of the cylinder. To prevent the inner piston L^2 with its rod L^1 and head piece L from turning in its cylinder, a vertical ribbed rod L^{10} is provided which is fastened with its end piece L^{11} to the piston L^9, as shown in the Fig. 7. The inner piston L^2 has fastened to its lower end with the screws L^{13} a guide collar or bushing L^{12} shown in detail in the Figs. 5, 6 and 7; Fig. 5 being a section through 5—5, Fig. 6; Fig. 6 a section through 6—6, Fig. 5; and Fig. 7 a vertical section through the lower parts of the outer and inner pistons with their rods, showing the inner piston L^2 at its lowest position and also showing the lower part of said ribbed rod L^{10} with its fittings and connections. Figs. 8, 9 and 10 are details of said rod L^{10} with its end piece L^{11} fastened thereto with key or by other means; Fig. 8 being a section through 8—8, Fig. 9; Fig. 9 only shows the lower part of the ribbed rod L^{10} with its end piece L^{11} shown in section through 9—9, Fig. 8. Fig. 10 is a plan end view of the end piece L^{11}. The grooves formed by the ribs of said rod L^{10} as shown, fit over the tongues formed on the inner side of said guide collar L^{12} and thereby prevent the inner piston L^2 with its rod L^1 and head piece L from turning in the bore of L^8. The piston-rod L^8 with its bore for piston and rod L^2, L^1 has bolted to its upper end a cross piece L^{15} which is also provided with the regular packing-box for the rod L^1 and has fastened thereto the guide and stop rods L^{16}, L^{16}, which rods also prevent the said parts L, L^1, L^2, L^8 and L^9 with their said fittings from turning in the said outer cylinder L^{19}. Said rods L^{16}, L^{16} have shoulders at their upper ends and are provided with thread and nuts as shown, wherewith these rods are rigidly fastened to the cross piece L^{15}, as shown. At their lower ends these rods L^{16}, L^{16} are each provided with thread and lock-nuts L^{17} as shown. The outer cylinder L^{19} is provided at its upper end and at opposite sides with the lugs L^{18}, L^{18} forming guide bearings for said rods L^{16}, L^{16} and also forming stops for the upstroke of piston L^9 and by the means of said lock-nuts L^{17}, L^{17} and the thread on the lower ends of these rods, the distance between said lock-nuts L^{17}, L^{17} and said cross piece L^{15} can be shortened or lengthened, whereby the upstroke of said piston L^9 can be made less or more, as may be required. The outer cylinder L^{19}, by means of its lugs L^{21}, L^{21} and the side brackets L^{23} and L^{24} is rigidly bolted to the foundation box A^5 which supports the said device, as shown.

Fig. 1 shows said head piece L lowered away from the work-piece F the distance for instance indicated by the dotted line y^4—y^4, and shows a vertical section through 1—1, Fig. 3 showing said device with its inner and outer pistons in their lowest operating positions and also showing the ports for inlet and outlet. Fig. 3 is a section through 3—3, Fig. 4, and Fig. 4 is a section through 4—4, Fig. 3.

In said receiving and positioning mechanism, or raising, lowering and retaining device; the medium, for instance either steam, compressed air or liquid having sufficient pressure, may be used in operating the device, preferably compressed air. For raising the inner piston L^2, air enters through the pipe L^{25} to the lower end of the hollow rod L^{26} where it enters said hollow rod and then flows upward and through the short pipe connection L^{27} thence into and downward through the port L^{28}, at the lower end of which it enters the cylinder for the inner piston L^2 through the port L^{29} and forces the piston L^2 with its piston-rod L^1 and head piece L upward to the position shown in the Fig. 2. For raising the outer piston L^9, air enters through the pipe L^{30} into and downward through the port L^{31}, and into the outer cylinder L^{19} through the port L^{32}, forcing the outer piston L^9 with the parts L^8, L^{10}, L^{15}, L^{16}, L^{16}, L^1 and L, upward to the position shown in Fig. 2. For the pull-

back or lowering of the pistons L^9 and L^2, air of sufficient constant pressure, as for instance, from an accumulator or reservoir enters the pipe L^{33} passes into and down the circular space L^{34} formed by the bore of the outer cylinder L^{19} and the piston-rod L^8 to the upper end of piston L^9 and from there through the port L^{35} into and upward through the port L^{36} and at its upper end through the port L^{37} into the cylinder for the inner piston and to the upper end of said inner piston L^2. To lower the inner piston L^2, for instance from the position shown in Fig. 2 to the position shown in Fig. 1, the pressure inlet through L^{25} is shut off and the outlet for the air from the lower end of said inner piston L^2 is opened, said outlet being connected to said pipe L^{25}, thus causing the lower end of piston L^2 to be relieved of its pressure and permitting the air to flow out gradually through said outlet while the same constant pressure on the other or upper end of said piston L^2 forces the said piston downward. To again raise said inner piston, said outlet is again closed and the pressure is again let into and through pipe L^{25} to the lower end of the inner piston L^2 and while it forces said piston upward it also forces the air from the accumulator under its constant pressure on the upper end of said piston out through the said pipe L^{33} and back into the said accumulator or reservoir. To lower the outer piston L^9, for instance from the position shown in Fig. 2 to the position shown in Fig. 1, the air entering under pressure through pipe L^{30} is shut off and the outlet for the air from the lower end of said outer piston L^9 is opened, said outlet being connected to said pipe L^{30}, thus causing the lower end of piston L^9 to be relieved of its pressure and permitting the air to flow gradually out through said outlet while the air from the accumulator acting against the other or upper end of said piston L^9 forces the piston downward. To again raise said outer piston, said outlet is again closed and the pressure is again let into and through the pipe L^{30} to the lower end of the piston L^9 and while said pressure forces said piston upward, it also forces the air acting against the upper end of said piston under its said constant pressure out through pipe L^{33} and back into said accumulator or reservoir.

During the operation of the said receiving or positioning mechanism, or raising, lowering and retaining device, there is continually a constant pressure on the upper ends of both pistons. When both pistons are up, that is, at the end of their adjusted upstrokes, as in the Fig. 2, the finished wheel or other finished article is taken from the said head piece L and a new properly heated ingot, bloom, blank or other work-piece put in place of it. The inner piston L^2 is then lowered to the position indicated by the dotted lines in Fig. 2, in which position the center or axes of the outer portion or periphery of the ingot, bloom, blank or other work-piece F is brought in line with the centers or axes of said piercers or work-supporting means as for instance illustrated in Fig. 11 and in said position said work-piece F is held by said head piece L and is to be centrally engaged, or to be centered, or pierced and centered and supported by said piercers or work-supporting centers as for instance illustrated in Fig. 12, and, either after said work-piece is so engaged, or centered, or pierced and centered, or at the beginning of or during said centering or piercing and centering process the outer piston L^9 is lowered. When so lowered, both pistons and said head piece L are in the positions shown in Fig. 1 and in this position the said head piece L is lowered away from said work-piece F the distance for instance indicated by the dotted lines y^4—y^4 in said Fig. 1, or as for instance indicated in Fig. 11 by the distance between the work-piece F shown in solid lines and said lower position of said head piece L shown in solid lines, and in which position said head piece L is retained away from said work-piece until said work-piece or finished article or product is ready to be taken out of the apparatus or mill, and then, when said work-piece or finished wheel or other article is ready to be taken out of the apparatus or mill, the outer piston L^9 is again raised until stopped by the nuts L^{17}, L^{17} coming against the lugs L^{18}, L^{18}, when the head piece L is in proper position to receive said work-piece or finished wheel or other finished article, after which the inner piston is raised until the said head piece L with the said work-piece or finished wheel F^2 or other finished article is again in the position shown in the Fig. 2, to be removed therefrom.

In Fig. 11 said head piece L is shown in solid lines in said lower position, with a portion of said device. Said herein named raising, lowering and retaining device, or receiving and positioning mechanism, or positioning device, herein shown is, as hereinbefore described, arranged below and is adapted to operate in a plane between said piercers or work-supporting means for instance E^6, E^6 and between positions below and above said work-supporting means. Said head piece L operates or is moved as and in the manner hereinbefore described, for instance, forward and backward, as the case may require, between or to the positions shown thereof in solid and in dotted lines and in a plane indicated by the dotted line x—x, Fig. 11. Said lower position of said device is indicated in Fig. 11 by the portions thereof shown with said head piece L and which is the position also shown in

Fig. 1. In said Fig. 11, said upper position of said head piece L with the work-piece F thereon are both shown in dotted lines and, the central position of said head piece L shown in dotted lines with the work-piece F thereon shown in solid lines shows the work-piece F centrally positioned between said piercers or work-supporting means E^6, E^6 and in which position the center line or axes of the outer portion or periphery of the work-piece F is in line with the centers or axes of said piercers or work-supporting means for instance E^6, E^6; the work-piece F in Fig. 11 shown in dotted lines is placed onto said head piece L at its said upper position shown in dotted lines and from there it is lowered and positioned into said position in which the center line or axis of the outer portion or periphery of the work-piece F is in line with the centers or axes of said piercers or work-supporting means for instance E^6, E^6 and in said position said work-piece F is held by said head piece L to be centered or pierced and centered and supported by said piercers or work-supporting means for instance E^6, E^6 as for instance illustrated in Fig. 12 and, either after said work-piece is so centered or pierced and centered, or at the beginning of or during said centering, or piercing and centering process, said head piece L is lowered by said device away from the work-piece F to the lower position of said head piece L shown thereof in Fig. 11 in solid lines, and, in which position said raising, lowering and retaining device with its head piece L is retained away from the work-piece until said work-piece or the finished article or product is ready to be taken out of the apparatus or mill, and then, when the work-piece or the finished wheel or other article is ready to be taken out of the apparatus or mill, said head piece L is again raised from its lower position shown in solid lines to the middle position in Fig. 11 shown in dotted lines when it will be in proper position to receive the work-piece or the finished wheel or other finished article after the said piercers or work-supporting means have been withdrawn, after which said head piece L with the work-piece or finished wheel or other finished article is again raised to the upper position shown thereof in Fig. 11 in the dotted lines to be removed therefrom and another properly heated work-piece F put in place of it and so on. Fig. 12 shows said work-piece F pierced or centered by said piercers or work-supporting means for instance E^6, E^6 and supported thereby as shown, and ready to be rolled or operated upon.

In Fig. 13 is shown for instance at E^2 one of the herein named piercers, or work-supporting centers, or work-supporting means which is also formed as the case may require and also formed differently from those herein shown to serve other purposes for instance such as forming dies &c. In Fig. 14 is shown for instance at E^3 one of the herein named piercers, or work-supporting centers, or work-supporting means which may be suitably formed so as to support a work-piece which should not have a large impression or hole or no hole whatever and be used for supporting the work-piece at its one or both sides as the case may require, or such work-supporting means are also formed as the case may require and also formed differently from those herein shown to serve other purposes for instance such as forming dies &c. In Fig. 15 is shown for instance at E^4 one of the herein named piercers, or work-supporting centers, or work-supporting means which may be formed as shown for supporting a work-piece which has a large central hole or bore. In Figs. 16, 17 and 18 are shown at E^5, E^6 and E^1 a few more of the herein named piercers, or work-supporting centers, or work-supporting means, each one formed somewhat different. There are many other purposes that these herein named piercers, or work-supporting centers, or work-supporting means may be used for and may be formed to suit such purposes, as there is practically no limit to the shapes or forms these herein named piercers, or work-supporting centers, or work-supporting means may have.

Where in the specification and claims the words "ingot, bloom or blank" are used, it is intended to mean the work-piece to be operated upon, and the word "work-piece" is used herein in a broad sense and is intended to include an ingot, bloom, blank, car wheel, or any other unfinished or completely finished circular, or approximately circular or other shaped object adapted to be rolled, rerolled, reworked, or re-formed or otherwise operated upon either to entirely change its shape, or only partly change its shape or outline, or to change its dimensions in whole, or part as desired. In other words "work-piece" means any object to be operated upon.

The herein shown and described method of and device or means for raising, lowering and retaining a work-piece in an apparatus or mill, enables the work-piece to be centrally operated on with great rapidity or be centrally pierced or penetrated and rotatably supported and rolled or operated upon in a rapid manner without losing any of its heat and by reason of which, a rapid, continuous and economical operation of the work-pieces will result therefrom.

While I have shown and described the device or means which I now consider best and most practical for carrying out my method or process of receiving and position-

ing and retaining a work-piece as and for the purpose herein set forth, also the means for carrying out my method of bringing and temporarily retaining the work-piece into such position in which the center of the outer portion or periphery of the work-piece is in line with the center line or axes of said herein named piercers or work-supporting means to permit the same to centrally engage or operate upon, or to centrally pierce or penetrate or center the work-piece, it is, of course, understood that I do not wish to be confined to the exact construction herein shown and described nor to the direction of movement of said device or mechanism, and that my method may be carried out in various other ways; also that apparatus or means other than herein shown and described may be provided without departing from from the spirit of my invention or sacrificing any of the advantages thereof.

The features of my invention herein shown and described are not all claimed herein, but such features not herein claimed are covered by claims within my aforesaid original application and within applications filed by me and having the hereinbefore mentioned serial numbers and filing dates.

I claim as my invention:—

1. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and lowering the said work-piece from a position above the piercers or work-supporting means or from a position above the rolls to a position central with said work-supporting means to be centrally pierced, or penetrated, or centered by said work-supporting means and therewith supported during the rolling or operating process, which consists in placing the work-piece onto a receiving or supporting member of a raising and lowering device arranged below and adapted to operate in a plane between said piercers or work-supporting means and assume a position above the latter or above said rolls, in therewith lowering the work-piece from a position above said piercers or work-supporting means or from a position above said rolls to a position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said piercers or work-supporting means.

2. The method of receiving a heated ingot, bloom, blank, or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and lowering the said work-piece from a position above the piercers or work-supporting centers or work-supporting means to a position central with said piercers or work-supporting centers or work-supporting means to be centrally pierced, or penetrated, or centered by said piercers or work-supporting centers or work-supporting means and therewith supported during the rolling or operating process, which consists in placing the work-piece onto a receiving or supporting member of a raising, lowering and retaining device arranged below and adapted to operate in a plane between said piercers or work-supporting centers or work-supporting means and assume a position above the latter, in therewith lowering the work-piece from a position above said work-supporting means or from a position above the rolls of said apparatus or mill to a position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said piercers or work-supporting centers or work-supporting means, and in temporarily retaining said receiving or supporting member of said device with the work-piece in said central position to permit said piercers or work-supporting centers or work-supporting means to pierce or penetrate or center said work-piece in the center of its outer portion or periphery and support the same.

3. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and raising the said work-piece or finished article from a position it occupies during the rolling or operating process to a position above the work-supporting means or to a position above the rolls, which consists in placing the work-piece or finished article onto a receiving or supporting member of a raising, lowering and retaining device arranged below and adapted to operate in a plane between said work-supporting means, in therewith raising said work-piece or finished article from the position it occupies during the rolling or operating process to a position above said work-supporting means or to a position above said rolls of said apparatus or mill.

4. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and raising the said work-piece or finished article from a position between the rolls or from a position between the work-supporting means to a position above the rolls or to a position above said work-supporting means, which consists in placing the work-piece or finished article onto a receiving or supporting member of a raising, lowering or retaining device arranged below and adapted to operate in a plane between said work-supporting means, in therewith raising said work-piece or finished article from the position adjacent the rolls or from the position adjacent said work-supporting means to a position above the rolls or to a position above said work-supporting means.

5. The herein described method of receiving an ingot, bloom, blank, or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, placing the same centrally between the work-supporting means to be centrally pierced, or penetrated, or centered or otherwise operated upon by said work-supporting means and supported therewith, of receiving the work-piece or finished article and raising the same from the position adjacent said work-supporting means to a position above said work-supporting means or to a position above the rolls, which consists in placing the work-piece onto a receiving or supporting member of a raising, lowering and retaining device arranged below and adapted to operate in a plane adjacent said work-supporting means and assume a position above the latter or above said rolls, in therewith lowering the work-piece from a position above said work-supporting means or from a position above said rolls to a central position in which position the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting means, in temporarily retaining said receiving or supporting member with the work-piece temporarily held thereby in said central position to permit said work-supporting means to engage said work-piece, in lowering said receiving or supporting member away from the work-piece into a position below the work-piece to clear the latter during the rolling or operating process, in again raising said receiving or supporting member to a position to receive the work-piece or finished article, and in then raising said receiving or supporting member with the work-piece or finished article from said central position to a position above said work-supporting means or to a position above said rolls.

6. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, and moving or carrying the said work-piece from a position away from the work-supporting members or from a position away from the rolls to a position in which it is to be supported and be operated upon, which consists in placing the work-piece onto a receiving or positioning member of a positioning mechanism arranged in a fixed position away from said work-supporting members and adapted to move said receiving or positioning member to a point between positions at opposite points of and away from said work-supporting members, and in therewith carrying and positioning the work-piece into a position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting members of said apparatus or mill.

7. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, and carrying the said work-piece from a position away from the work-supporting members or from a position away from the rolls to a position in which it is to be supported or operated upon, which consists in placing the work-piece onto a receiving or positioning member of a positioning mechanism arranged below or away from and adapted to operate in a plane between said work-supporting members, in therewith carrying and positioning the work-piece into a central position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting members, and in temporarily retaining said receiving or positioning member with the work-piece in said central position to permit said work-supporting members to engage the work-piece from opposite sides or ends.

8. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies, and carrying the said work-piece or finished article from the position it occupies during the rolling or operating process to a position above or to a position away from the work-supporting members, which consists in placing the work-piece or finished article onto a receiving or positioning member of a positioning mechanism arranged in a fixed position below or away from the position the work-piece occupies during the rolling or operating process and being adapted for operating in a plane between said work-supporting members, in therewith carrying said work-piece or finished article from the position it occupies during the rolling or operating process to a position above said or away from said work-supporting members or other operating parts of said apparatus or mill.

9. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and raising the said work-piece or finished article from a position between the rolls or from a position between the work-supporting members to a position above the rolls or to a position above said work-supporting members, which consists in placing the work-piece or finished article onto a receiving or positioning member of a positioning mechanism arranged below and adapted to operate in a plane between said work-supporting members, in therewith raising said work-piece or finished article to a position above said rolls or to a position above said work-supporting members.

10. The herein described method of re-

ceiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, placing and temporarily retaining said work-piece centrally between the work-supporting members to be supported and rolled or otherwise operated upon, of receiving the work-piece or finished article and carrying the same from the position between said work-supporting members to a position above or away from said work-supporting members or to a position above or away from the rolls, which consists in placing the work-piece onto a receiving or positioning member of a positioning mechanism arranged normally below or away from and adapted to operate in a plane between said work-supporting members and assume an extreme opposite position above or directly opposite said normal position, in therewith carrying and positioning the work-piece into a position central with and between said work-supporting members in which position the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting members, in temporarily retaining said receiving or positioning member with the work-piece in said central position to permit said work-supporting members to engage the work-piece from opposite sides or ends, in moving said receiving or positioning member into its normal position below or away from the work-piece to clear the latter during the rolling or operating process, in again moving said receiving or positioning member into a position to receive the work-piece or finished article, and in moving said receiving or positioning member with the work-piece or finished article from said central position of the work-piece to its said extreme opposite position.

11. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and lowering said work-piece from a position above the work-supporting means to a position in which it is to be supported or operated upon, which consists in placing the work-piece onto a movable part of a positioning mechanism arranged normally below or away from said work-supporting means and adapted for operating from a position or positions below to a position above said work-supporting means, in therewith lowering and positioning the work-piece into a position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting means.

12. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and lowering said work-piece from a position above the work-supporting means to a position in which it is to be operated upon, which consists in placing the work-piece onto a positioning mechanism adapted for operating between positions below and above said work-supporting means, in therewith lowering and positioning the work-piece into a position central with said work-supporting means, and in temporarily retaining said positioning mechanism with the work-piece in said position central with said work-supporting means to permit the latter to engage the work-piece.

13. The method of receiving a work-piece or finished article and raising the same from the position it occupies during the operating process to a position above or away from the work-supporting means in an apparatus or mill for rolling or forming car wheels or other circular bodies, which consists in placing the work-piece or finished article onto a positioning mechanism arranged below and adapted to operate between positions below and above said work-supporting means, in therewith raising said work-piece or finished article from the position it occupies during the operating process to a position above or away from said work-supporting means.

14. The method of receiving a work-piece or finished article and raising the same from a position between the work-supporting means to a position above said work-supporting means in an apparatus or mill for rolling or forming car wheels or other circular bodies, which consists in placing the work-piece or finished article onto a positioning mechanism arranged below said work-supporting means and adapted to operate between positions below and above said work-supporting means, and in therewith raising said work-piece or finished article to a position above said work-supporting means.

15. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, placing said work-piece into and temporarily retaining the same in proper position to be operated upon, of clearing the work-piece so it may be operated upon, of receiving the work-piece or finished article and carrying the same from the position it occupies during the operating process to a position above or away from the work-supporting means or other operating parts of said apparatus or mill to be removed therefrom, which consists in placing the work-piece onto a positioning mechanism arranged normally in a position below or away from the work-piece or from said work-supporting means or said other operating parts and adapted to operate in a plane between said work-supporting means or said other operating parts and as-

sume an extreme opposite position away from said normal position, in therewith carrying the work-piece from said extreme opposite position and positioning the work-piece into proper position to be operated upon, in temporarily retaining said positioning mechanism with the work-piece in said proper position to permit said work-piece to be engaged or operated upon, in positioning or moving said positioning mechanism into said normal position below or away from the work-piece to clear the same during the operating process, in positioning or moving said positioning mechanism into a position to receive the work-piece or finished article, and in operating or moving said positioning mechanism to carry the work-piece or finished article from said proper position to or toward said extreme opposite position to be removed from said apparatus or mill.

16. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece from a position above or from a position away from the work-supporting means or from a position above or away from the rolls to a position central with said work-supporting means to be centrally pierced, or penetrated, or centered by said work-supporting means and therewith supported during the rolling or operating process, which consists in placing the work-piece onto a receiving member of a positioning device arranged normally below or away from said work-supporting means or from said rolls and adapted to operate in a plane between said work-supporting means or said rolls and assume a position above or directly opposite said normal position, in therewith carrying the work-piece from a position above or from said directly opposite position away from said work-supporting means or from a position above or from said directly opposite position away from the rolls to a position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said work-supporting means.

17. The method of receiving a heated ingot, bloom, blank, or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece from a position above or from a position away from the piercers or work-supporting centers or from a position above or away from the rolls to a position central with said piercers or work-supporting centers to be centrally pierced, or penetrated, or centered by said piercers or work-supporting centers and therewith supported during the rolling or operating process, which consists in placing the work-piece onto a receiving or supporting member of a positioning device arranged normally below or away from said piercers or work-supporting centers or from said rolls and adapted to operate in a plane between said piercers or work-supporting centers and assume a position above or directly opposite said normal position, in therewith carrying the work-piece from a position above or from said directly opposite position away from said piercers or work-supporting centers or from a position above or from said directly opposite position away from said rolls to a central position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said piercers or work-supporting centers, and in temporarily retaining said receiving or supporting member with the work-piece in said central position to permit said piercers or work-supporting centers to pierce or penetrate or center said work-piece in the center or approximately in the center of its outer portion or periphery and support the same.

18. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece or finished article from the position it occupies during the rolling or operating process to a position above or to a position away from the work-supporting means or other operating parts or other members of said apparatus or mill, which consists in placing the work-piece or finished article onto a receiving or supporting member of a positioning device arranged normally below or away from said work-supporting means or away from said other operating parts and adapted to operate in a plane between said work supporting means or said other operating parts, in therewith carrying said work-piece or finished article from the position it occupies during the rolling or operating process to a position above or away from said work-supporting means or said other operating parts, or to a position opposite said normal position of said receiving or supporting member.

19. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece or finished article from a position between the rolls or from a position between the work-supporting means to a position above or to a position away from the rolls or to a position above or to a position away from said work-supporting means or other operating parts of said apparatus or mill, which consists in placing the work-piece or finished article onto a receiving or supporting member of a positioning device arranged normally below or away from said work-supporting means or said other operating parts and adapted for operating in a plane

between said work-supporting means or said other operating parts, in therewith carrying said work-piece or finished article from the position between or adjacent the rolls or from the position between said work-supporting means to a position above said rolls or above said work-supporting means or said other operating parts, or to a position away from said rolls or said work-supporting means other than the normal position of said receiving or supporting member.

20. The herein described method of receiving a heated ingot, bloom, blank, or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies, placing the same centrally between the work-supporting means to be centrally pierced, or penetrated, or centered or otherwise operated upon by said supporting means and supported therewith, of receiving the work-piece or finished article and carrying the same from the position between said work-supporting means to a position above or to a position away from said work-supporting means or to a position above or to a position away from the rolls, which consists in placing the work-piece onto a receiving or supporting member of a positioning device arranged normally below or away from said work-supporting means and adapted to operate in a plane between said work-supporting means or said rolls and assume a position above said work-supporting means or said rolls or a position away from said work-supporting means or said rolls other than its said normal position, in therewith carrying the work-piece from a position above said work-supporting means or above said rolls or from a position away from said work-supporting means or said rolls other than its said normal position to a central position between said work-supporting means in which position the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said work-supporting means, in temporarily retaining said receiving or supporting member of said device with the work-piece temporarily held thereby in said central position to permit said work-supporting means to centrally pierce, or penetrate, or center, or otherwise operate upon said work-piece, in moving said receiving or supporting member away from the work-piece into a position to clear the work-piece during the rolling or operating process, in again moving said receiving or supporting member toward or against the work-piece into a position to receive the work-piece or finished article, and in then moving said receiving or supporting member with the work-piece or finished article from said central position of the work-piece to a position above said work-supporting means or above said rolls, or to a position away from said work-supporting means or said rolls other than said normal position.

21. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece from a position above or from a position away from the work-supporting members or from a position above or away from the rolls to a position in which it is to be supported and operated upon, which consists in placing the work-piece onto a receiving or positioning member of a positioning mechanism arranged in a fixed position below or away from said supporting members and adapted to operate in a plane between said work-supporting members or said rolls and assume a position above said work-supporting members or said rolls or a position away from said work-supporting members or said rolls other than said normal position, in therewith carrying and positioning the work-piece from said assumed position into a central position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting members, and in temporarily retaining said receiving or positioning member of said mechanism with the work-piece in said central or coaxial position to permit said work-supporting members to engage the work-piece from opposite sides.

22. The method of receiving a work-piece or finished article in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying the said work-piece or finished article from a position between the rolls or from a position between the work-supporting members to a position above or to a position away from said rolls or to a position above or away from said work-supporting members, which consists in placing the work-piece or finished article onto a receiving or positioning member of a positioning mechanism arranged normally below or away from said work-supporting members and adapted to operate in a plane between said work-supporting members or said rolls, in therewith carrying said work-piece or finished article to a position above said rolls or above said work-supporting members, or to a position away from said rolls or said work-supporting members other than said normal position.

23. The method of receiving a heated ingot, bloom, blank or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying said work-piece from a position above or from a position away from the work-supporting means to a position in which it is to be supported or operated upon, which consists in placing the work-piece onto a positioning mechanism arranged normally

below or away from said work-supporting means and adapted for operating from such position to a position above or to a position away from said work-supporting means other than said normal position, and in therewith carrying and positioning the work-piece into a position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting means.

24. The method of receiving a heated ingot, bloom, blank, or other work-piece in an apparatus or mill for rolling or forming car wheels or other circular bodies and carrying said work-piece from a position above or from a position away from the work-supporting means or other operating parts of said apparatus or mill to a position in which it is to be operated upon, which consists in placing the work-piece onto a positioning mechanism adapted for operating in a plane between said work-supporting means and between positions at opposite points of and away from said work-supporting means, in therewith carrying and positioning the work-piece into a position central, or approximately so with said work-supporting means, and in temporarily retaining said positioning mechanism with the work-piece in said position central with said work-supporting means to permit said work-supporting means to engage the work-piece.

25. The method of receiving a work-piece or finished article and carrying the same from a position between the work-supporting means to a position away from said work-supporting means in an apparatus or mill for rolling or forming car wheels or other circular bodies, which consists in placing the work-piece or finished article onto a positioning mechanism arranged in a fixed position away from said work-supporting means and adapted to operate between positions at opposite points of and away from said work-supporting means, and in therewith carrying said work-piece or finished article to a position away from said work-supporting means to be removed from the apparatus or mill.

26. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished product or article therefrom, which consists in placing the work-piece onto a receiving or positioning member of a rectilinearly movable positioning device arranged in a fixed position below or away and adapted to operate in a plane between the central engaging members or between the rolling or forming members of said apparatus or mill, in therewith carrying and positioning the work-piece into proper position so as to permit the work-piece to be engaged by said central engaging members or said rolling or forming members, in temporarily retaining said receiving or positioning member in said proper position to permit the work-piece to be engaged by said central engaging members or by said rolling or forming members, in moving said receiving or positioning member away from the work-piece into a position to clear the work-piece during the operating process, in again moving said receiving or positioning member into a position to receive the work-piece or finished article, and in then moving said receiving or positioning member with the work-piece or finished article to a position above or away from the said central engaging members or from said rolling or forming members to be removed from said apparatus or mill.

27. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished product or article therefrom, which consists in placing the work-piece onto a receiving or positioning member of a rectilinearly movable positioning device arranged in a fixed position below or away and adapted to operate in a plane between the central engaging members or between the rolling or forming members of said apparatus or mill, in therewith carrying and positioning and temporarily retaining the work-piece into proper position so as to permit the work-piece to be engaged or operated upon, in moving said receiving or positioning member away from the work-piece into a position to clear the work-piece and thus retain said receiving or positioning member during the operating process, in again moving said receiving or positioning member into a position to receive the work-piece or finished article, and in then moving said receiving or positioning member with the work-piece or finished article to a position above or away from the said central engaging members or from said rolling or forming members to be removed from said apparatus or mill.

28. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished article or product therefrom, which consists in placing the work-piece onto a rectilinearly movable positioning device arranged normally below or away from and adapted to operate in a plane between the engaging or the rolling or the forming members of said apparatus or mill and between said normal position and another or extreme position of said device at an opposite point above or away from said engaging or said rolling or said forming members, in operating said positioning device to place the work-piece into proper position to be engaged or operated upon, to release and clear the work-piece

during the operating process, and to receive the work-piece or finished article and place the same into said extreme position to be removed from the apparatus or mill.

29. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished article or product therefrom, which consists in placing the work-piece upon a rectilinearly movable positioning device arranged normally away from and adapted to operate in a plane between the engaging or the rolling or the forming members of said apparatus or mill and between said normal position and another or extreme position of said device at an opposite point away from said engaging or said rolling or said forming members, in operating said positioning device to place the work-piece into proper position to be engaged or operated upon and to receive the work-piece or finished article and place the same into said extreme position to be removed from the apparatus or mill.

30. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished article or product therefrom, which consists in placing the work-piece onto a rectilinearly movable positioning device, in operating said positioning device to place the work-piece into proper position to be engaged or operated upon, to release and clear the work-piece during the operating process, and to receive the work-piece or finished article and place the same into position to be removed from the apparatus or mill.

31. The method of positioning a work-piece into an apparatus or mill for rolling or otherwise forming articles of manufacture and of removing the finished article or product therefrom, which consists in placing the work-piece onto a rectilinearly movable positioning device, in operating said positioning device to receive the work-piece and place the same into proper position to be engaged or operated upon, and to receive the work-piece or finished article and place the same into position to be removed from the apparatus or mill.

32. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising a cylinder, a piston within said cylinder having a piston-rod extending therefrom, means at the outer end of said piston-rod adapted to receive a work-piece or finished article, and a stop on said piston-rod to limit the movement thereof in one direction.

33. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising a cylinder having a piston provided with a piston-rod, means at the outer end of said piston-rod adapted to receive a work-piece or finished article, means to limit the movement of said piston in one direction, and a stop adjustable on said piston-rod and adapted to engage said cylinder to limit the movement of said piston in its other direction.

34. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising an outer fixed cylinder, a piston within said cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, and means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article.

35. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising an outer fixed cylinder, a piston within said outer cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, a carrying and positioning member at the outer end of said last-mentioned piston-rod to receive the work-piece or finished article, means to limit the movement of said first-mentioned piston-rod in one direction, and an adjustable stop coöperating with said first-mentioned piston-rod and adapted to engage said outer fixed cylinder to limit the movement of said first-mentioned piston-rod in its other direction.

36. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising an outer cylinder having a fixed position, a piston within said cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, a carrying and positioning member at the outer end of said last-mentioned piston-rod to receive the work-piece or finished article, and means to limit the movement of each of said pistons in both directions.

37. In an apparatus or mill for rolling or otherwise forming articles of manufacture, a rectilinearly movable device for positioning a work-piece comprising an outer cylinder having a fixed position, a piston within said cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, a receiving and positioning member at the outer end of said last-mentioned piston-rod to receive the work-piece or finished article, and means to limit the movements of said pistons in one or in opposite directions.

38. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising a support having a fixed position, an

outer cylinder fastened to said support and having guides or lugs at one end, a piston within said cylinder having a piston-rod serving also as an inner cylinder and being provided at its outer end with a cross piece or flange, guide and stop rods secured to said cross piece or flange and slidable in said guides or lugs, and adjustable means on said guide and stop rods adapted to engage said guides or lugs to limit the movement of said piston-rod or inner cylinder in one direction.

39. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising a support having a fixed position, an outer cylinder fastened to said support and having guides at one end, a piston within said cylinder having a piston-rod serving also as an inner cylinder and being provided at its outer end with a cross piece or flange, guide and stop rods secured with one of their ends to said cross piece or flange and slidable in said guides, and adjustable stops on said guide and stop rods at their other ends adapted to engage one of the ends of said guides to limit the movement of said piston-rod or inner cylinder in one direction, said cross piece or flange being also adapted to engage the other ends of said guides to limit the movement of said piston-rod or inner cylinder in the other direction.

40. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising an outer cylinder having guides or lugs at one end, a piston within said cylinder having a piston-rod serving also as an inner cylinder and being provided at its outer end with a cross piece or flange, guide and stop rods secured with one of their ends to said cross piece or flange and slidable in said guides or lugs, nuts adjustable on said rods at their other ends to limit the movement of said inner cylinder in one direction, a piston within said inner cylinder having a piston-rod, means at the outer end of said last-mentioned piston-rod adapted to receive the work-piece or finished article, and a stop adjustable on said last-mentioned piston-rod to limit the inward movement thereof.

41. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising a cylinder, a piston within said cylinder having a piston-rod, means at the outer end of said piston-rod adapted to receive the work-piece or finished article, means whereby a constant pressure is exerted against said piston in one direction, and means whereby pressure is exerted against said piston in its other direction to overcome said constant pressure.

42. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising a support having a fixed position, an outer cylinder fastened to said support, a piston within said cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, means whereby a constant pressure is exerted against said first-mentioned piston in one direction, and means whereby pressure is exerted against said first-mentioned piston in its other direction to overcome said constant pressure.

43. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for positioning a work-piece comprising a support having a fixed position, an outer cylinder fastened to said support, a piston within said outer cylinder having a piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a piston-rod, means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article, means whereby a constant pressure is exerted against said first-mentioned piston in one direction, means whereby pressure is exerted against said first-mentioned piston in its other direction to overcome said constant pressure, means whereby a constant pressure is exerted against said second-mentioned piston in one direction, and means whereby pressure is exerted against said second-mentioned piston in its other direction to overcome said constant pressure exerted against said second-mentioned piston.

44. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism comprising a vertically disposed cylinder, a piston within said cylinder having a hollow piston-rod serving also as a second cylinder, a piston within said second cylinder having a piston-rod, means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article, and means whereby a power or pressure medium or mediums are caused to act against each of said pistons to position said piston-rods in extended, retracted or intermediate positions.

45. In an apparatus or mill for rolling or otherwise forming articles of manufacture, a rectilinearly movable device comprising an outer cylinder arranged in a fixed position, a piston within said outer cylinder having a hollow piston-rod serving also as a second cylinder, a piston within said second cylinder having a piston-rod, means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article, and means whereby a power or pressure medium or mediums are caused to act against each of said pistons to position said piston-rods in extended, retracted or intermediate positions.

46. In an apparatus or mill for rolling or forming car wheels or other circular

bodies, a raising, lowering and retaining device having an outer cylinder, a piston within said outer cylinder having a hollow piston-rod serving also as an inner cylinder and having a vertically-ribbed rod arranged centrally therein, a piston within said inner cylinder having a hollow piston-rod into which said ribbed rod extends, and means at the outer end of said last-mentioned piston-rod for receiving a work-piece or finished article.

47. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism comprising an outer cylinder arranged in a fixed position, a piston within said outer cylinder having a hollow piston-rod serving also as an inner cylinder and having a ribbed axially-disposed rod fixedly arranged therein, a piston within said inner cylinder having a central bore and a piston-rod with a central bore into which said ribbed rod extends, and means at the outer end of said last-mentioned piston rod for receiving a work-piece or finished article.

48. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a raising, lowering and retaining device having a vertically disposed outer cylinder, a piston within said outer cylinder having a hollow piston-rod serving also as an inner cylinder, means to prevent rotation of said hollow piston-rod, a piston within said hollow piston-rod itself provided with a piston-rod, means within said inner cylinder to prevent rotation of said last-mentioned piston-rod, and means at the outer end of said last-mentioned piston - rod to receive a work-piece or finished article.

49. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism comprising an outer cylinder arranged in a fixed position, a piston within said outer cylinder having a piston-rod with a bore serving as an inner cylinder, means to prevent rotation of said bored piston-rod, a piston within said bored piston-rod itself provided with a piston-rod, means to prevent rotation of said last-mentioned piston-rod, and means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article.

50. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a device for raising, lowering and retaining a work-piece having an outer cylinder, a piston within said outer cylinder held against rotation therein and having a hollow piston-rod serving also as an inner cylinder, a piston within said inner cylinder having a central bore and a bushing secured on said bore, said last-mentioned piston having also a hollow piston rod, means at the outer end of said last-mentioned piston-rod for receiving a work-piece or finished article, and a ribbed rod secured centrally to the first-mentioned piston and extending centrally into said inner cylinder and into the hollow piston-rod of said second-mentioned piston and fitting the bushing in said second-mentioned piston, said bushing having its hole shaped or formed so as to correspond with the cross section of said ribbed rod.

51. In an apparatus or mill for rolling or otherwise forming articles of manufacture, a rectilinearly movable device for positioning a work-piece comprising an outer cylinder, a piston within said outer cylinder having a piston-rod with a central bore serving as an inner cylinder, a piston within said inner cylinder having a central bore and a bushing secured thereto, said last-mentioned piston having also a piston-rod with a central bore, a receiving or positioning member at the outer end of said last-mentioned piston-rod for receiving a work-piece or finished article, and a ribbed rod secured centrally to the first-mentioned piston and extending centrally into said inner cylinder and into the bored piston-rod of said second-mentioned piston and fitting the bushing in said second-mentioned piston, said bushing having its hole shaped or formed so as to correspond with the cross-section of said ribbed rod.

52. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising an outer cylinder, a piston within said cylinder having a hollow piston-rod serving also as an inner cylinder, said outer cylinder having ports to direct a power or pressure agent or agents against opposite ends of said piston and having also a chamber and an inlet leading a power or pressure agent to said chamber, a pipe telescoping into said chamber and arranged to move with said piston or inner cylinder, a piston within said second or inner cylinder, and ports within said second or inner cylinder to direct a power or pressure agent or agents against opposite ends of the piston therein, said second-mentioned piston having a piston-rod, and a receiving or positioning member at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article.

53. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a raising, lowering and retaining device comprising a vertically disposed outer cylinder having a chamber adapted to receive a power or pressure agent, a piston within said outer cylinder having a piston-rod serving also as an inner cylinder, said outer cylinder having a port for the power or pressure agent to direct the same against the lower end of said piston, a piston within said inner cylinder having a piston-rod, a receiving or positioning member at the outer end of said last-mentioned piston-rod to re-

ceive a work-piece or finished article, said inner cylinder having a port for a power or pressure agent to direct the same against the lower end of the piston therein, and elescopic connection between said last-mentioned port and the chamber of said outer cylinder.

54. In an apparatus or mill for rolling or forming car wheels or other circular bodies, mechanism for positioning a work-piece comprising an outer cylinder arranged in a fixed position and having a chamber adapted to receive a power or pressure agent, a piston within said outer cylinder having a piston-rod serving also as an inner cylinder, said outer cylinder having a port for the power or pressure agent to direct the same against the lower end of said piston, a piston within said inner cylinder having a piston-rod, means at the outer end of said last-mentioned piston-rod to receive a work-piece or finished article, said inner cylinder having a port for a power or pressure agent to direct the same against the lower end of the piston therein, and a pipe telescoping into the chamber of said outer cylinder and connected with said last-mentioned port.

55. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between the work-supporting means and between positions below and above said work-supporting means or between positions below and above the rolls of said apparatus or mill, said device comprising means for receiving the work-piece, and means for lowering the work-piece from a position above said work-supporting means or from a position above said rolls to a position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said work-supporting means.

56. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and being adapted to operate in a plane between the piercers or work-supporting centers or work-supporting means and between positions below and above said piercers or work-supporting centers or work-supporting means of said apparatus or mill, said device comprising means for receiving the work-piece, and mechanism for lowering the work-piece from a position above said piercers or work-supporting centers or work-supporting means to a central position in which the center of the outer portion or periphery of the work-piece is in line or approximately in line with the centers or axes of said piercers or work-supporting centers or work-supporting means and for temporarily retaining said work-piece in said central position to permit said piercers or work-supporting centers or work-supporting means to pierce, or penetrate, or center said work-piece in the center of its outer portion or periphery.

57. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between the work-supporting means and between positions below and above said work-supporting means or positions below and above the rolls of said apparatus or mill, said device comprising means to receive a work-piece or finished article, and mechanism for raising the work-piece or finished article from the position it occupies during the rolling or operating process to a position above said work-supporting means or to a position above said rolls.

58. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between the work-supporting means or the rolls and between positions below and above said work-supporting means or between positions below and above said rolls of said apparatus or mill, said device comprising means to receive a work-piece or finished article, and mechanism to raise the work-piece or finished article from a position between the rolls or from a position between said work-supporting means to a position above the rolls or to a position above said work-supporting means of said apparatus or mill.

59. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between the work-supporting means or the rolls and between positions below and above said work-supporting means or positions below and above said rolls of said apparatus or mill, said device comprising means to receive the work-piece, and mechanism for lowering the work-piece from a position above said work-supporting means or from a position above said rolls to a position central and between said work-supporting means with the center of the outer portion or periphery of the work-piece in line or approximately in line with the centers or axes of said work-supporting means, for temporarily retaining the work-piece in said central position to permit said work-supporting means to centrally engage the work-piece, for lowering said receiving means of said device away from the work-piece into a position below the work-piece to clear the same during the rolling or operating process, for again raising said receiving means to a position to receive the work-piece or finished article, and for raising the work-piece

or finished article from said central position to a position above said work-supporting means or to a position above said rolls.

60. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between the work-supporting members and between positions below and above said work-supporting members of said apparatus or mill, said device comprising mechanism for receiving the work-piece and for lowering and positioning the work-piece into a position in which the outer portion or periphery of the work-piece is coaxial or approximately so with the work-supporting members of said apparatus or mill.

61. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate between positions below and above the work-supporting members or the rolls of said apparatus or mill, said device comprising mechanism for receiving the work-piece and for lowering and positioning the work-piece into a position in which the work-piece is to be operated upon.

62. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate between positions below and above the work-supporting members or the rolls or other operating parts of said apparatus or mill, said device comprising mechanism for receiving the work-piece or finished article and raising the same from the position it occupies during the rolling or operating process to a position above said work-supporting members or to a position above said rolls or said other operating parts.

63. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below or away from the work-supporting members or the rolls or other operating parts of said apparatus or mill and adapted to operate between positions at opposite points of and away from said work-supporting members or said rolls or said other operating parts, said device comprising mechanism for receiving the work-piece or finished article and raising the same to a position above or away from said work-supporting members or said rolls or said other operating parts.

64. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below and adapted to operate in a plane between positions below and above the work-supporting members or the rolls of said apparatus or mill, said device comprising means or mechanism for receiving the work-piece and for lowering and for positioning the work-piece into a central position between said work-supporting members with the outer portion or periphery of the work-piece coaxial or approximately so with said work-supporting members, and also for temporarily retaining the work-piece in said central position to permit said work-supporting members to centrally engage the work-piece from opposite sides, for lowering the operating parts of said device away from the work-piece into a position below the work-piece to clear the same during the rolling or operating process, for again raising the operating parts of said device to a position to receive the work-piece or finished article, and for raising the work-piece or finished article from said central position of the work-piece to a position above said work-supporting members or to a position above said rolls.

65. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below or away from the work-supporting means or the rolls of said apparatus or mill and adapted to operate in a plane adjacent the work-supporting means and between positions at opposite points of and away from said work-supporting means or said rolls, said device comprising means or mechanism for receiving the work-piece and for carrying and positioning the work-piece into a position in which the outer portion or periphery of the work-piece is coaxial or approximately so with said work-supporting means.

66. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below or away from the work-supporting means and adapted to operate in a plane adjacent the work-supporting means and between positions at opposite points of and away from said work-supporting means or the rolls of said apparatus or mill, said device comprising means or mechanism for receiving the work-piece and for carrying and positioning the work-piece into a position central with said work-supporting means, and also for temporarily retaining the work-piece in said position central with said work-supporting means to permit said work-supporting means to centrally engage the work-piece.

67. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged below or away from the work-supporting means or the rolls of said apparatus or mill and adapted to operate in a plane adjacent said work-supporting means and between positions at opposite points of and away from said work-supporting means or said rolls,

said device comprising means or mechanism for receiving the work-piece or finished article and for carrying the work-piece or finished article from the position it occupies during the rolling or operating process to a position above or away from said work-supporting means or said rolls.

68. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged in a fixed position below or away from the work-supporting means or the rolls or other operating parts of said apparatus or mill and adapted to operate between positions at opposite points of and away from said work-supporting means or said rolls or said other operating parts, said device comprising means or mechanism for receiving a work-piece or finished article and for carrying the same to a position above or to a position away from said work-supporting means or said rolls or said other operating parts.

69. In an apparatus or mill for rolling or forming car wheels or other circular bodies, a work-positioning device arranged at one side of the work-supporting means or the rolls or other operating parts of said apparatus or mill and adapted to operate between positions at opposite points of and away from said work-supporting means or said rolls or said other operating parts, said device comprising means or mechanism for receiving the work-piece and for carrying and positioning the work-piece into a position central with said work-supporting means and for temporarily retaining the work-piece in said central position to permit said work-supporting means to centrally engage the work-piece, and also for moving the operating parts of said device into a position away from the work-piece to clear the work-piece during the rolling or operating process, for again moving said operating parts toward the work-piece into a position to receive the work-piece or finished article, and for moving the work-piece or finished article from said central position of the work-piece to a position to be removed from said apparatus or mill.

70. In an apparatus or mill for rolling or otherwise forming articles of manufacture, a work-positioning device arranged in a position below or away from the work-piece or the rolls or the forming members or other operating parts of said apparatus or mill and adapted to receive the work-piece and place and position the same into proper position to be engaged or operated upon, to release and clear the work-piece during the operating process, and to receive the work-piece or finished article and place the same into position to be removed from the apparatus or mill.

71. In an apparatus or mill for rolling or otherwise forming articles of manufacture, a work-positioning device arranged in a position below or away from the work-piece or the rolls or the forming members or other operating parts of said apparatus or mill and adapted to receive the work-piece and place the same into proper position to be engaged or operated upon, and to receive the work-piece or finished article and place the same into proper position to be removed from the apparatus or mill.

In testimony whereof, I have hereunto set my hand.

LOUIS F. DIETER.

Witnesses:
E. M. SCHWEIGER,
E. J. MEYER.