Sept. 18, 1956 E. H. KENDALL 2,763,168

WHEEL ROLLING MILL

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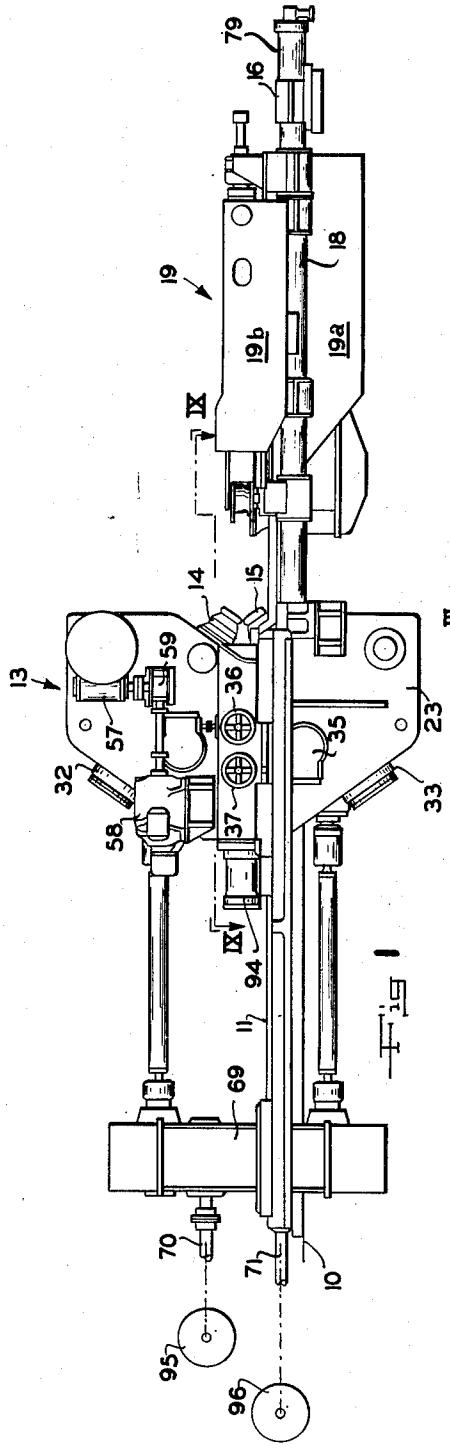


Fig. 1

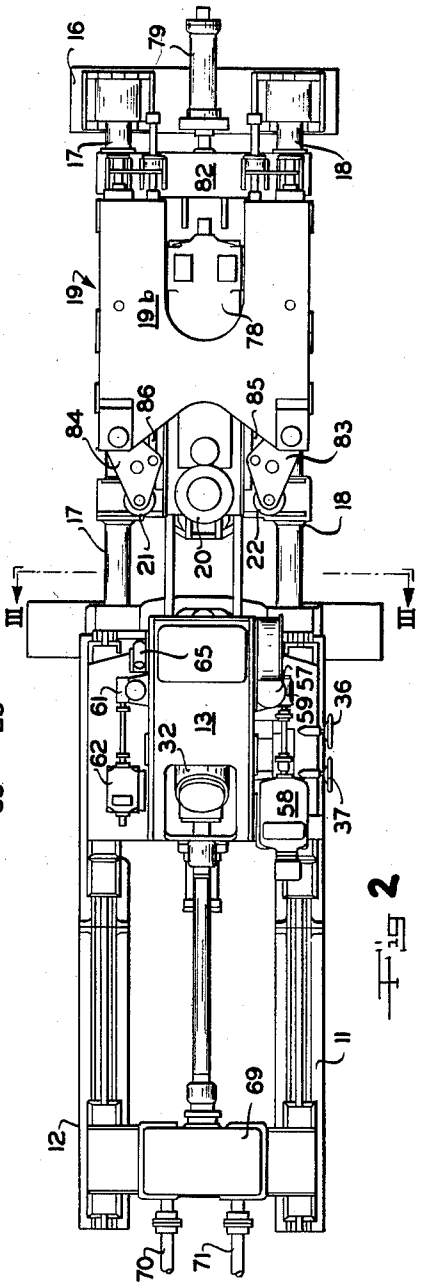


Fig. 2

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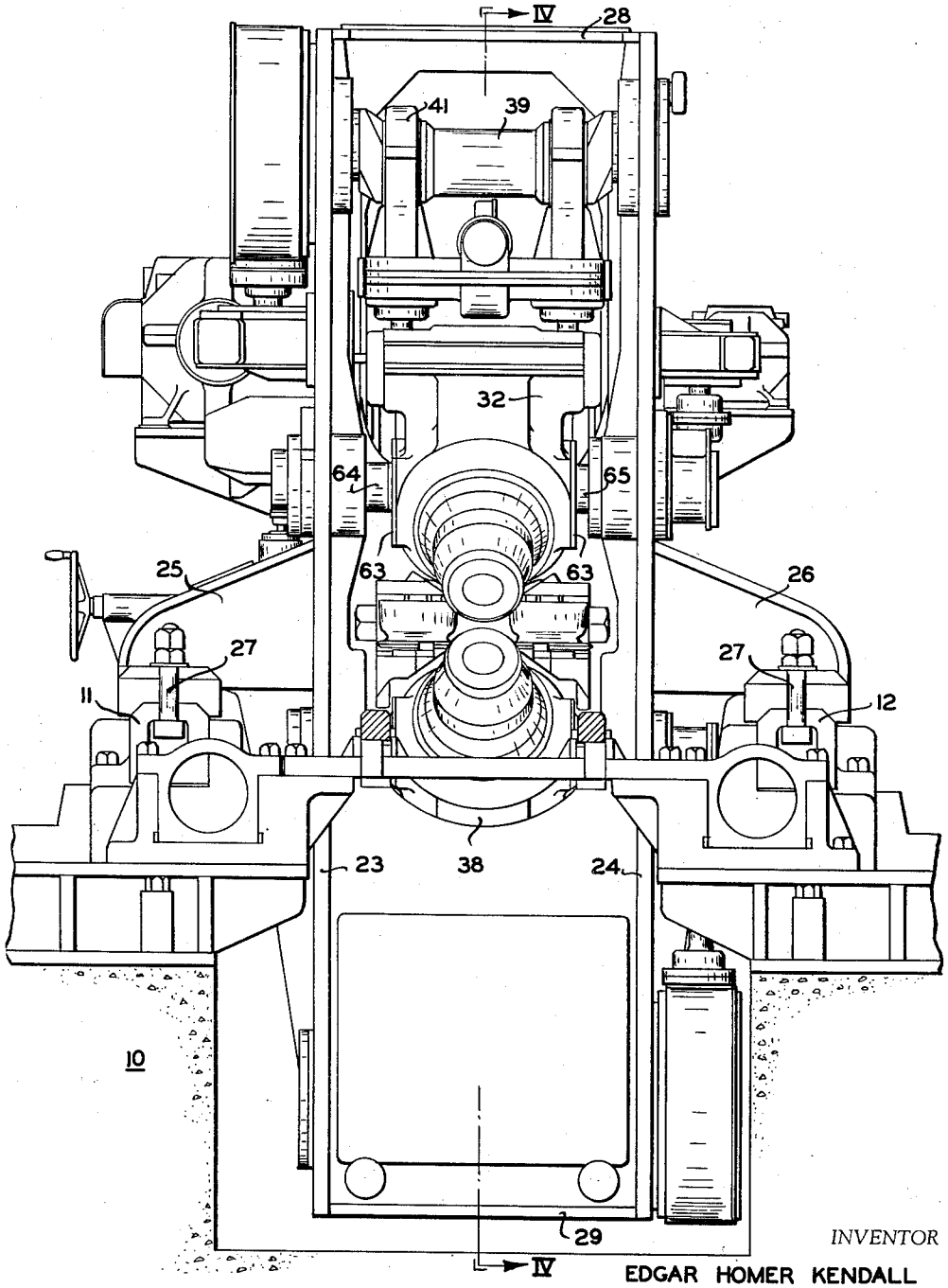


Fig 3

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WHEEL ROLLING MILL

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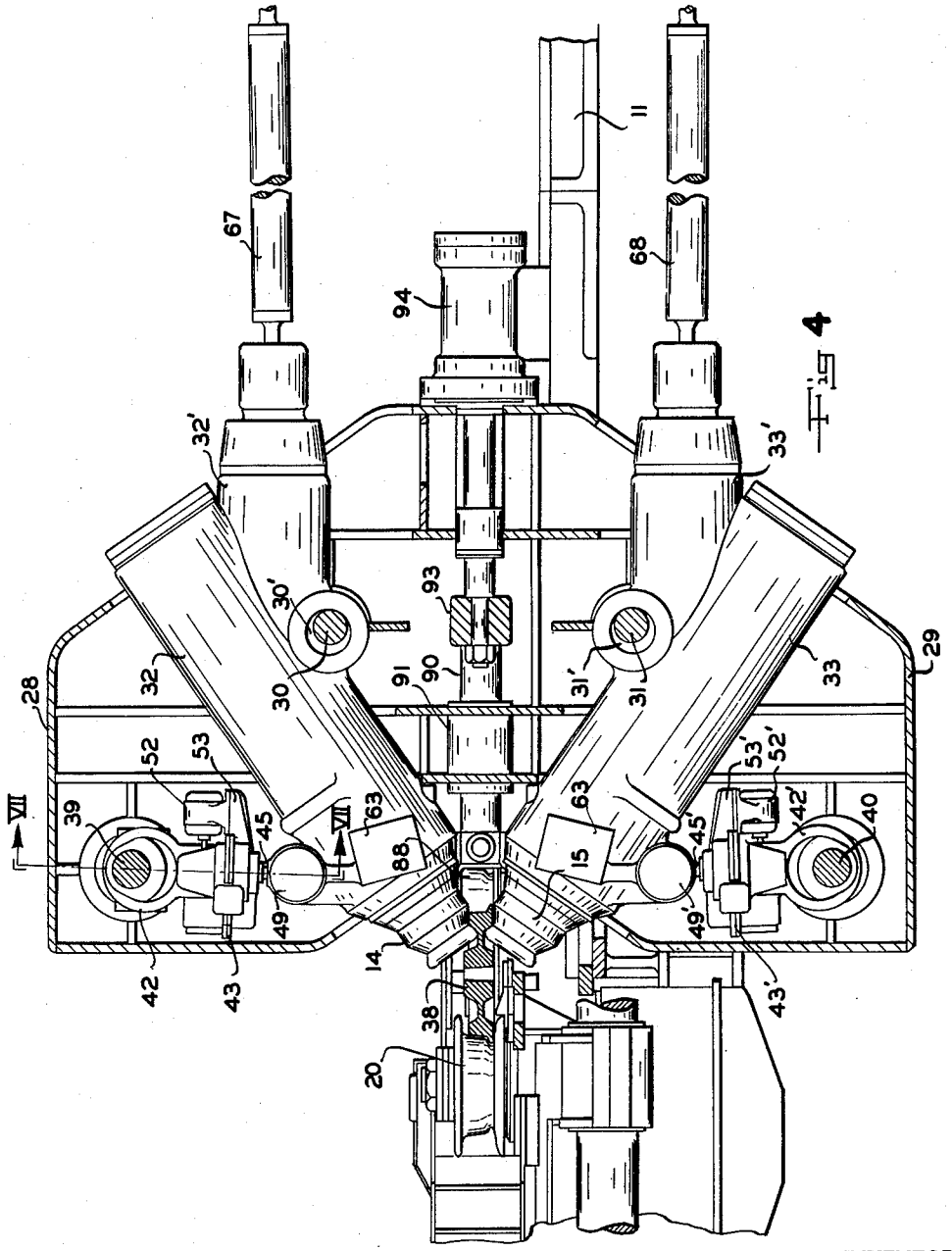


Fig. 4

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WHEEL ROLLING MILL

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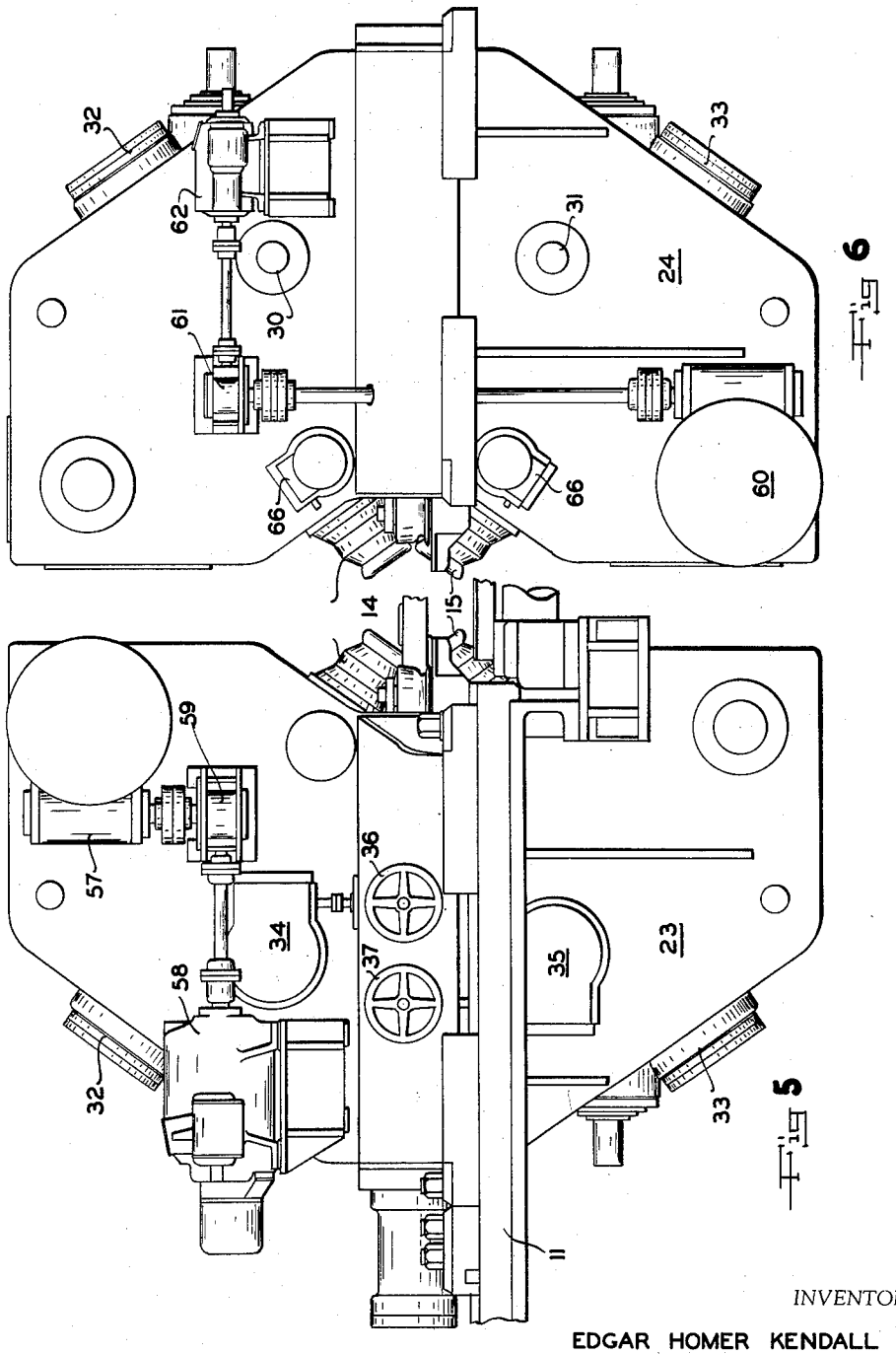


Fig. 6

Fig. 5

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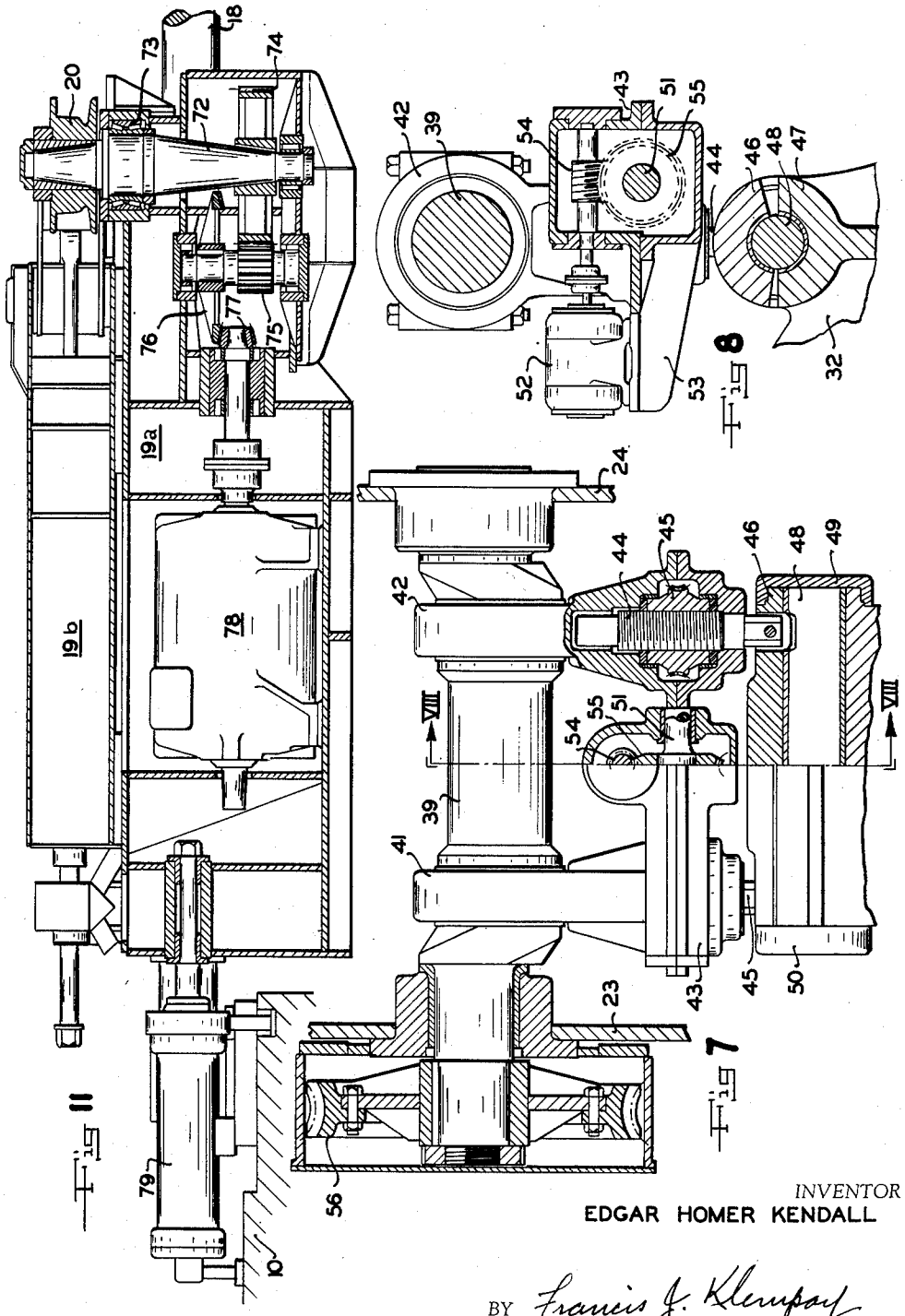


Fig. 8

Fig. 7

Fig. 11

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WHEEL ROLLING MILL

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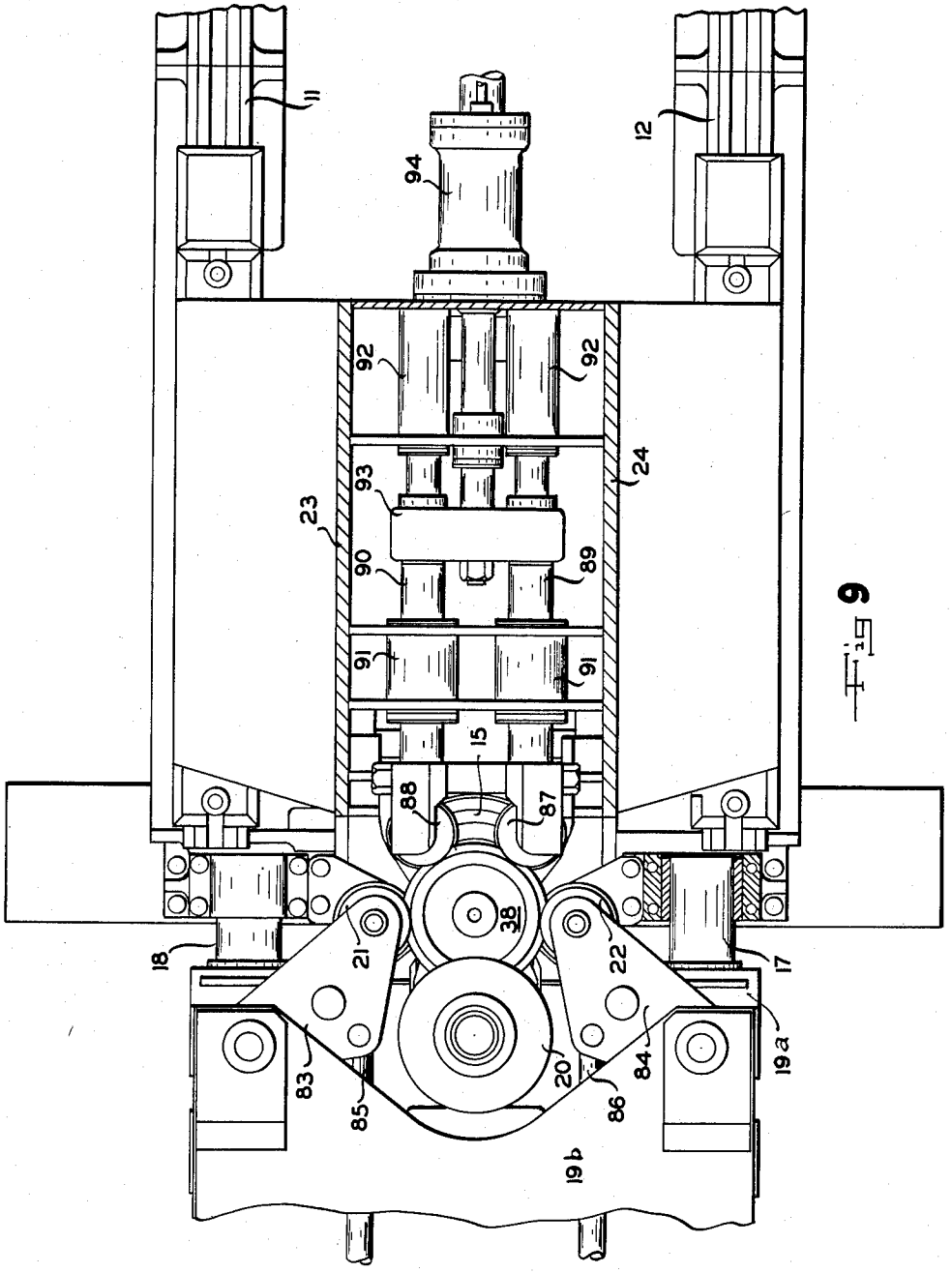


FIG. 6

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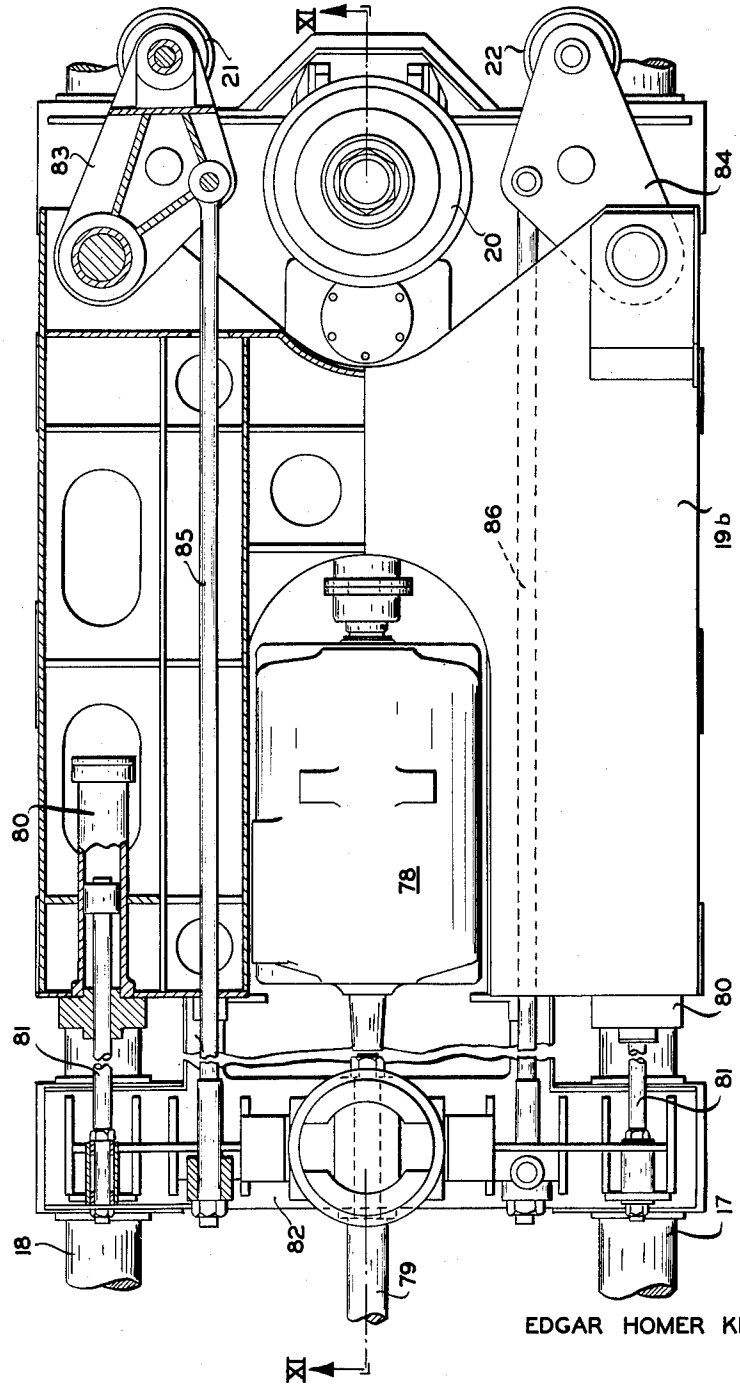


Fig. 10

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2,763,168

WHEEL ROLLING MILL

Edgar Homer Kendall, Alliance, Ohio

Application December 28, 1951, Serial No. 263,852

3 Claims. (Cl. 80—16)

The present invention relates to metal working and forming apparatus and more particularly to apparatus of this general character for use in the production of large metal wheels, as for example the type commonly utilized on railroad vehicles, in an efficient and expedient manner and in a semi-finished state requiring a minimum of additional finish machine operations.

The present invention contemplates the reception of partially formed wheels from suitable forging and working apparatus, and subsequent working and forming of such partially formed wheels by means of a plurality of cooperatively related rolls into a semi-finished product in an expeditious manner suitable for and readily adaptable to mass production output.

In accordance with the above it is an object of this invention to provide means comprising a plurality of cooperatively related working and forming rolls for simultaneously forming a metal wheel along each of its coordinate axes substantially to the dimensions and contours desired in the finished product.

Another object of this invention is the provision of apparatus of the character and for the purpose stated which is particularly adapted to receive partially formed wheels being transferred from associated pre-forming apparatus by means of conventional conveying apparatus, and to thereafter form such wheel into a semi-finished product in the shortest practicable time whereby but a single heating of the blank or bloom is required for the entire sequence of forming operations.

More particularly the invention contemplates the use of a plurality of vertically journaled rolls which are movable horizontally toward and away from each other for acting upon and forming the outer peripheral contours of a wheel, and of a plurality of cooperatively related relatively movable rolls adapted to simultaneously act upon and form the contours of the axial ends of the wheel. As will appear hereinafter, the invention also provides means for retracting all of the above mentioned rolls at the end of a wheel forming operation whereby a partially formed wheel may be readily moved horizontally into the apparatus in readiness for a new forming operation.

Yet another object of the invention is the provision of apparatus of the character described embodying certain novel structural features which render the apparatus particularly suitable for the purpose intended. As will appear hereinafter the apparatus forming the subject matter of the present invention includes power actuating devices for executing the proper related movement of the various rolls which are uniquely adapted for the particular functions involved and which are readily adaptable for automatic or semi-automatic operation as may be desired in various installations.

The above and other objects and advantages of the invention will become apparent upon full consideration of the following detailed specification and accompanying drawings wherein are shown certain preferred embodiments of the invention.

In the drawing:

Figure 1 is a side elevation of apparatus for hot working and forming metal wheels as constructed in accordance with the teachings of my invention;

Figure 2 is a plan view of the apparatus of Figure 1;

Figure 3 is a section view of the apparatus of my invention taken generally along line III—III of Figure 2 and showing particularly the arrangement of elements utilized for forming and sizing the axial end edges of a wheel being formed in my apparatus;

Figure 4 is a section view taken generally along line IV—IV of Figure 3;

Figures 5 and 6 are opposite side elevations of the apparatus shown in Figure 3;

Figure 7 is a fragmentary section view taken generally along line VII—VII of Figure 4;

Figure 8 is a fragmentary section view taken generally along line VIII—VIII of Figure 7;

Figure 9 is an enlarged fragmentary section view taken generally along line IX—IX of Figure 1 showing details of the various cooperating working and forming rolls utilized in the manner taught by my invention for acting upon and forming the outer peripheral surface of a metal wheel;

Figure 10 is an enlarged fragmentary view, partly in section, of the apparatus shown in Figure 2, showing in particular certain features and details of construction of a movable carriage which mounts the main or anvil roll of the apparatus; and

Figure 11 is a section view taken generally along line XI—XI of Figure 10.

Referring to the drawings and initially to Figures 1 and 2 thereof the reference numeral **10** designates a concrete or other suitable foundation upon which is mounted a pair of spaced parallel tracks **11** and **12**. Mounted upon tracks **11** and **12** at the right hand end portion thereof and disposed substantially vertically therebetween is a mounting frame **13** for a pair of edge rolls **14** and **15** which, as will hereafter become apparent, are adapted to act upon and form the axial end edges of a wheel being processed in my apparatus.

Supported at one end in the frame **13**, and at the other end by a stanchion **16** mounted on the foundation **10** is a pair of spaced parallel guide rods **17** and **18** which serve to mount a carriage **19** for slidable movement toward and away from the frame **13**. As will become more fully apparent the carriage **19** serves as a movable mount for a main or anvil roll **20** and a plurality of guide rolls **21** and **22** which are adapted in cooperation with edge rolls **14** and **15** to hot-work and form a metal wheel in the manner desired.

The frame **13**, which is shown in detail in Figures 3–6, comprises spaced vertical side wall members **23** and **24** which are mounted by means of outwardly extending cantilever arms **25** and **26** upon the tracks **11** and **12**, and are secured thereto by means of a plurality of bolts **27**. The side walls **23** and **24** are maintained in spaced relation by means of top and bottom walls **28** and **29** and other suitable transversely disposed structural members as appears in Figure 4.

Pivotally mounted in the frame **13** by means of eccentric shafts **30** and **31** are journal housings **32** and **33** for edge rolls **14** and **15** respectively. The shafts **30** and **31** are rotatably journaled in the side walls **23** and **24** of the frame **13** and are provided with eccentric reaches **30'** and **31'** for pivotally supporting roll housings **32** and **33** respectively whereby the normal point of pivotal support for the housings **32** and **33** may be adjusted by suitable rotation of the shafts **30** and **31**.

Means for rotating the shafts **30** and **31** are shown in Figure 5 and comprise worm gear reducers **34** and **35** associated respectively with shafts **30** and **31** and operated

by means of hand wheels 36 and 37. The purpose of the above described adjustment may be best ascertained with reference to Figure 4 wherein is shown a wheel 38 being formed in my apparatus. It will be observed that the edge rolls 14 and 15 are contoured to act upon the inner annular surface as well as the axial end edges of the rim of the wheel 38. Thus, for example, if it is desirable to provide a wheel having a rim which is of greater radial thickness at the lower side, exclusive of the flange portion as shown on the wheel 38, the shafts 30 and 31 may be suitably adjusted by means of hand wheels 36 and 37 so that the pivot point of housing 33 is shifted substantially forward or to the left of the pivot point of housing 32. In the normal use of the apparatus herein described it is contemplated that adjustment of the housing pivots will be but infrequently required, and accordingly I have provided only a manual adjustment by means of hand wheels 36 and 37. It will be understood, however, that hand wheels 36 and 37 may be replaced by suitable remote operated power means wherever desirable.

According to the teachings of my invention housings 32 and 33 and rolls 14 and 15 journaled therein will initially be pivoted away from the position shown in Figure 4 whereby a wheel to be formed may be conveyed horizontally from a forming press or other allied apparatus, not shown, into the position indicated in Figure 4. The housings 32 and 33 will then be pivoted inwardly into contact with the wheel 38 and the rolls 14 and 15 forcibly urged toward each other as the wheel 38 is rotated about its axis. To accomplish this pivotal movement I have provided cranks 39 and 40 which are journaled in the side walls 23 and 24 of frame 13 and which are associated with the forward end portions of housings 32 and 33 by means of adjustable connecting linkage to be hereafter explained.

Figures 7 and 8 show details of the above mentioned linkage for the upper edge roll housing 32, and it will be observed therein that spaced connecting members 41 and 42 are journaled on the eccentric reach of crank 39 and depend downwardly therefrom. Connecting members 41 and 42 are rigidly secured at their lower end extremities to a horizontally disposed gear box 43 wherein is provided means for adjusting the length of the connecting linkage assembly. The length adjusting means comprises vertically disposed threaded shafts 44 which are positioned in alignment with connecting members 41 and 42 and which are engaged and normally restrained against vertical displacement by similarly threaded worm gear nuts 45. The lower ends of shafts 44 are connected to a horizontally disposed pad 46 having a concave lower contour as shown in Figure 8. The pad 46 is positioned over a similar pad portion 47 which forms an integral part of the upper housing 32, and located between the concave surfaces of the pads 46 and 47 is a relatively large diameter shaft 48 which functions to evenly distribute the pressure exerted by the crank 39 and associated connecting linkage over the surfaces of the pads 46 and 47 regardless of the relative angular disposition thereof. Circular end cap members 49 and 50 are provided to prevent separation of the pad 46 from the pad portion 47 of housing 32 whereby when the pad 46 is drawn upwardly by suitable movement of the crank 39 and linkage the housing 32 will also be drawn upwardly into a retracted position.

In the contemplated operation of my apparatus the crank 39 will operate through an angle of approximately 45 degrees; the housing 32 being fully lowered with the eccentric reach of the crank 39 in its lowermost position, and fully retracted with the crank 39 rotated approximately 45 degrees from such position. Thus to adjust the lowermost position of the roll 14 to conform with the desired dimensions of the wheel 38 to be formed the threaded shafts 44 must be raised or lowered with respect to the gear box 43 and connecting members 41 and 42.

This may be accomplished by suitable rotation of the worm nuts 45 and for this purpose I have provided a horizontally disposed shaft 51 having a worm gear, not shown, at each end thereof for cooperating engagement with the worm nuts 45 whereby upon rotation of the shaft 51 shafts 45 will be raised or lowered simultaneously to accordingly raise or lower the housing 32 with respect to the crank 39. Power means for rotating shaft 51 are preferably provided and in the illustrated embodiment of the invention such means includes an electric motor 52 which is rigidly mounted on a platform 53 extending from the gear box 43. The motor 52 carries a worm gear 54 upon its operating shaft for engagement with a worm wheel 55 mounted on the shaft 51, and it will be understood that energization of motor 52 will cause the housing 32 to be raised or lowered with respect to crank 39 in the manner desired.

In the embodiment of the invention herein described the connecting linkage associated with the lower crank 40 and edge roll housing 33 is substantially identical to that described as associated with the upper crank 39 and housing 32 and therefore the lower linkage will not be separately described. Reference to various of the components of the lower linkage may be made, however, by comparing reference numerals of the upper linkage to their primed counterparts as used with respect to the lower linkage.

It will be understood in conjunction with the preceding that any length adjustment of the connecting linkages will be made prior to, rather than during a wheel forming operation whereby full advantage may be taken during the forming operation of the extremely high leverage of the cranks 39 and 40 as the same are rotated into their lowermost and uppermost positions respectively.

For rotating the upper crank 39 in the manner desired I have provided a worm wheel 56 which is rigidly secured to an outwardly extending end portion of the crank 39 and which is operatively associated with a worm gear, not shown, journaled in housing 57. The worm gear, not shown, is driven by an electric motor 58 through additional gear reducing means shown generally at 59. The motor 58, in the illustrated embodiment of the invention, is mounted on the side wall 23, and of course is of the reversing type whereby rotation of crank 39 may be effected in either direction.

Control means for operating motor 58 are not shown, but it will be understood that conventional switches and allied controls may be located remotely of the apparatus at a centralized control pulpit, not shown, and that such controls may include, if desired, suitable roll position or work detecting means whereby operation of the motor 58 may be rendered substantially automatic.

Means for rotating the lower crank 40 includes gear reducers 60 and 61 and electric motor 62, and of course suitable control apparatus therefor, not shown. It will be noted from inspection of Figures 5 and 6 that motor 62 which operates the lower crank 40, is substantially smaller in size than the motor 58 which operates the upper crank 39. This may be explained from the fact that, as will be more fully appreciated upon consideration of the remainder of the specification, in the preferred operation of the apparatus both edge rolls 14 and 15 are retracted for loading a wheel into or removing one from the apparatus, and upon completion of the loading the lower edge roll 15 is fully or substantially fully raised. The fully raised lower edge roll 15 thus forms a supporting member for a wheel being processed while the upper roll 14 is forcibly urged downwardly to perform the required operation.

To properly guide the edge roll housings 32 and 33 at their forward ends I have provided vertically disposed bearing plates 63 thereon which are adapted to act cooperatively with guide members 64 and 65 extending inwardly from side walls 23 and 24 respectively whereby the forward ends of housings 32 and 33 are confined to move-

ment in a vertical plane. The guide members 65 are provided with adjusting means 66 positioned on the outside of side wall 24 whereby necessary guide adjustments may be readily made from outside the apparatus.

I have found it desirable to provide power means for rotating the edge rolls 14 and 15 during a wheel forming operation, and to this end I have provided generally horizontally extending portions 32' and 33' of roll housings 32 and 33 which contain suitable gearing means, not shown, associated with the edge rolls 14 and 15 which gearing means are also connected with conventional universal wobbler shafts 67 and 68. Wobbler shafts 67 and 68, as shown in Figures 1 and 2, are connected to a speed reducing gear box 69 mounted on the tracks 11 and 12 in spaced relation to the frame 13, and suitable prime movers 95 and 96 are connected with the gear box 69 through shafts 70 and 71 whereby the wobbler shafts 67 and 68 may be driven in the manner desired.

Shown in detail in Figures 9, 10 and 11 is the carriage 19 which mounts the main or anvil roll 20 and guide rolls 21 and 22. Carriage 19 comprises two parts 19*a* and 19*b* which are movable longitudinally as a unit toward and away from the frame 13 and are also relatively movable longitudinally as will become apparent. The principal part 19*a* of the carriage 19 is slidably supported upon guide rods 17 and 18 for movement longitudinally therealong, and is provided with means for rotatably carrying the anvil roll 20. As shown in Figure 11 the part 19*a* comprises the lower portion of the carriage 19, and carries at its forward end a vertically disposed anti-frictionally journaled shaft 72. The shaft 72 extends upwardly from the carriage part 19*a*, and mounted on the upwardly extending portion of the shaft 72 is the anvil roll 20. A large heavy-duty anti-friction bearing 73 is provided for journaling the shaft 72 in close adjacency with the roll 20 whereby the large transverse forces exerted against the roll 20 may be effectively confined.

Mounted on the lower end of shaft 72 is a large spur gear 74 which is adapted to engage and be driven by pinion 75. Pinion 75 is in turn driven through bevel gears 76 and 77 by a large motor 78 which is also carried by the carriage part 19*a* as shown. It will be understood, of course, that the drive arrangements for anvil roll 20 and edge rolls 14 and 15 are so designed as to operate the respective rolls at speeds suitably proportioned for obtaining substantially equal peripheral velocities whereby slippage between the driven rolls and the wheels being acted upon is minimized.

Mounted rearwardly of the carriage 19 upon the foundation 10, and connected with the carriage part 19*a*, is a hydraulic actuator 79, as shown in Figure 11. The actuator 79 is adapted in response to the application of suitable fluid pressure thereto to move the carriage part 19*a*, and hence the anvil roll 20, toward or away from the frame 13 as desired.

Carriage part 19*b* is supported upon the guide rods 17 and 18 and is normally carried in longitudinal movement by the part 19*a*. But in accordance with the teachings of the invention the part 19*b* is movable longitudinally with respect to the part 19*a*. As shown in Figure 10, carriage part 19*b* mounts at each side thereof a hydraulic actuator 80 having a piston rod 81 extending rearwardly toward and connected to a transversely disposed member 82 of the carriage part 19*a*. Thus it will be apparent that by suitable application of fluid pressure to the actuators 80 the carriage part 19*b* may be caused to move forwardly or rearwardly with respect to the part 19*a*. With fluid trapped within the actuators, however, the part 19*b* will be held in fixed relation with the part 19*a* and will be caused to move therewith upon actuation of actuator 79 as will be understood.

Mounted at the forward end of carriage part 19*b* on each side of the anvil roll 20, and adapted for pivotal movement in a horizontal plane toward and away from the roll 20 are carrier arms 83 and 84 which journal at their outer ends the guide rolls 21 and 22 respectively. Pivotally secured to the arms 83 and 84 at points intermediate the pivotal mounting of the arms and the guide rolls carried thereby are tie rods 85 and 86. The rods 85 and 86 extend rearwardly from carrier arms 83 and 84 to the transverse member 82 of carriage part 19*a*, and are secured thereto. Thus it will be apparent that relative movement of the carriage parts 19*a* and 19*b* will cause pivotal movement of arms 83 and 84 to carry guide rolls 21 and 22 simultaneously toward or away from the main or anvil roll 20.

In a wheel forming operation wherein the anvil roll 20 is moved against the outer periphery of a wheel 38 it is, of course, necessary to oppose the force exerted by the anvil roll, and for this purpose I have provided a pair of pressure rolls 87 and 88 (see Figure 9) which are mounted in the frame 13, one on each side of the axis of movement of the anvil roll 20. Pressure rolls 87 and 88 are journaled and carried by longitudinally movable rods 89 and 90 respectively, which rods are slidably guided in bearings 91 and 92 rigidly mounted on the frame 13. Rigidly connecting the rods 89 and 90 is a cross bar 93; the arrangement being such that movement of the rods 89 and 90 with pressure rolls 87 and 88 must be equal and simultaneous. As shown in Figure 4, pressure rolls 87 and 88 act in opposition to the anvil roll 20 in forming a wheel 38 of the desired outside diameter, and also act in opposition to the edge rolls 14 and 15 in properly forming the outer rim of the wheel 38 to the desired radial thickness. Thus it may be understood that during a wheel forming operation, as the upper edge roll 14 is urged downwardly by crank 39 the metal displaced thereby is forced outwardly to increase the radial thickness of the rim and the pressure rolls 87 and 88 must accordingly be retracted to compensate for such increased rim thickness. This is accomplished in the illustrated embodiment of the invention by providing a hydraulic actuator 94 the cylinder member of which is secured to the frame 13 and the piston member of which is connected to the cross bar 93. It is contemplated that the actuator 94 will be initially energized to move the pressure rolls 87 and 88 outwardly into pressure contact with the wheel 38, and that conduit and control means, not shown, will be provided whereby upon radial expansion of the rim of wheel 38 the pressure rolls 87 and 88 will retract under a predetermined constant pressure. The force necessary to cause retraction of the pressure rolls 87 and 88 should, of course, be somewhat greater than the force exerted against the wheel 38 by the anvil roll 20. This may readily be provided for by suitable pressure responsive means, not shown, associated with the actuator 94 as will be understood.

In the preferred operation of my apparatus all rolls are initially in retracted positions whereby a wheel to be formed may be readily conveyed horizontally into the proper position. With a wheel positioned at the proper height and approximately centered with respect to the apparatus the lower edge roll 15 may be raised by energizing motor 62 and rotating crank 40, and the pressure rolls 87 and 88 and anvil roll 20 may be moved into contact with the outer periphery of the wheel as shown in Figure 4. The anvil roll 20 is of course moved into contact with the wheel 38 by energizing hydraulic actuator 79 and shifting the entire carriage 19 forward. When contact is initially made with the wheel 38 the forward movement of the carriage part 19*a* is halted and actuators 80 are energized to cause the carriage part 19*b* to continue moving forward. Tie rods 85 and 86, being secured to the stationary part 19*a*, thus cause carrier arms 83 and 84 and associated guide rolls 21 and 22 to swing inwardly into contact with the periphery of the wheel 38. The upper edge roll 14 may also be brought into contact with the wheel at this time if desired.

With the various rolls in contact with the wheel 38

as above described the same is fully supported and power may be applied to motors **78**, **95** and **96** to drive the anvil roll **20** and edge rolls **14** and **15**. After the motors have arrived at operating speed the motor **58** may be energized to rotate crank **39** and cause the upper edge roll **14** to be forced downwardly against the rim of the wheel **38**. As the wheel expands under the axial pressure of the edge rolls **14** and **15** pressure rolls **87** and **88** will retract in the manner explained, and it is contemplated that similar pressure responsive means, not shown, will be employed to permit the anvil roll **20** and the guide rolls **21** and **22** to retract as required. Upon the wheel **38** reaching the dimensions desired, as indicated by the edge roll **14** reaching its lowermost position, the various rolls may again be retracted to remove the finished wheel and to load a succeeding unfinished one, whereupon the entire sequence is repeated as described.

My apparatus is of course adaptable to numerous operational arrangements to suit the conditions of the particular installation and thus the sequence above described should be considered as illustrative only of such various arrangements.

It should now be apparent that I have accomplished the objects initially set forth. The apparatus constructed according to the teachings of my invention provides a rapid and wholly practical means of forming roughly formed metal wheels into a semi-finished product requiring a minimum of additional finishing operations. The invention teaches the method of, and apparatus for simultaneously working of a plurality of sides of a wheel to be formed whereby a plurality of related procedural steps may be effectively combined into a single rapid and accurate operation performed by a single machine. It will be readily understood that by such teachings expensive and time-consuming re-heats of the wheel blank during the processing thereof may be eliminated or substantially reduced. According to the preferred procedure as explained herein, where wheel blanks are quickly conveyed from associated pre-forming presses into the apparatus of the invention, re-heating of the blank is thought to be wholly unnecessary.

In addition to advantageous operational characteristics of my apparatus, there is embodied therein a number of novel mechanical concepts such as, for example, the teaching of the use of pivotally mounted carrier arms for journalling guide rolls at each side of the main anvil roll. The arrangement shown herein, where relatively movable carriage parts mount respectively the carrier arms and tie rods therefor as explained, provides a novel means of obtaining laterally directed guide roll pressure through actuating means acting in a longitudinal direction. It will be apparent that the arrangement described provides a considerable saving in space through the elimination of, for example, actuating devices associated directly with the guide rolls and extending laterally outward of the apparatus. The described structure is also of greater structural soundness as may be readily understood.

My arrangement of the edge rolls **14** and **15** is advantageous in many respects. For example, the use of crank means for causing movement of the edge rolls toward or away from the wheel, and the combination of such crank means with adjustable linkage for connecting the crank means with the edge roll, provides that substantially regardless of the desired dimensions of a wheel to be formed the connecting linkage may be suitably adjusted to permit full advantage to be taken of the extremely high mechanical advantage of the crank means moving into its dead center position. This arrangement also enables the final closing position of these working rolls to be accurately predetermined which is of distinct advantage in the rapid production of consistently dimensioned wheels.

My invention also teaches the advantageous use of eccentric pivotal mountings for the edge rolls whereby wheels having asymmetrical rim dimensions may be readily accommodated in the apparatus. This feature lends substantially to the versatility and general usefulness of the apparatus as will be understood.

Having thus described apparatus wherein the various teachings of my invention may be advantageously embodied, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus for forming and hot working metal wheels the combination of longitudinally movable first carriage means, an anvil roll journaled on said first carriage means, frame means, a plurality of pressure rolls mounted on said frame means for longitudinal movement toward and away from said anvil roll, means to move said first carriage longitudinally toward or away from said pressure rolls, means to move said pressure rolls toward or away from said anvil roll, second carriage means mounted for longitudinal movement toward or away from said pressure rolls, carrier arms pivotally mounted on said second carrier means on each side of said anvil roll, guide rolls journaled by said carrier arms, said guide rolls being positioned outwardly of said anvil roll and between said anvil roll and said pressure rolls, tie rod means connecting said carrier arms and said first carriage means, actuating means associated with said first and second carriage means operative to cause relative longitudinal movement thereof whereby said carrier arms are caused to pivot toward or away from said anvil roll, said anvil roll and said guide rolls and said pressure rolls being positioned substantially in a single plane, a pair of edge rolls mounted in said frame means one on each side of said plane and adapted for pivotal movement toward and away from said plane, said edge rolls being adapted to act upon the axial end edges of a wheel positioned in said plane, crank means for each of said edge rolls, connecting linkage connecting each of said edge rolls with a crank means, means to rotate said crank means whereby said edge rolls are caused to move toward and away from said plane, and means forming a part of said connecting linkage for adjusting the length of said linkage.

2. In a wheel rolling mill a first roll for engaging the periphery of the wheel blank being rolled, a second roll positioned substantially opposite said blank from said first roll and rotatable in the plane of rotation of said first roll, first carriage means mounting said second roll for movement toward or away from said first roll, second carriage means associated with said first carriage means and normally carried thereby in movements of said first carriage means toward or away from said first roll, a plurality of carrier arms pivotally mounted on said second carriage means, guide rolls mounted on said carrier arms for movement toward or away from the line extending between said first and second rolls, tie rods secured to said carrier arms and to said first carriage means whereby upon relative movement of said first and second carriage means said carrier arms will be caused to pivot, and means including a hydraulic actuator for causing relative movement of said first and second carriage means whereby upon a wheel blank being positioned between said first and second rolls said guide rolls may be pivoted into contact with said wheel, said hydraulic actuator being adapted to retract said guide rolls in a direction radially outward of said wheel blank during expansion of said wheel blank.

3. In a wheel rolling mill of the type having means to rotate a wheel blank about a vertical axis, edging rolls for working the axial end edges of said blank, an anvil roll for working the peripheral edge of said blank, and guide rolls for acting on said peripheral edge to guide and stabilize said blank during rotation thereof; the improvement comprising a fixed frame for said edge rolls, guide rods anchored with respect to said fixed frame and extending outwardly thereof, a carriage slidable on said

guide rods and mounting said anvil roll, drive means for said anvil roll carried on said carriage, a second carriage mounted on said first mentioned carriage and normally movable therewith, said guide rolls being mounted on said second carriage, and means to move said second carriage with respect to said first mentioned carriage.

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