C. VON PHILP.

ROLLING MILL FOR ROLLING CAR WHEELS.

APPLICATION FILED FEB. 3, 1909.

956,780.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

Fig. 1

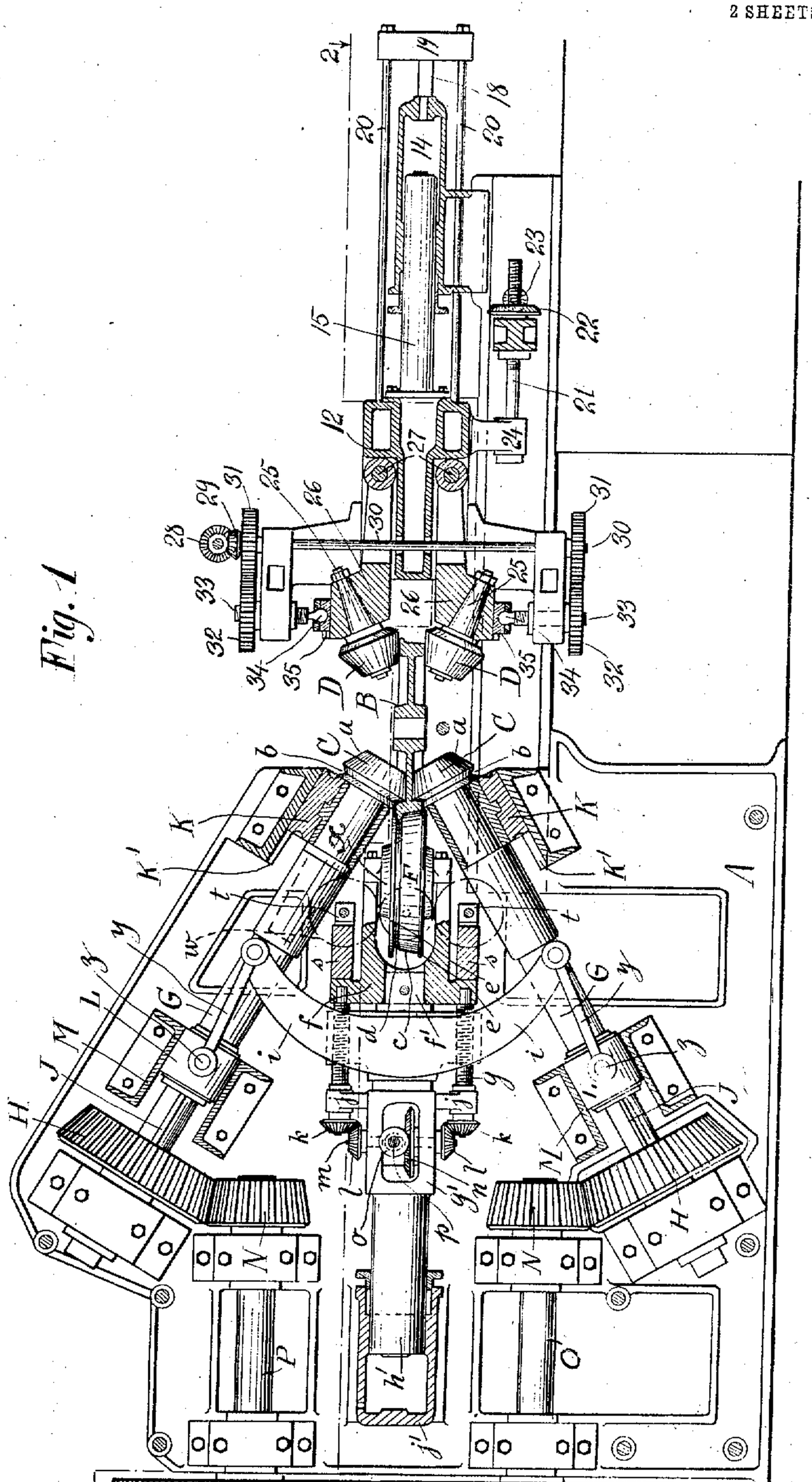

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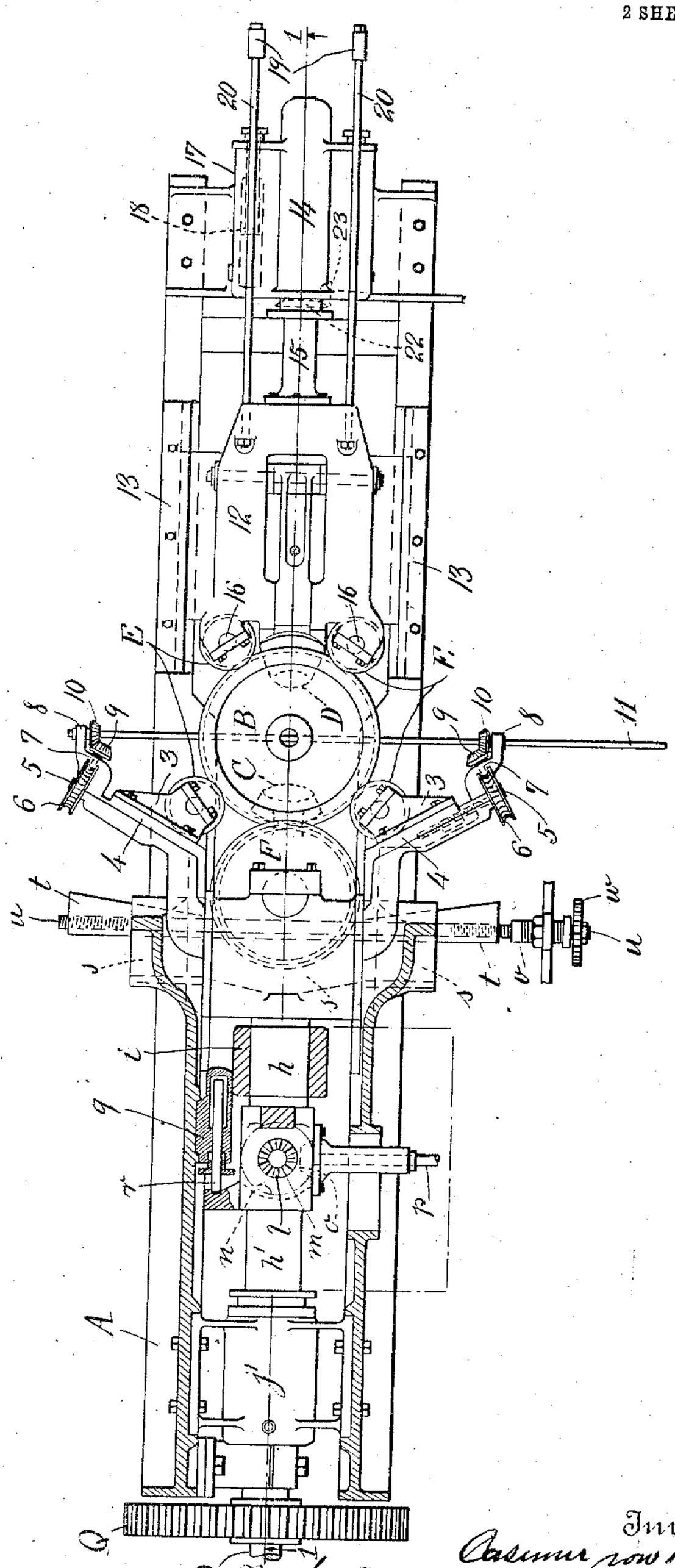
Fig. 2



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ROLLING-MILL FOR ROLLING CAR-WHEELS.

956,780. Specification of Letters Patent. **Patented May 3, 1910.**

Application filed February 3, 1909. Serial No. 475,860.

To all whom it may concern:

Be it known that I, CASIMIR VON PHILP, a citizen of the United States, and a resident of the city of Bethlehem, State of Pennsylvania, have invented certain new and useful Improvements in Rolling-Mills for Rolling Car-Wheels, of which the following is a specification, accompanied by drawings.

This invention relates to rolling mills for rolling car wheels and the objects of the invention are to enable the tread, the edges of the tread and the web to be rolled in the same operation.

Another object is to enable all the rolls to be adjusted as desired.

Further objects of the invention will hereinafter appear and the invention consists of the apparatus substantially as described and claimed in this specification and shown in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation substantially on the line *x*—*x* of Fig. 2; and Fig. 2 is a horizontal sectional plan view substantially on the line *y*—*y* of Fig. 1.

Referring to the drawings, A represents the frame of the machine and B is the car wheel blank in the process of being rolled. The web reducing rolls C operate upon the web of the wheel, the edging rolls D operate upon the edges of the rim, the tread rolls E are adapted to round up the wheel and operate upon the tread, and the tread pressure roll F coöperates with the web reducing rolls C to form the tread and flange of the wheel.

Actuating means are provided for positively driving the web reducing rolls C and the remaining rolls are idlers. All of the rolls are provided with adjusting means to adjust the rolls to the blank and to enable the blank to be placed in the machine and enable the finished wheel to be removed from the rolls. Preferably the hub of the wheel is first formed in any suitable manner previous to introducing the blank between the rolls.

The web reducing rolls C are mounted on the inclined spindles G which slide in the bevel gears H but rotate therewith by means of the feathers J.

The spindles are provided with sliding bearings K sliding in the guide ways K′ and the thrust bearings L sliding in the bearings M on the frame. Gears H mesh with pinions N, one being on the power shaft O and the other on counter shaft P, driven from the power shaft by gears Q. The rolls C have web reducing surfaces *a* and angular grooves *b* for rolling the inner shoulders of the wheel rim.

The tread pressure roll F has a tread rolling surface *c* and a groove *d* for rolling the wheel flange. Roll F is also provided with side flanges *e* substantially meeting the edges of the rolls C when the rolls are adjusted into rolling position. Roll F is revolubly mounted on the block *f* carried on the stud *f′* connected to the housing *g′* on the end of the plunger *h′* operated in cylinder *j′*. A cross-head having arms *i* slides on neck *h* of plunger *h′* and is adjusted relatively to block *f* by means of screw threaded rods *g* having bearings in brackets *j* and provided with bevel gears *k* meshing with bevel gears *l* on shaft *m* supported in housing *g′* and provided with bevel gear *n* meshing with bevel pinion *o* on shaft *p* from which power is applied to actuate said train of gears and rotate the rods *g* for moving the cross-head and arms *i* longitudinally. The cylinder *j′* and plunger *h′* are adapted to force the block *f* inwardly carrying therewith arms *i* and roll F. The small cylinder *q* having plunger *r* connected to the housing *g′* is adapted to pull back or move the housing and its connected parts in the opposite direction. Suitable stops *s* extending from side to side of the machine are adapted to form an abutment for limiting the inward movement of the block *f* and its connected parts. These stops *s* are adjusted by means of the wedges *t* connected to the screw threaded rods *u* which pass through the adjustable sleeves *v* for regulating the initial positions of the wedges. The rods *u* are provided with gears *w* both meshing with central actuating gear *x*. The arms *i* are pivoted to links *y* which in turn are pivoted at *z* to the thrust bearings L so that adjustment of arms *i* adjusts the spindles G. The cylinder *j′* thus moves both the tread pressure roll F and the web reducing rolls C inward and cylinder *q* moves these rolls outward. Final slight adjustments of the rolls are made by means of the cross-head *h* and the wedges *t*. After the wheel is completed the rolls F and C are moved outward or backward gradually separating or spreading apart as they move and carrying with them the wheel B until said wheel can be removed.

The tread rolls E adjacent the web reducing rolls C are mounted on slidable bearings, sliding in the guides 4, and connected to the screw threaded rods 5 having wheels 6 meshing with worms 7 having bearings in brackets 8. Bevel pinions 9 on said worms mesh with bevel gears 10 on transverse actuating shaft 11, so that rotation of said shaft enables the rolls E to be adjusted in and out.

At the other end of the machine is mounted a frame 12 sliding in the guides 13 and actuated inwardly by the cylinder 14 and plunger 15 which permits the frame and tread rolls E to retreat as the wheel is enlarged, while constantly applying suitable hydraulic pressure. Two of the tread rolls E are mounted on said frame 12 at 16 and are adjusted by said frame. Small cylinders 17 are provided at each side of cylinder 14 for moving the frame 12 outwardly. The plungers 18 of these cylinders are connected to cross heads 19 which in turn are connected by rods 20 to the frame 12.

The inward movement of frame 12 is limited by the arm 24 engaging the head of an adjustable screw threaded rod 21 having bevel gear 22 meshing with bevel pinion 23 for adjusting said rod so as to form an adjustable stop for the frame.

The edging rolls D are carried on pins 25, mounted in arms 26 pivoted at 27 to the frame 12. These rolls D may be moved to and from the wheel B about the pivots 27 and for this purpose adjusting means are provided actuated from the bevel gear 28, which meshes with the bevel pinion 29 on transverse shaft 30 provided with the gears 31 meshing with gears 32 on short screw threaded pins 33 having enlarged ends 34 engaging sockets 35 on arms 26, so that rotation of screws 33 adjusts the rolls D in and out.

In the operation of the machine all the rolls are first adjusted outwardly to enable the car wheel blank to be inserted in the mill against the tread pressure roll F and then the rolls are moved inwardly to rolling position in contact with the blank. During the operation of rolling the wheel is enlarged in diameter and finally rounded up by the tread rolls E. The rim is kept at the proper thickness by the edging rolls D.

It will be understood that as the rolling progresses the three rolls C, C and F are forced forward by the plunger h' and the rolls C, C continue to approach each other until the stops s controlled by wedges t limit the motions. As the diameter of the wheel enlarges, the frame 12 is forced back against the fluid pressure in the cylinder 14. Accurate adjustment of the sliding bearings 3 of the rolls E provides for keeping the rolls accurately against the wheel to insure the wheel being truly circular. The screws g permit the reduction of the rim between rolls C C and F to exactly the extent required.

According to this invention the tread rolls E and edging rolls D are adjustable inwardly and outwardly in a horizontal plane and the edging rolls are in addition adjustable inwardly and outwardly in a vertical plane. Two of the tread rolls E are also adjustable in two directions in a horizontal plane. The web reducing rolls C are adjustable to and from the center of the machine and may be adjusted independently of the tread pressure roll, which is itself adjustable in a horizontal plane.

I claim and desire to obtain by Letters Patent the following.

1. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll and means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls.

2. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll and means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls, said last named means comprising sliding thrust bearings and connections for moving them simultaneously with the advance of the tread pressure roll.

3. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll, means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls, and tread rolls having bearings movable with the said tread pressure roll.

4. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll, means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls, edging rolls, and means for horizontally advancing and retreating the edging rolls.

5. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll, means connected to the tread pressure roll to act there-

with for axially advancing the web reducing rolls, edging rolls, means for horizontally advancing and retreating the edging rolls, and tread rolls mounted to advance and retreat therewith.

6. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll, means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls, and means for independently advancing the web reducing rolls relatively to the tread pressure roll.

7. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, a tread pressure roll adjustably mounted to coact therewith, means for advancing the tread pressure roll, means connected to the tread pressure roll to act therewith for axially advancing the web reducing rolls, and means for independently adjusting such connection to vary the relation of the rolls.

8. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, gearing for actuating the said rolls, mechanism for axially advancing and retreating the said rolls, edging rolls, a movable frame or carriage therefor, and means for advancing and retreating the said frame and edging rolls.

9. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, gearing for actuating the said rolls, mechanism for axially advancing and retreating the said rolls, edging rolls, a movable frame or carriage therefor, means for advancing and retreating the said frame and edging rolls, and a plurality of tread rolls.

10. In a car wheel rolling mill, the combination of axially adjustable web reducing rolls arranged with their axes inclined to each other, gearing for actuating the said rolls, mechanism for axially advancing and retreating the said rolls, edging rolls, a movable frame or carriage therefor, and means for advancing and retreating the said frame and edging rolls, the last said means comprising means for producing a fluid pressure on the said carriage, whereby it may retreat as the work piece is enlarged.

11. In a car wheel rolling mill, the combination of two web reducing rolls having inclined axes and means for driving them, a tread rolling roll, a sliding block or housing carrying said tread roll, means for advancing and retreating the block or housing, and means coöperating with the tread rolling mechanism for adjusting the said web reducing rolls along their axes simultaneously with the movement of the block or housing.

12. In a car wheel rolling mill, the combination of two web reducing rolls having inclined axes and means for driving them, a tread rolling roll, a sliding block or housing carrying said tread roll, means for advancing and retreating the block or housing, means coöperating with the tread rolling mechanism for adjusting the said web reducing rolls along their axes simultaneously with the movement of the block or housing, and means for separately adjusting said sets of rolls relatively to each other.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CASIMIR VON PHILP.

Witnesses:
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C. R. DEIBERT.