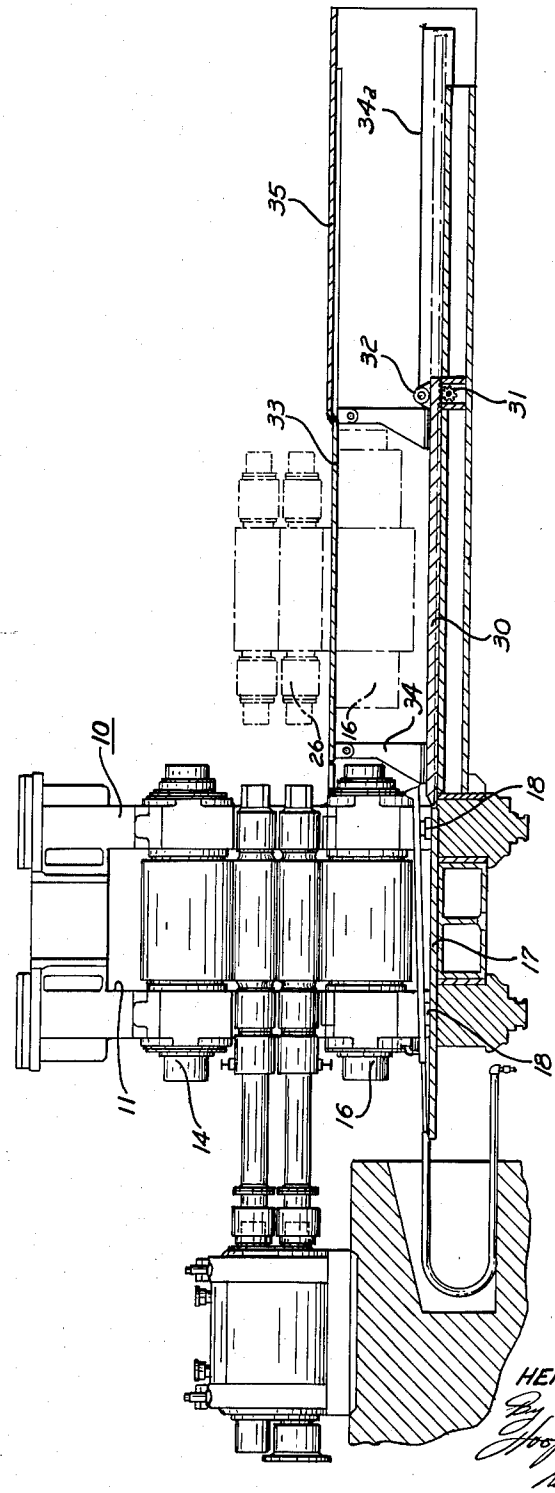
Sept. 7, 1965 H. J. KALBERKAMP 3,204,443

ROLLING MILL STRUCTURES

Filed Nov. 19, 1962 2 Sheets-Sheet 1

Fig. 1.



INVENTOR
HERMAN J. KALBERKAMP
By Hooper, Leonard & Ruehl
his Attorneys

Sept. 7, 1965 H. J. KALBERKAMP 3,204,443

ROLLING MILL STRUCTURES

Filed Nov. 19, 1962 2 Sheets-Sheet 2

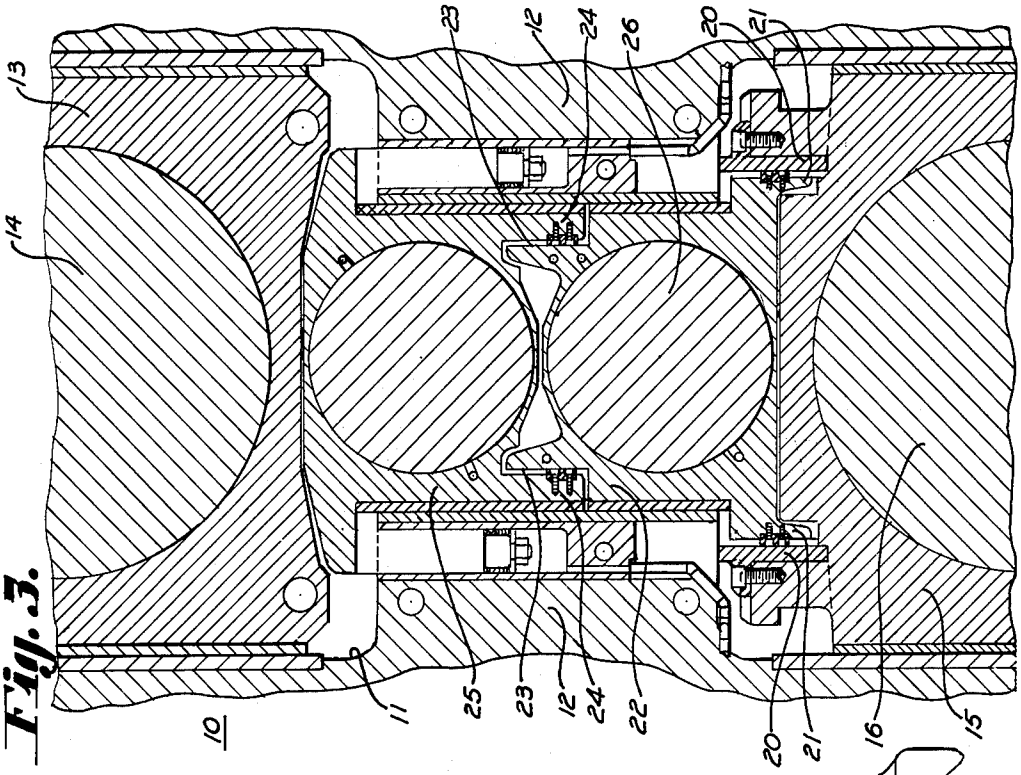


Fig. 3.

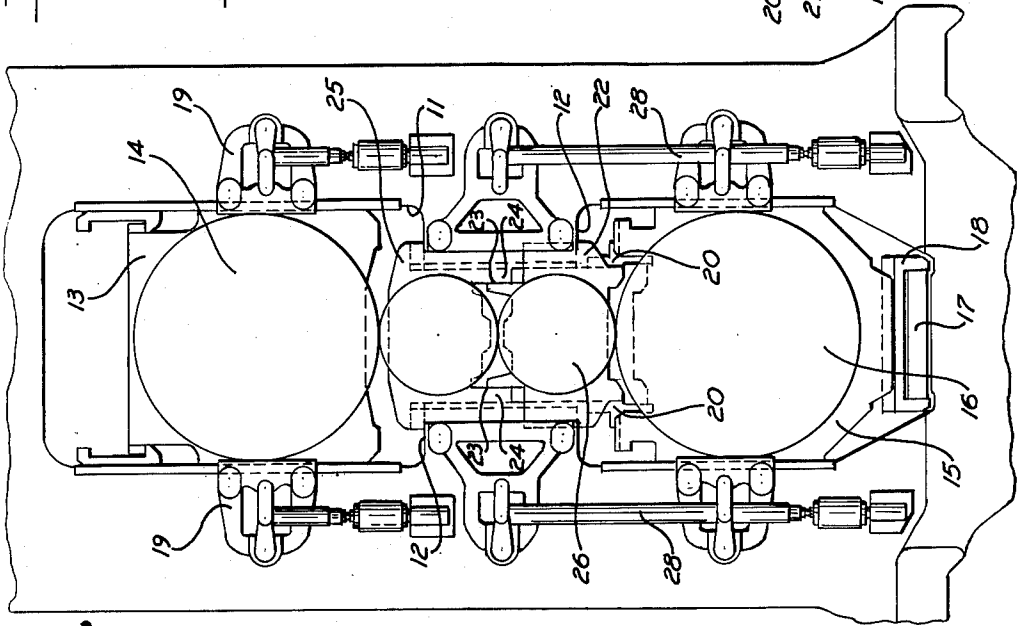


Fig. 2.

INVENTOR.
HERMAN J. KALBERKAMP
BY
Hoogel, Leonard & Buell
his Attorneys

United States Patent Office 3,204,443 Patented Sept. 7, 1965

3,204,443

ROLLING MILL STRUCTURES

Herman J. Kalberkamp, Whitehall Borough, Pa., assignor to Mesta Machine Company, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Nov. 19, 1962, Ser. No. 238,361
5 Claims. (Cl. 72—239)

This invention relates to rolling mill structures and particularly to four-high rolling mill structures provided with novel roll chock and roll change mechanism.

The use of four-high rolling mills with a pair of work rolls, each backed up by a larger back-up roll is almost universal in the rolling of strip and plate. One of the principal difficulties encountered with such mills lies in the area of handling and supporting the chocks and bearings for the work rolls and removal of the work rolls for changing product. Frequent work roll changes are required to replace worn work rolls to meet the varying requirements of strip and plate character being rolled in modern steel mills. These roll changes have in the past required considerable time and special equipment because of the inaccessability of the work rolls, nested as they must be between the two back-up rolls.

There has also been the further problem that the bearings on the work rolls are smaller than the back-up roll bearings and require small chocks. Wings are, accordingly normally provided on the work roll chocks for the purpose of engaging the edges of the mill housing window so as to hold the work roll chocks in the housing. These wings get battered and damaged with frequent roll changes, causing loss of time and expense of replacement or rehabilitation.

I have invented a rolling mill structure which eliminates most if not all of the foregoing problems. I provide in an four-high rolling mill a pair of end housings, a vertical window in each housing, said window having inwardly projecting work roll chock guide members or flanges on each side integral with the housing and intermediate the top and bottom of the window, a sled slidable through the housing window transverse to the housing at the bottom thereof, said sled carrying the chocks for the bottom back-up roll and the two work rolls in superposed relation, cooperating holding means on the roll chocks holding them in vertical alignment and drive means for moving said sled transverse to the housing.

In the foregoing general descrption I have set out certain objects, purposes and advantages of my invention. Other objects, purposes and advantages will be apparent from a consideration of the following description and the accompanying drawings in which,

FIGURE 1 is a vertical section through a rolling mill structure according to my invention;

FIGURE 2 is an end elevation of a segment of housing of FIGURE 1; and

FIGURE 3 is a segmental section through the middle of the housing of FIGURE 2.

Referring to the drawings, I have illustrated a housing **10** having a vertical window **11** adapted to carry the chocks of the four rolls making up a four-high mill stand. Intermediate the sidewalls of the window **11** there are provided inwardly projecting work roll guide members **12** which are integral with the housing and extend into the window midway between the top and bottom thereof. In the top of the window **11** there is provided a back-up roll chock **13** carrying a back-up roll neck **14** journaled therein. At the bottom of the window **11** there is provided a bottom back-up roll chock **15** carrying a back-up roll neck **16** journaled therein. The back-up roll chock **15** is mounted on a sled **17**

and is positioned in the window **11** by means of liner plates **18** which are used to raise and lower the level of the chock **15** in the window. The upper back-up roll chock **13** is held in position in the window by power operated clamps **19**. The bottom back-up roll chock **15** is provided with vertically extending guideways **20** which engage fingers **21** on the lower work roll chock **22**. The guideways **20** and fingers **21** permit vertical movement of the roll chock **22** with respect to the back-up roll chock **15** but maintain them together against axial movement. The bottom work roll chocks **22** are provided at the top with vertical guideways **23** which are engaged by fingers **24** on upper work roll chock **25**. Again, the work roll chocks **22** and **25** are free for vertical movement with respect to one another but are held together against axial movement with respect to each other. The bottom work roll chock **22** carries a work roll neck **26** journaled therein and the upper roll chock **25** carries an upper work roll neck journaled therein. The bottom back-up chock **15**, the lower work roll chock **22** and the upper work roll chock **25** are all locked in the window **11** by means of power operated clamps **28** on each side of the window. The sled **17** is mounted on ways for movement axially of the housing window **11**. The sled **17** is connected to a rack **30** which is driven by a pinion **31** from a power source not shown through a conventional gear train. The rack **30** is held on contact with the pinion **31** by a guide roller **32** which acts on top of the rack to hold it in contact with the pinion. The rack **30** is covered by a moving floor section **33** at the level of the work floor on a pedestal **34**. The rack **31** moves into a cover **34***a* when the bottom back-up roll and the two work rolls are moved from the solid line position of FIGURE 1 to the right into the chain line position of FIGURE 1. At the same time moving floor section **33** moves beneath the main floor section **35**. This brings the work rolls and the bottom back-up roll out of the roll housings to the chain line position to the right of the roll housings in FIGURE 1 where the work rolls may be removed and replaced and the whole assembly returned into the housing on the sled **17**.

The structure above described permits the rapid interchange of work rolls and the rapid clamping up of the work rolls and bottom back-up into operative condition. It places the edge of the window of the mill housing in supporting contact with the work roll chocks or bearing boxes, thus providing a stronger, more positive support for the work rolls and a structure in which the work rolls may be rapidly changed to meet modern processing conditions.

In the foregoing specification, I have set out certain preferred embodiments of my invention. It will be understood however that this invention may be otherwise embodied within the scope of the following claims.

I claim:

1. In a four-high rolling mill, a pair of end housings, a vertical window in each said housing, said windows having an inwardly projecting work roll guide member on each vertical side integral with the housing and intermediate the top and bottom thereof, sled means slidable through the housing window at the bottom thereof, bottom back-up roll chocks on said sled, a pair of work roll chocks mounted on said bottom back-up roll chocks in each housing within said guide members, said sled carrying the chocks for the bottom back-up roll and in turn the chocks for the two work rolls in superposed relation, cooperating holding means on the several roll chocks holding them in alignment in superposed relation and drive means for moving said sled transverse to the housing.

2. In a four-high rolling mill, a pair of end housings, a vertical window in each said housing, said windows having an inwardly projecting work roll guide member on each vertical side integral with the housing and intermediate the top and bottom thereof, a bottom back-up roll chock beneath said roll guide members, a pair of work roll chocks on said bottom back-up roll chocks adapted to fit within said guide members and clamping means on the housings simultaneously engaging the work roll chocks and the bottom back-up roll chocks to hold them positioned within the housings.

3. In a four-high rolling mill, a pair of end housings, a vertical window in each said housing, said windows having an inwardly projecting work roll guide member on each vertical side integral with the housing and intermediate the top and bottom thereof, sled means slidable through the housing window at the bottom thereof, bottom back-up roll chocks on said sled, a pair of work roll chocks mounted on said bottom back-up roll chocks in each housing within said guide members, said sled carrying the chocks for the bottom back-up roll and in turn the chocks for the two work rolls in superposed relation, cooperating holding means on the several roll chocks holding them in alignment in superposed relation, rack means fixed to said sled and pinion means engaging said rack means for moving said sled transverse to the housing.

4. In a four-high rolling mill, a pair of end housings, a vertical window in each said housing, said windows having an inwardly projecting work roll guide member on each vertical side integral with the housing and intermediate the top and bottom thereof, said members adapted to slidably engage the work roll chocks, sled means slidable through the housing window at the bottom thereof, bottom back-up roll chocks on said sled, a pair of work roll chocks mounted on said bottom back-up roll chocks in each housing within said guide members, said sled carrying the chocks for the bottom back-up roll and in turn the chocks for the two work rolls in superposed relation, cooperating guideways and fingers on the top and bottom on the several roll chocks holding them in alignment in superposed relation and drive means for moving said sled transverse to the housing.

5. In a four-high rolling mill, a pair of end housings, a vertical window in each said housing, said windows having an inwardly projecting work roll guide member on each vertical side integral with the housing and intermediate the top and bottom thereof, a bottom back-up roll chock beneath said roll guide members, a pair of work roll chocks on said bottom back-up roll chocks adapted to fit within said guide members in sliding engagement and clamping means on the housings simultaneously engaging the work roll chocks and the bottom back-up roll chocks to hold them positioned within the housings.

References Cited by the Examiner

UNITED STATES PATENTS

Re. 18,992	11/33	Iversen	80—38
749,745	1/04	Philp	80—1.3
1,571,026	1/26	Schulz	80—31.1
2,095,448	10/37	McBane	80—55
3,171,304	3/65	Sims et al.	80—1

FOREIGN PATENTS

384,360	11/23	Germany.

CHARLES W. LANHAM, *Primary Examiner.*