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2,240,362

ROLLING MILL

Filed Feb. 16, 1939

2 Sheets-Sheet 1

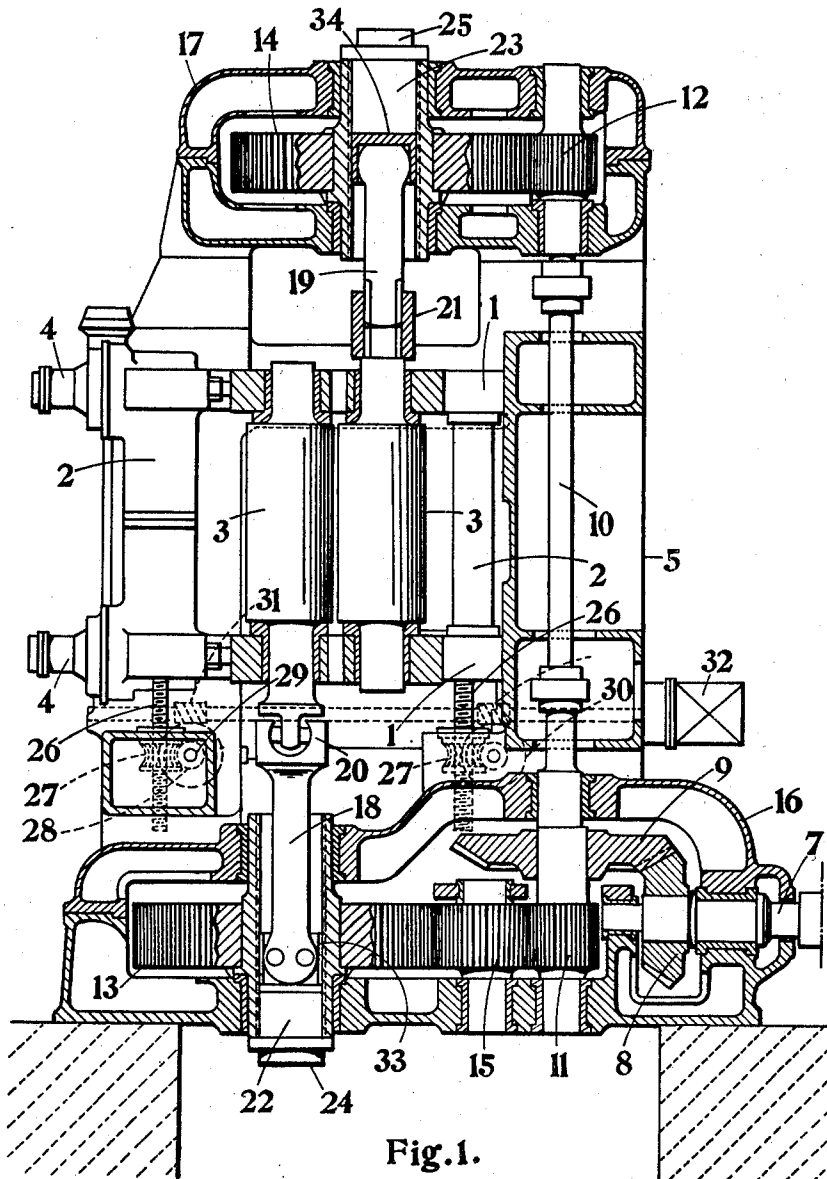


Fig.1.

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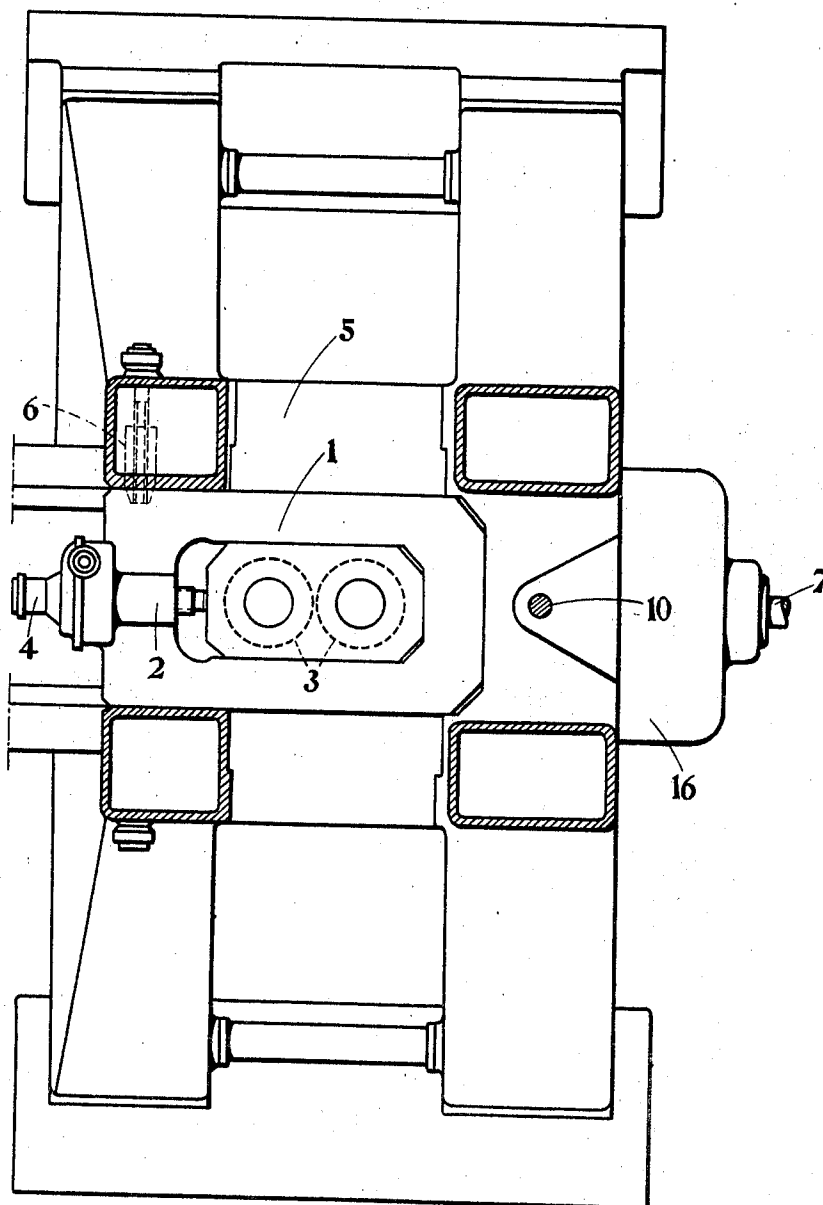


Fig.2.

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UNITED STATES PATENT OFFICE

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ROLLING MILL

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In Germany February 25, 1938

3 Claims. (Cl. 80—31.1)

It has already been proposed to construct vertical rolling mill stands intended for large output in such manner that both rolls are driven from one side by a geared roll stand which is also disposed vertically, with a set of gears located below the roll stand. At the same time a deep pit is necessary for the shafts of the roll stand and the driving gears; the pit may be for example from 5.5 m. to 7 m. deep. This is a great disadvantage particularly if the below-ground water level is high.

According to the present invention, this disadvantage is avoided by not driving both rolls from one side, but by driving one roll from below and the other from above. The means employed for driving the two rolls are connected together, for example by a shaft disposed parallel to the rolls, which shaft through toothed pinions, drive gear wheels that are mounted on the roll shafts. The gear wheels are of large diameter and the pitch of the teeth is so selected that the width of tooth face is only about one-third compared with the gears of ordinary geared roll stands, whereby a substantial reduction in height is secured.

The undue height of the roll stand that is caused by the use of large gear wheels, is reduced by providing the bearing journals of the gear wheels of the rolls hollow, and in passing the coupled shafts through the hollow journals with the necessary amount of play, and by providing the second hinged head on the side of the gear wheels facing away from the rolls.

By such means taken together from about 3 to 4 m. can be saved in height and the pits provided need not be deeper than those for horizontal stands. Furthermore, favourable conditions for power transmission through the gear wheels are secured, so that in comparison with ordinary geared roll stands provided with gearing in front economy in cost is secured.

Apparatus according to the invention is diagrammatically illustrated by way of example in the accompanying drawings:

Figure 1 is a vertical sectional elevation through a rolling mill stand constructed according to the invention.

Figure 2 is a corresponding plan.

In carrying the invention into effect as illustrated in the accompanying drawings, the two roll stands upon which the fittings for the reception of the working rolls are applied, are connected together by frame members 2 to form a rigid structure. In the construction illustrated the actual roll stand, which comprises the parts

1 and 2, the rolls 3, and the adjusting mechanisms 4 is adapted to be moved from one side into a frame 5, which rests on the foundation, and be secured therein by means of wedges 6 (Figure 2).

The rolls 3 are driven from the shafts 7 through bevel gear wheels 8 and 9 and a vertical shaft 10 disposed parallel with the rolls 3; on the shaft 10 are mounted above and below pinions 11, 12, these latter in turn driving gear wheels 13, 14, each of which is secured to the driving shaft of one of the working rolls. On one driving side (in the case illustrated, the lower side) an intermediate gear wheel 15 is interposed between the gear wheels 11 and 13 in order that the rolls shall rotate in opposite directions. The driving gear wheels 8, 9, 11, 13, 15 and 12, 14 are mounted in separate housings 16 and 17. Instead of withdrawing the stands to the side, as herein-before described, the stands may be withdrawn upwardly by providing the gear housing 17 to be removable. In this case a disconnectable coupling is provided on the pinion shaft 10.

The coupling spindles 18 and 19 are connected to the rolls 3 in the usual manner by means of the disconnectable hinge couplings 20, 21 respectively. The outer ends of the coupling spindles 18 and 19 are mounted loosely in the hollow bearing journals 22, 23 of the gear wheels 13, 14.

It is furthermore possible to provide the apparatus so that the actual roll stand 1, 2 can be adjusted within its supporting frame both upwardly and downwardly by suitable means, in order that when one pass wears another pass may be brought in front of the roll or guide channel by raising or lowering the rolls. For this purpose adjusting spindles 26 are provided which are adapted to be moved up and down by the use of nuts 27 that are mounted to rotate on parts of the frame 5. The nuts 27 are provided with worm teeth on the periphery, to engage in worms 28 mounted on the spindles 29. Further, the spindles 29 have mounted on them worm wheels 30, which engage in worms 31 mounted on the shaft of the motor 32. The stand is secured at the vertical height determined upon in the frame 5 by means of wedges numbered 6, for example in Figure 2. To enable the stand to move axially of the roll spindles the outer pivotal heads 33 and 34 of the coupling spindles 18 and 19 are adapted to move in the hollow bearing journals 22 and 23.

If there be no provision in the frame 5 for adjusting the stand in the vertical direction the outer pivotal heads 33 and 34 of the coupling

spindles 18 and 19 may be combined with the closure members 24 and 25.

I claim:

1. A roll stand, comprising a housing with two rolls vertically arranged therein, a horizontal drive shaft, and a vertical shaft, an angle drive from the horizontal drive shaft to the vertical shaft, cylindrical pinions on said vertical shaft above and below the rolls, spur wheels, that are driven from the pinions, arranged in said housing above and below the rolls, the spurwheel arranged underneath the rolls coupled with the one roll and the spurwheel arranged above the rolls coupled with the other roll.

2. A roll stand according to claim 1, coupling elements for connecting the one of said rolls with the spurwheel arranged above the rolls, and coupling elements for connecting the other roll with the spurwheel arranged underneath the

rolls, hollow axles in said spurwheels, and movable means within said hollow axles for the connection of the coupling elements for the rolls.

3. A roll stand, comprising a housing with two rolls vertically arranged therein, one of the rolls coupled at its top end with a spurwheel and the other roll coupled at its bottom end with a spurwheel, the two said spurwheels supported in the said housing and driven by pinions, said pinions being seated on a vertical shaft that is likewise supported in the said housing, a closed housing part for the spurwheel gearing above the rolls and a closed housing part for the spurwheel gearing underneath the rolls, and the one of said housing parts, that is arranged above the rolls, removable for the purpose of taking out the rolls in an upward direction.

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