Aug. 30, 1960 H. UEBING 2,950,934

KNOCKOUT AXLE ASSEMBLY

Filed Aug. 1, 1957 2 Sheets-Sheet 1

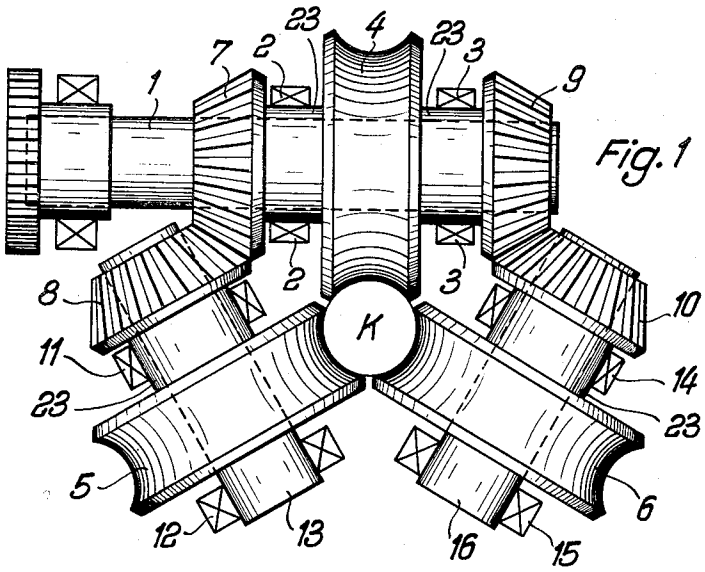



Fig. 1

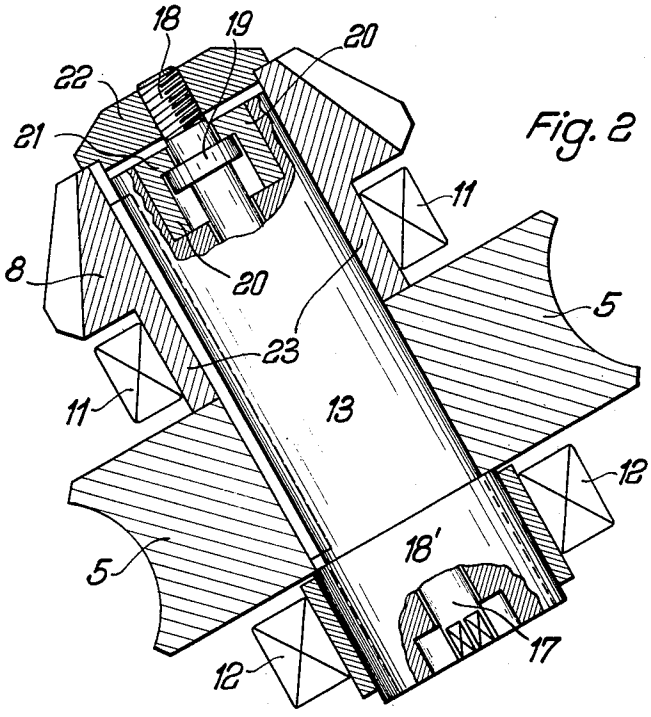



Fig. 2

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KNOCKOUT AXLE ASSEMBLY

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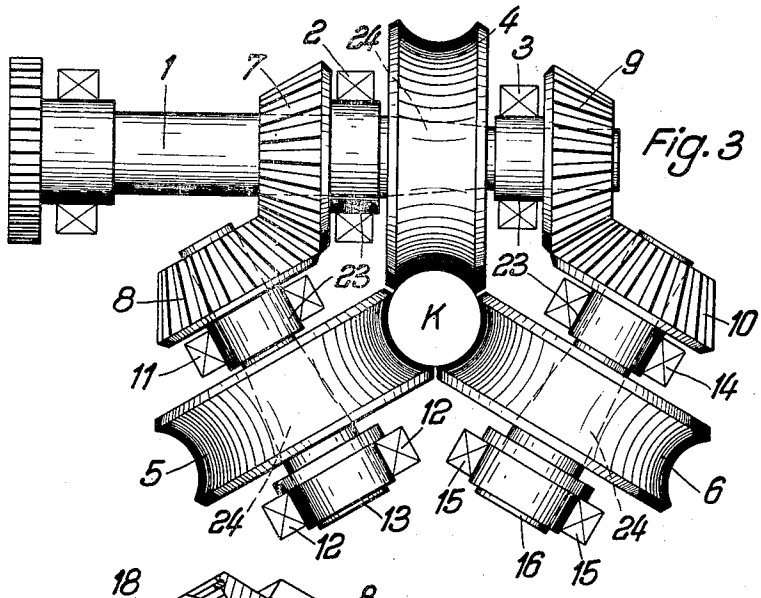



Fig. 3

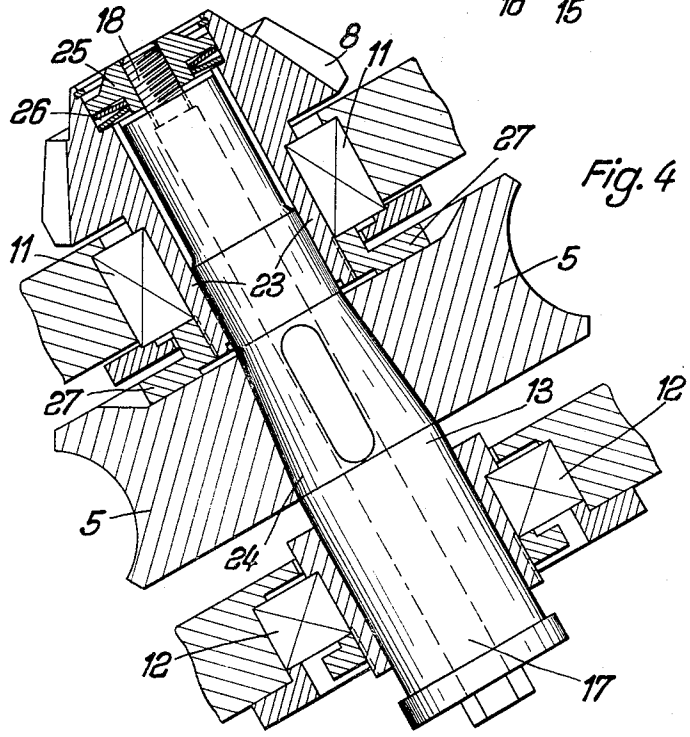



Fig. 4

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# KNOCKOUT AXLE ASSEMBLY

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2 Claims. (Cl. 287—53)

In some stands for universal rolling mills, for example tube reducing rolling mills, with passes formed by two or more rolls, all the rolls are driven from a single driving shaft through bevel gear wheels. The rolls are fixed to axles on which they are supported by being forced against shoulders on the axles and both ends of the axles are carried in bearings one on each side of the roll. Dismantling of these rolls is very complicated; it can, in practice, only be done by removing the bevel wheels and dismantling the bearings also.

Dismantling of the rolls of such stands is considerably simplified by the arrangement, in accordance with the invention, wherein the bevel gear wheels mounted on the axles have hubs carried in one of the bearings and the bevel wheels and the rolls are clamped together by means connected to the axles so that the drive is transmitted from the bevel wheels to the rolls, the axles being removable axially from within the hubs, rolls and bearings when the means are released from the axles. Because the bevel gear wheels are clamped to the rolls on the axles, and have hubs carried in the bearings the formation of the pass is considerably simplified and it is possible to exchange the rolls without moving the bevel gear wheels from their positions in the bearings of the axle.

Preferably the rolls are mounted on conical seatings on the axles and the thrust between each bevel wheel and the corresponding roll is transmitted through a ring which is detachably fixed to the hub of the bevel wheel and which bears against the roll and the means for clamping each bevel wheel and roll together includes a spring interposed between an end cap on the axle and the bevel wheel. The conical seatings on the axles in the region where the rolls are mounted ensures a satisfactory connection between the axles and the rolls at all times, because of the wedge action produced. The rings may also bear against the end faces of the bearings in which the hubs are carried and so prevent axial displacement of the bevel gear wheels and rolls and the springs constantly press the bevel gear wheels against the rolls.

Two examples of stands constructed in accordance with the invention each having three rolls are illustrated in the accompanying drawings in which:

Fig. 1 is a diagrammatic front elevation of the assembly of the rolls and the driving shaft;

Fig. 2 is a longitudinal sectional detail of one of the rolls shown in Fig. 1 with its driving bevel gear, axle and bearings;

Fig. 3 is a diagrammatic front elevation of a modified assembly of the rolls and the driving shaft in which the rolls are carried on conical seatings on the axles; and

Fig. 4 is a view similar to that of Fig. 2 but of one of the rolls shown in Fig. 3.

Referring to the examples shown in both Fig. 1 and Fig. 3, a motor, which is not shown, of the rolling mill, drives a shaft 1 situated above the axis of a pass K.



The shaft 1 is mounted in bearings 2 and 3, and in turn drives a roll 4 carried on it. Rolls 5 and 6 are driven through pairs of bevel wheels 7,8 and 9,10 respectively, which are mounted respectively on an axle 13 carried in bearings 11 and 12, and on an axle 16 carried in bearings 14 and 15. The rolls 4, 5 and 6 are arranged at 120 degrees to each other and together form the pass K.

In Fig. 2 the roll 5 mounted on its axle 13 is shown together with the bevel gear wheel 8 which is also mounted on the axle 13. The arrangement of the rolls 4 and 6 is similar.

The roll 5 can be exchanged without dismantling the bearings 11, 12 or the bevel wheel 8 by loosening a bolt 17 which has a flange 19 at some distance from the end 18 of its thread and which clamps a cap 22 against the bevel wheel 8. The flange 19 bears against a ring piece 20 with a shoulder 21 which is screwed into a recess in the axle 13. The axle 13 is thus firmly connected to the end cap 22 by means of the bolt 17, 18 and the end-cap 22 is clamped against the wheel 8 and the roll 5 is clamped between the wheel 8 and a collar 18' on the axle 13. A hub 23 of the bevel gear wheel 8 is carried in the bearing 11 of the axle 13 and bears against the side of the roll 5.

When the bolt 17 has been removed the axle 13 can be withdrawn axially downwards and the roll 5 removed. The bevel gear wheel 8 remains in place.

In the modification shown in Fig. 3 and Fig. 4, the axle 13 has a cone-shaped seating 24 on which the roller 5 is mounted. A cup spring 26 is disposed between an end cap 25 and an internal shoulder on the bevel wheel 8. This spring presses the bevel wheel 8 towards the roll 5 and causes a detachable intermediate ring 27, which is screwed onto the hub 23 of the bevel wheel 8, to be clamped against the side of the roll 5. By means of a recess in the intermediate ring 27, sufficient clearance is provided between the side of the roll 5 and the end of the hub 23 to ensure that the roll 5 is pressed fully onto the conical seating 24 to prevent axial displacement of the roll 5 on the axle 13. With the arrangement shown in Figs. 3 and 4, the roll 5 can be removed in a similar manner to that used with the arrangement shown in Figs. 1 and 2.

I claim:

1. An axle assembly comprising in combination a knockout axle, a collar on one end of said axle, an inwardly threaded open recess at the other end of said axle, a central longitudinal bore extending through said axle into said recess, a member removably mounted on said axle adjacent said collar, a bevel gear having a hub portion rigidly mounted on said other end of said axle and adjacent said member, a hollow, externally threaded ring piece received in threaded engagement with said recess and having an inwardly directed shoulder, a bolt extending through said bore and said recess, and provided at its threaded end with a flange which bears against said shoulder, an end cap in threaded engagement with said bolt, and adapted to bear against said bevel gear, whereby by removing said bolt, said knockout axle and the member may be withdrawn while the gear remains in place.

2. In an axle assembly according to claim 1, a conical seat on the axle supporting the member, a ring detachable fixed to the hub of the bevel gear in contact with the member and adapted to transmit thrust between said bevel gear and said member, and a spring interposed between the said end cap on the said axle and the said bevel gear adapted to clamp the bevel gear and member together.

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