WORKING STAND OF COLD-ROLLING TUBE MILL

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ABSTRACT

The lower shaft of the stand mounts a gear cluster with rims of different diameters, the central rim meshing with the gear of the upper shaft while the end rims mesh with the gear rack secured in the lower part of the housing.

1 Claim, 2 Drawing Figures
WORKING STAND OF COLD-ROLLING TUBE MILL

The invention relates to the working stands of rolling mills and more particularly it relates to the working stands of the double-strand cold-rolling tube mills.

Wide known in the art is the working stand of the cold-rolling tube mill comprising a housing with supporting guides, said housing accommodating upper and lower shafts with passes at the ends and a gear in the middle with the supporting rolls mounted on the shafts on both sides of each gear, said rolls interacting with said supporting guides.

The shafts are driven via gears by the gear racks secured in the housing.

However, this design of the working stand has a number of disadvantages the main of them being its complexity. Thus, normal functioning of the mill can be ensured only by a set of ten gears and four gear racks in the stand which means that there are then gear pairs working under the conditions of impact application of alternating loads.

Besides, relative fixing of the rolling tools in the lateral direction is effected in the given design by means of the cover straps installed on the pitmans; said straps are gradually worn in the process of rolling, which causes variations, in the size of the center of deformation and, consequently, in the size of the finished tube which renders the manufacture of thin-walled tubes with accurate dimensions in the given mill actually impossible.

Besides, the above described design of the working stand fails to ensure a high speed of tube rolling.

An object of the present invention consists in providing a working stand of the cold-rolling tube mill which would be highly reliable, produce rolled tubes of accurate geometrical dimensions and ensure high efficiency of the mill.

To achieve this and other objects, in the working stand of the cold-rolling tube mill comprising a housing with supporting guides, said housing accommodating upper and lower shafts with passes at the ends and a gear in the middle with the supporting rolls mounted on the shafts on both sides of each gear, said rolls interacting with said supporting guides, and a gear rack secured in the lower part of the housing, according to the invention, the gear mounted on the lower shaft is made in the form of a gear cluster with rims of different diameters, the central rim of said cluster meshing with the gear of the upper shaft while the end rims mesh with the gear rack.

Such a design of the working stand makes it possible to build a high-speed multiple-strand cold-rolling tube mill of high efficiency and capable of turning out tubes of accurate geometrical dimensions.

Now the invention will be described in detail by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a front view of the working stand according to the invention, partly cut away;
FIG. 2 — same, side view.

The working stand consists of a movable housing 1 which may consists either of a one-piece structure or of two separate casings. The upper and lower closing contours of the casings are made in the form of a smooth curve with a certain radius of curvature which eliminates local concentrations of stresses in the transitional sections of the housing.

The housing accommodates a pair of upper adapters 2 and a pair of lower adapters 3 with upper and lower shafts 5 and 6, respectively, mounted on bearings 4.

The lower shaft 6 is driven by a gear cluster 7 rigidly secured in the middle of this shaft, the diameter of the end rims of the gear cluster corresponding to the average effective diameter of the rolling tools while the diameter of the central rim corresponds to the outside diameter of the rolling body of the rolling tool.

The end rims of the gear cluster are in mesh with the gear rack 8 secured in the lower part of the housing with a provision for adjusting its position longitudinally.

Rigidly secured on the upper shaft 5, of both sides of the gear cluster 7, are the supporting rolls 9 which interact with the supporting guides 10 in the lower part of the housing. The central rim of the gear cluster 7 is in mesh with the gear 11 secured rigidly by a key 12 (or by some other method) in the middle of the upper shaft 5, the diameter of said gear 11 corresponding to the outside diameter of the rolling tool body. Mounted on the upper shaft 5 of both sides of the gear 11 are supporting rolls 13 which may be made either integrally with the gear or separately from it.

The rolls of the upper shaft 5 are connected by the guides 14 with the upper part 15 of the housing 1. The clearance between the rolls 13 and the guides 14 can be adjusted by displacing the guides 14 in a longitudinal direction.

The circular passes 16 located on both ends of the upper and lower shafts 5, 6 are locked on said shafts by splines or by some other method and secured on them by nuts and lock nuts 17.

The clearance between the shafts 5, 6 can be adjusted by a mechanism 18 (FIG. 2) and the working stand is connected with the drive mechanism by means of lugs 19.

In the course of rolling the stand performs reciprocations motion while the shafts 5, 6 reciprocate and rotate simultaneously. The load is transmitted from the upper adapters 2 through wedges 20 and supporting segments 21 to the supporting casings of the working stand housing 1. The mechanism operates as follows.

In the course of rolling the stand is reciprocated by a crank mechanism (not shown in the drawing) while the shafts 5, 6 installed in the housing 1 reciprocate with the stand and perform reciprocating and rotary motion relative to the stand.

As the stand moves, the end rims of the gear cluster 7 roll over the gear rack 8 mounted immovably on the housing 1 while the central rim of the gear cluster 7 meshing with the gear 11 transmits motion to the upper shaft 5. The rolls 9 mounted on the lower shaft 6 roll over the guides 10 of the housing 1 while the rolls 13 of the upper shaft 5, over the guides 14.

Due to the above described arrangement of the gear 11, of the gear cluster 7, supporting rolls 9, 13 and guides 10, 14, the torque is transmitted symmetrically to the passes 16; besides, it is possible to adjust the gear mesh and to take up the clearances developed through wear of the gears.

The working stand of the cold-rolling tube mill according to the invention is simple in design because it has a minimum number of gear pairs, is adapted for independent adjustment of each strand in a multiple-
strand mill, ensures a high efficiency of the mill and accurate geometrical dimensions of the tubes.

What is claimed is:

1. A working stand of a cold-rolling tube mill comprising: a housing with supporting guides; an upper shaft installed in said housing and a gear rack secured in the lower part of said housing; a lower shaft installed in said housing; passes located on both ends of said upper and lower shafts; a gear mounted in the middle of said upper shaft; a gear cluster with rims of different diameters, mounted in the middle of said lower shaft, the central rim of the cluster meshing with said gear of said upper shaft while the end rims mesh with said gear rack; supporting rolls mounted on said upper and lower shafts at both sides of said gear and gear cluster and intended to interact with said guides of said housing.

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