

[54] APPARATUS FOR BALANCING INERTIAL FORCES OF RECIPROCATING MASSES OF TUBE COLD ROLLING MILL STAND

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[58] Field of Search 72/214, 220, 208, 209, 72/245; 188/321, 311

[56]

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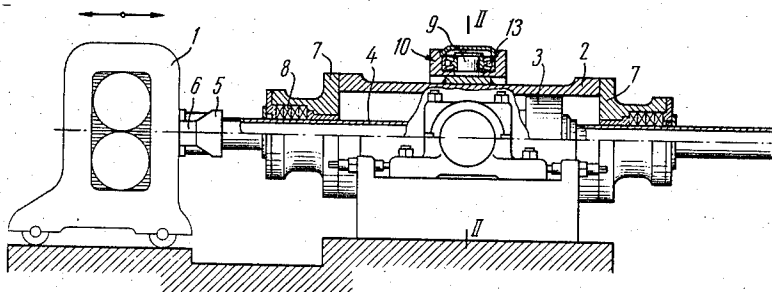
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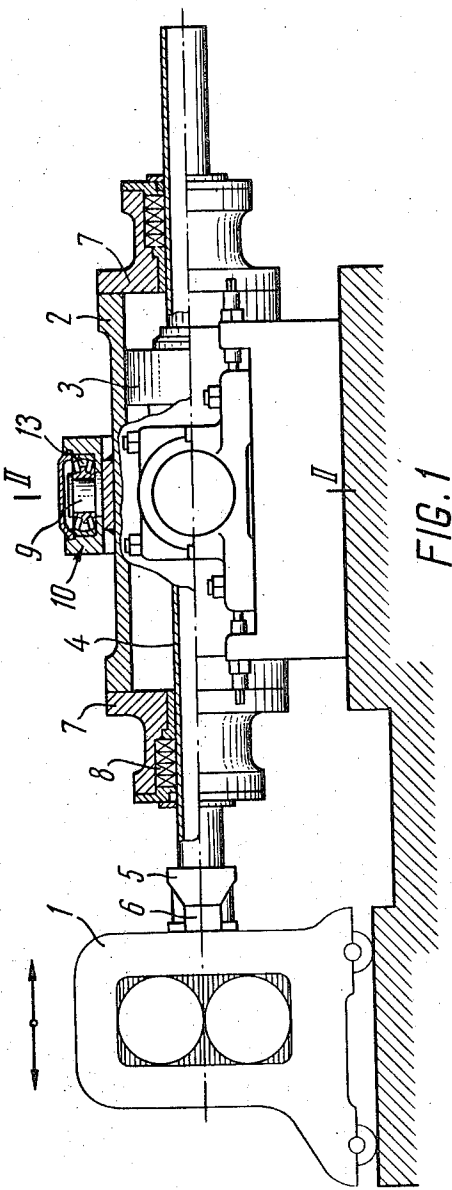
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ABSTRACT

An apparatus for balancing inertial forces of reciprocatingly moving masses of tube cold rolling mill stand comprising an air cylinder connected with said stand by means of a plunger and having two vertically and two horizontally disposed journals, the longitudinal axes of which are arranged in one vertical plane.

2 Claims, 2 Drawing Figures





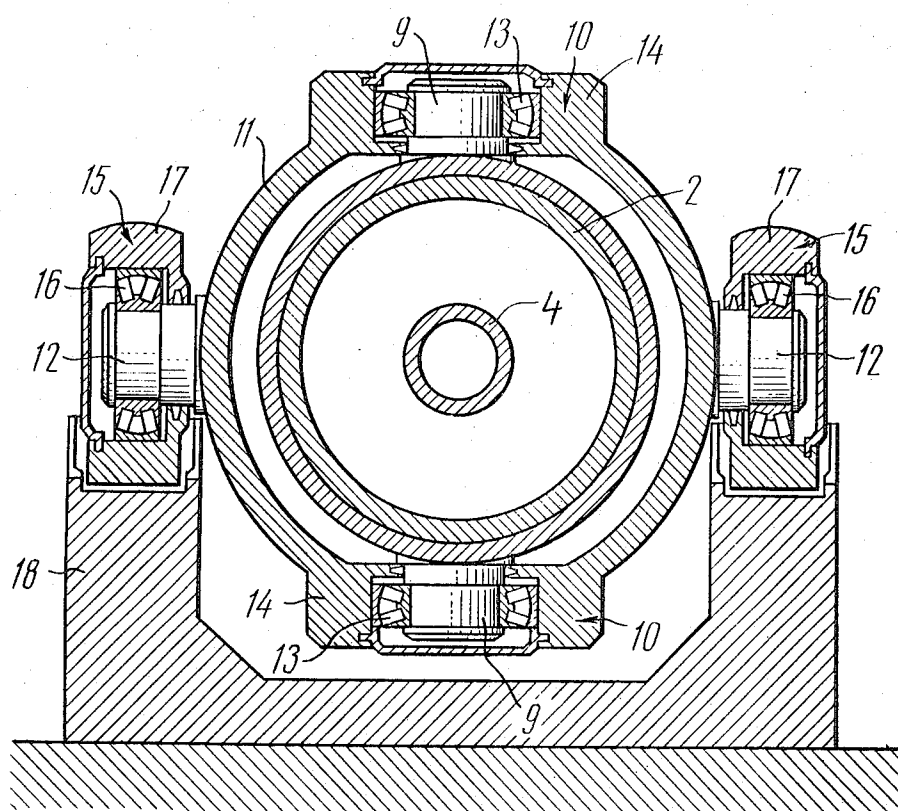


FIG. 2

APPARATUS FOR BALANCING INERTIAL FORCES OF RECIPROCATING MASSES OF TUBE COLD ROLLING MILL STAND

This invention relates to the rolling industry, and more specifically, to devices for balancing inertial forces of reciprocatingly moving masses of a stand of the tube cold rolling mill.

Commonly known in the art is a device for balancing inertial forces of reciprocatingly moving masses of the stand of tube cold rolling mill comprising an air cylinder with a plunger connected with said stand, and horizontally disposed journals mounted in bearing supports.

However, such commonly known device is provided with two journals only, ensuring 1° of freedom, adversely affecting its reliability in operation, causing scores on the plunger, irregular wear-out of guides of bushings, interior surfaces of the cylinder and packing.

The principal object of this invention is to provide an apparatus for balancing inertial forces of reciprocally moving masses of the stand of tube cold rolling mill which would prolong its service life term.

The object is attained in a device for balancing inertial forces of reciprocating masses of tube cold rolling mill stand comprising an air cylinder with a plunger, connected with said stand, and journals horizontally disposed along the cylinder diameter and mounted in bearing supports, wherein according to the invention, said air cylinder is additionally provided with two journals vertically disposed along the cylinder diameter having bearing supports encased in a holder on which said horizontally disposed journals are mounted.

A device with said four journals has 4° of freedom, increasing its service life term.

Preferably, the longitudinal axes of all said journals are arranged in one vertical plane and in symmetry with the longitudinal axis of the air cylinder.

The nature of the invention will become more apparent from the following description and accompanying drawings, wherein:

FIG. 1 is a side view with a detail of an apparatus constructed in accordance with the present invention;

FIG. 2 is a section along II—II of FIG. 1.

An apparatus for balancing inertial forces of reciprocatingly moving masses of the stand 1 of tube cold rolling mill (not shown in the Figure) comprises an axially disposed air cylinder 2 extending along the rolling axis with piston 3 and plunger 4 connected to the stand 1 by means of a rocker arm 5 and eye 6. End faces of the

air cylinder 2 are provided with covers 7 having packings 8 and through holes.

The air cylinder 2 has two vertically disposed journals 9 with bearing supports 10 encased in a holder 11 (FIG. 2) provided with horizontally secured journals 12, the longitudinal axes of all journals 9 and 12 being arranged in one vertical plane.

The bearing supports 10 include bearings 13, located in flanges 14 of the holder 11.

The journals 12 of the holder 11 are located in bearing supports 15 which comprise bearings 16 and supporting rings 17 mounted in a stationary housing 18.

An apparatus embodying the present invention operates as follows.

In the course of operation, compressed air is fed into working spaces of air cylinder 1 at a preset initial pressure (a compressed air supply system is not shown in the drawings), resulting in that, with established operating duty of the mill, the elastic reaction forces of compressed air acting on a stand 1 (FIG. 1) from balancing air cylinder, balance inertial forces developed at reciprocating motion of the stand 1.

Horizontal or vertical movements of the stand along its guides during the mill operation are compensated for by free rotation of the cylinder 2 relatively to corresponding axes, owing to pivotably connected journals 9 and journals 12 of the holder 11 with flanges 14 and supporting rings 17, respectively.

The rolling of the air cylinder 2 relative to its vertical and horizontal axes allows for excluding additional forces exerted by the stand 1 onto principal components of the balancing device, thus improving their operating conditions and prolonging their service life term.

What we claim is:

1. An apparatus for balancing inertial forces of reciprocating masses of a tube cold rolling mill stand, which comprises an air cylinder with a plunger, connected with said stand; two journals vertically disposed along the diameter of said cylinder; bearing supports of said vertically disposed journals; a holder encasing said cylinder with said vertically disposed journals; two journals placed into bearing supports and horizontally disposed along the diameter of said cylinder and secured in said holder.

2. An apparatus as claimed in claim 1, wherein the longitudinal axes of all said journals are arranged in one vertical plane and in symmetry with the longitudinal axis of said air cylinder.

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