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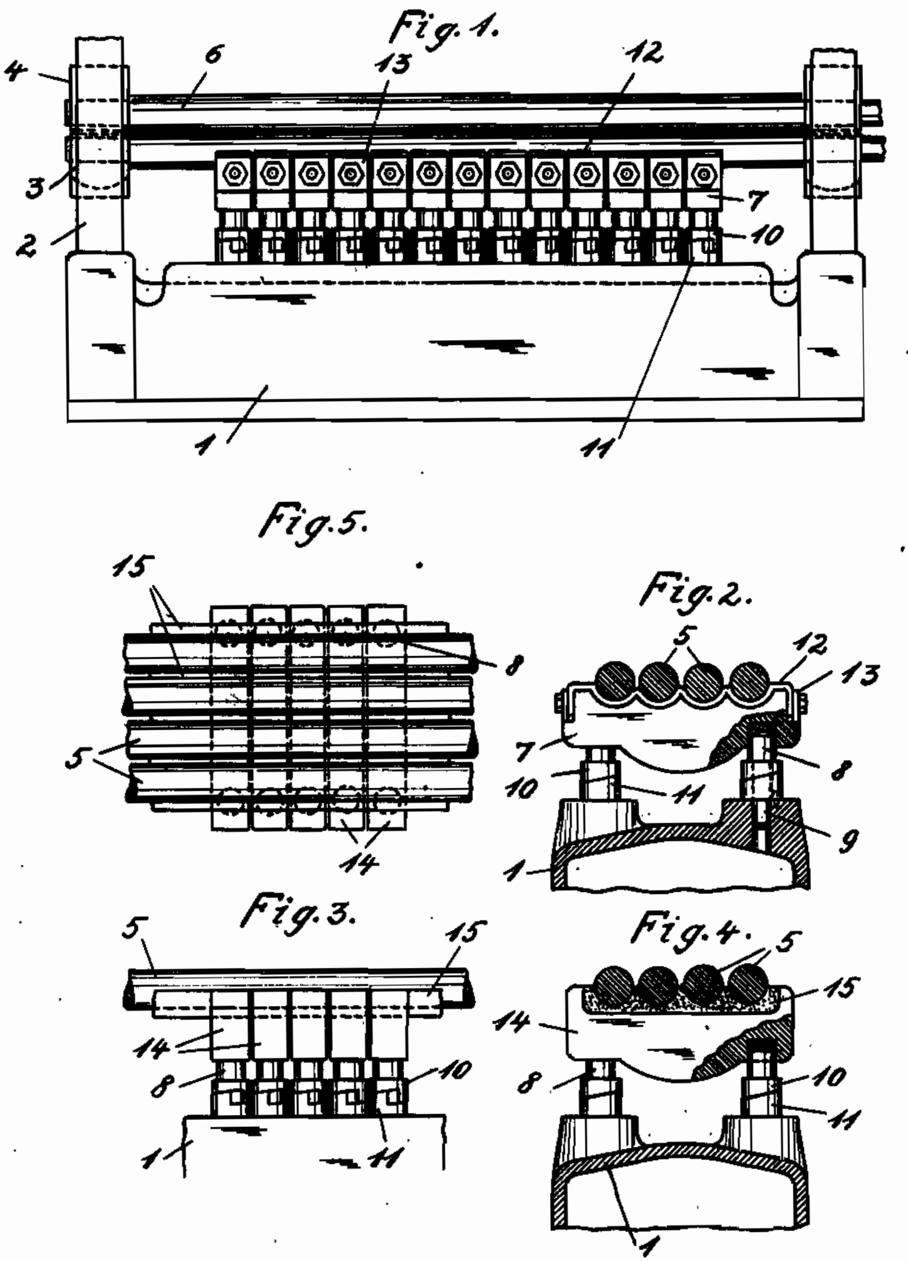

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STRAIGHTENING MACHINE FOR SHEET METAL PLATES

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The invention relates to a machine for straightening sheet metal plates by means of straightening rolls especially destined for straightening burnished-rolled sheet metal.

At the straightening of sheet metal plates, especially aluminium plates, the inconvenience is noticed that fine metal particles are torn off the sheet metal and deposited on the straightening rolls, where they stick and more and more smear the surface. The supporting rollers revolving with the straightening rolls of the srtaightening machines of known type equipped with these supporting rollers take off from the straightening rolls some of these detached metal particles and are therefore also dirtied, but the remaining metal particles are pressed more strongly against the straightening rolls by these supporting rollers, so that the straightening rolls are finally, and often even after a few hours, no longer suitable for the straightening of sheet metal plates which arrive in the straightening machine in burnished-rolled state but must not lose the bunish in this machine. The surface of the sheet metal plates becomes duller and of mean appearance when the dirtying of the straightening rolls increases, so that the attendant of the machine must frequently carry out a thorough cleaning of all straightening rolls and of the suporting rollers, sometimes even every few hours. With this object in view the rollers must be made easily accessible in the machine or removed completely, then polished again and finally re-inserted into the position in which the straightening of the sheet metal plates can be continued. Hereby stops lasting sometimes several hours occur often several times each day, during which stops the straightening rolls and supporting rollers must be re-polished, for instance by means of finest emery cloth. If this time-wasting work is carried out when the rolls and rollers are in the machine, it may happen that emery particles and polish dirt get into the machine and not only damage the bearings but also the material to be straightened if the impurities get at these points. When the straightening rolls and supporting rollers are removed from the machine for re-polishing, the time for removing and re-insertion is also lost.

In the course of time the diameters of the straightening rolls and supporting rollers further become shorter by these treatments, so that the rolls and rollers must be replaced.

These inconveniences are obviated by the invention.

The novelty consists in the arrangement of flaps, strips, plates or blocks of cloth, felt or similar material at least along that portion of the running surfaces of the straightening rolls which is used for the straightening, so that the cloth is pressed against the rolls or can be pressed on during the straightening.

It has been found that these means are sufficient to always remove immediately the deposited metal particles and to keep the rolls clean in this manner.

Additionally the supporting rolls may be kept clean by pressed-on cloth, felt or similar material.

The sheet metal plates straightened by rolls which are permanently kept clean in the manner described preserve the burnish produced by the burnished-rolling, and it is not at all necessary to freshly re-polish the rolls and rollers in the meantime.

It has further been found that the system of supporting rollers can be omitted and replaced by a supporting device which not only keeps clean the straightening rolls as said materials bear against or are pressed onto the straightening rolls, but also supports directly these rolls, it being immaterial whether these novel supporting means serve merely for a stationary supporting, by which the straightening rolls for instance remain directed accurately straight, or whether they serve for an adjustable supporting, by which a more or less strong bending of the straightening rolls towards the material to be straightened can take place.

The supposition, that the said materials might not be sufficiently yielding and wear-proof as supporting means, has not been confirmed by experiments. The capability of a hard felt block, for instance, for carrying out the necessary supporting or straightening pressure may result therefrom that at the straightening of metal- or aluminium plates not so great setting work and also not so great straightening pressure are necessary as at the straightening of plates of iron or steel. For the latter, especially for steel plates, the novel supporting means are not suitable. They are, however, especially suitable for machines, in which burnished sheet metal plates are completely straightened, detended and smoothened. This kind of sheet metal plates is already comparatively well rolled, so that often one single passage through the straightening machine is sufficient. The stretching must then also be very slight, as otherwise, owing to the alteration of the surface structure and of the displacing of the metal particles, the burnish gets lost more or less. The new supporting means

can perfectly stand the little straightening work which is thus to be effected.

Two embodiments of the invention, according to which the cleaning means for the straightening rolls is at the same time the direct supporting means for the same, are illustrated by way of example in the accompanying drawing, in which:

Fig. 1 shows in front elevation a straightening machine with supporting device according to the first embodiment of the invention,

Fig. 2 is a side elevation of Fig. 1,

Fig. 3 shows in front elevation a plate straightening machine with supporting device according to the second embodiment of the invention,

Fig. 4 is a side elevation of Fig. 3,

Fig. 5 is a top plan view of the lower set of straightening rolls with supporting device according to the second embodiment of the invention.

On the base box 1 of the plate straightening machine the uprights 2 are arranged one at each end. The bearing bodies 3 of the lower set of straightening rolls 5 and the bearing bodies 4 of the upper set of straightening rolls 6 are mounted in the uprights 2. The bearing bodies 4 of the upper set of straightening rolls 6 hang in known manner on a yoke, not shown, extending over the whole machine and adapted to be lifted and lowered by the rotating of corresponding hand wheels, and this yoke may also be inclined. The supporting of the lower set of straightening rolls 5 is effected by means of a great number of supporting beams 7 or 14, arranged closely the one at the side of the other in the direction of the length of the straightening rolls 5, said supporting beams being carried at two points by bolts 8, and the set off part 9 of said bolts is located in the adjusting rings 10 and 11 and in a bore of the base box 1. Helical faces of these adjusting rings 10 and 11 rest the one on the other so that, when the rings are mutually turned, these faces lift or lower the bolts 8 and therefore the beams 7 or 14 respectively. The supporting device in both embodiments of the invention is consequently adjustable, the lower adjusting ring 11 resting on the base box 1 being secured against turning, whereas the upper adjusting ring 10 can be slightly turned from one side of the machine by means of a system of levers not shown in the drawing. The pitch of the helical faces of the rings 10 and 11 is dimensioned so that, at a corresponding turning of the upper ring, the pitch is sufficient to effect the necessary lifting and lowering of the supporting beams 7 or 14 and therewith the desired bending of the straightening rolls 5 towards and away from the material to be straightened.

In this lifting and lowering of the upper rings 10 participate, according to the first embodiment of the invention shown in Figs. 1 and 2, strips 12 of cloth, felt or hard felt, placed one strip on each supporting ring 7 and fixed on the end face of the corresponding beam 7 by means of a clamping disc 13. The actually driven straightening rolls 5 are in this manner not only supported and, if necessary, slightly bent at certain points, but their surface is continually cleaned from the deposited metal particles which stick in the strip 12 of cloth or felt and do not longer rotate with the straightening rolls 5, as has been the case up to the present.

In the first embodiment of the invention illustrated in Fig. 2, the strip 12 of cloth or felt is located in indentations the depth of which depends on the thickness of the straightening rolls, these indentations forming undulations in the supporting beam 7 and therefore imparting to the strip 12 an undulated shape. Instead of single strips 12, which are in contact the one with the other at their edges and have a width equal to that of the supporting beam 7, plates or carpets may be placed on the beams 7 and extend over some or, if desired, over all beams 7. The elasticity, even of hard felt, is so great that, without getting damaged, it can stand the slight bendings of the felt plate occurring in the last instance at certain points of the felt plate towards or away from the material to be straightened.

According to the second embodiment of the invention a block 15 of hard felt is provided instead of the strip 12 or the plate, and in this block indentations for accommodating the straightening rolls are provided. This block 15 is not so stiff that it could not be pressed more strongly against the straightening rolls 5 at certain points than at other points.

According to the kind of sheet metal plates to be straightened, the strips 12, the carpet or block 15 will, in one or several weeks, be full of detached metal particles, so that they have to be exchanged against fresh ones. This is effected simply and quickly by lowering the beam 7 or 14 respectively, removing from the beams the dirty inserts 12 or 15 of cloth or felt, and replacing the same by fresh or cleaned inserts.

Instead of the adjusting elements 8, 9, 10, and 11 of the supporting device, any other suitable devices, for instance of hydraulic type or screw spindles, adjusting wedges, eccentrics or the like, may be used.

For the upper set of supporting rollers a supporting device, not shown in the drawing, may be provided, destined to clean the upper set of straightening rolls in a similar manner as the cleaning of the lower set of straightening rolls is carried out.

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