

April 15, 1969

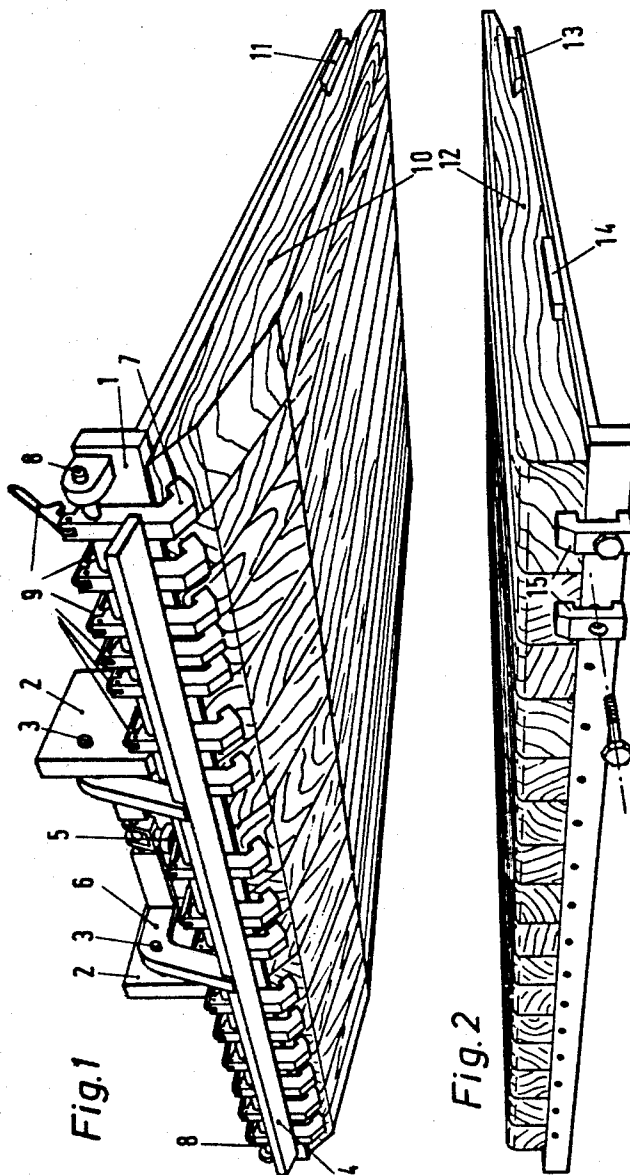
A. TEDESCHI

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APPARATUS FOR ATTACHMENT TO AN INLET BOX OF A COLD-ROLLING TRAIN

Filed Feb. 21, 1968

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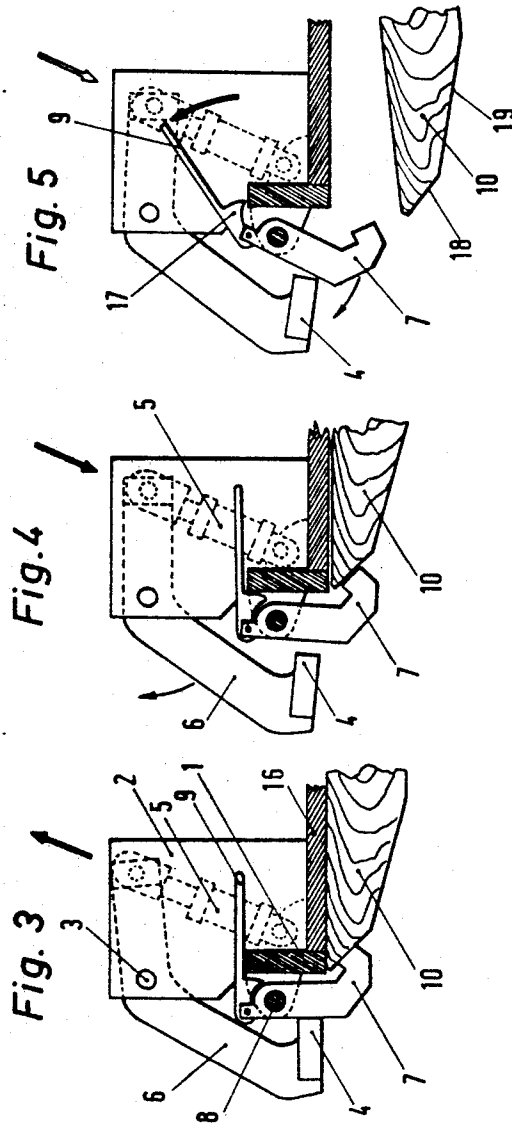
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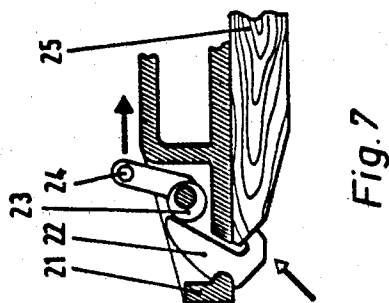
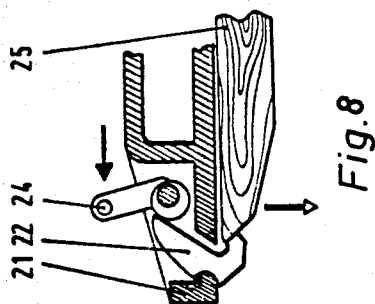
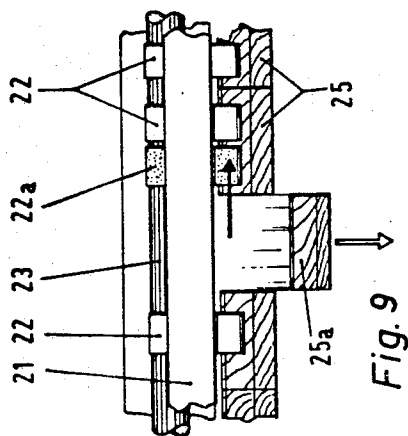
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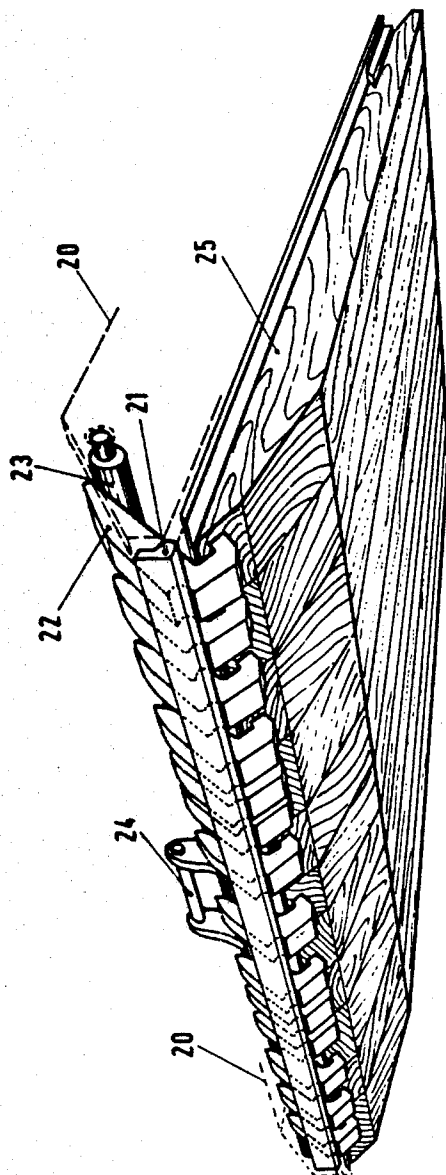


Fig. 6

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APPARATUS FOR ATTACHMENT TO AN INLET BOX OF A COLD-ROLLING TRAIN

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Int. Cl. B65g 11/00; B21b 39/20; B65h 23/04

U.S. Cl. 193—1

10 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for attachment to an inlet box of a cold-rolling train to permit the simultaneous blocking and release of a plurality of wooden guides arranged in two superposed platforms defining therebetween a passage for the metal plate to be rolled. The apparatus comprises a blocking bar connected to a set of hydraulically or mechanically actuated elbow levers. On lifting the blocking bar a plurality of hooked claws each retaining a wooden guide is simultaneously released. In this released position the wooden guides however do not yet fall due to their own weight, but are still loosely held so that they can be transversely shifted. Each hooked claw has a safety lever associated therewith, which, when released, permits the removal and exchange of the associated wooden guide. At least one transverse supporting member extends over the entire width of each platform and co-operates with the hooked claws to block the wooden guides in their position without the use of the known clamping screws.

This invention relates to apparatus for attachment to an inlet box of a cold-rolling train for rendering rapid and simple the mounting of the wooden guides on the upper platform of the inlet box.

As known, the inlet box is the part of the train of rolls which conveys the band to be rolled to the work rolls and comprises two platforms arranged one above the other and moved hydraulically. The platforms contact each other and first serve for introduction and then as a running path for the band of sheet metal traveling toward the work rolls.

Wooden sectional guides are placed on the two matching platforms to guide the band to be rolled in its movement. At present these guides are secured to the platforms by a series of clamping screws to prevent the guides from moving and being entrained by the movement of the traveling metal band, sheet or plate to be rolled.

Because of the heavy friction produced by the travelling metal sheet the guides wear off rapidly even though they consists of hard wood and must be exchanged (in part or completely) with the train of rolls stopped. This is a rather troublesome and complicated operation that can only be carried out by skilled workers and requires considerable time and seriously impairs production and the cost of rolling.

It is the object of the present invention to render more easy, simple and above all more rapid the exchange of the worn guides and the extension or restriction of the traveling path formed by the wooden guides located in the inlet box and to rationalize the work necessary for the operations of completely exchanging or of the initial preparation of the wooden part of the inlet box to permit the train of rolls to start the rolling operation immediately.

One of the difficulties encountered with the use of clamping screws of the known type is that for exchanging one guide it is necessary to release the corresponding clamp, retain the guides that are not to be exchanged, as they would otherwise fall, and finally to locate the clamps before they are tightened, as each clamp only

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serves to block one or two guides of the upper platform.

The apparatus according to the invention permits all the guides to be released simultaneously but nevertheless to be held in position so that they can be horizontally shifted when the width of the traveling path is to be increased or reduced or when a faulty guide is to be rapidly replaced.

According to a first embodiment of the invention the apparatus comprises a blocking bar connected to a set of elbow levers actuated hydraulically or mechanically, said bar when being lifted releasing simultaneously a series of hooked claws for blocking the guides, the claws releasing their grip on the guides without letting them go so that they can be shifted laterally; a lever for each guide provided with a rounded lug serving as abutment and permitting the complete removal of the guide to be replaced; a metal transverse member instead of the known clamps is secured transversely of the lower platform and serves to delimit the forward and backward course for the guides which are thus retained in position in the movements transversely of the traveling sheet and in the longitudinal movements from the transverse abutment member.

The advantage obtained in replacement of the guides and their transverse shifting with the train of rolls stopped is obvious as these operations can be freely carried out without blocking the clamps, which would be necessary for all the clamps if the inlet box has to be prepared for operation or the traveling path is to be restricted or extended, as the guides are only supported on the lower platform and firmly secured thereto by grooved connections provided therein.

In another embodiment a hydraulically or mechanically actuated lever is provided for simultaneously releasing all the guides and this lever, by acting upon an eccentric lever, serves as a support for the retaining claws for reducing the pressure on the heads of the guides when they are released.

By manually shifting the claws it is then possible to completely release the guide to be replaced, such guide being held in position by moving a claw up to it and then tightening the lever for definitely blocking the guides on the platform.

This apparatus provides a simplification in the mechanical parts with respect to those used in the first embodiment and consequently is less expensive and more practical.

A further advantage consists in the possibility of reducing or increasing the number of retaining jaws in accordance with the number of guides present on the platform. Further, any maintenance and cleaning work on the claws is avoided as they have no mobile or projecting parts subject to deformations caused mainly by shocks; it follows that there is no danger of accidents that might be caused by violent flapping of the tail of the sheet at the end of each roll of sectional iron to be rolled.

More precisely this apparatus is characterized in that the supports carried by the heads of the upper platform of the inlet box are designed to support at their free ends a transverse supporting member for the hooked retaining jaws coupled thereto merely by contact in the manner of a free joint (toggle joint), and the ends of an eccentric freely rotatable shaft.

Two preferred embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIGS. 1 to 5 show the first embodiment, FIGS. 1 and 2 being schematic perspective views of an inlet box of a train of rolls with the apparatus according to the invention with an upper platform shown in FIG. 1 and a lower platform shown in FIG. 2; FIGS. 3, 4 and 5 show the device for blocking the guides schematically and partially in sec-

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tion, in the closed position with a guide blocked in the operative position, in the partially open position with the guide still retained, and in the open position with the guide clear of the claw, respectively.

FIGS. 6 to 9 show the second second embodiment, FIG. 6 being a schematic perspective view of the upper platform, whereas FIGS. 7 to 9 show the blocking device in its principal positions, i.e., the blocked position, the released position and the released position in a partial front view, respectively, the latter illustrating the succession of operations to be carried out for exchanging one or more guides on the platform.

Referring to FIGS. 1 to 5, 1 indicates a support for the apparatus according to the invention, intended to be welded to a head of an upper platform of an inlet box 16. Supporting blocks 2 are secured to the support 1 and the upper platform and provided with pivots 3 for rotatably mounting a blocking bar 4. A hydraulically or mechanically operated ram 5 controlled by the operator on the inlet box produces the power for driving a pair of elbow levers 6 and the blocking bar 4 secured thereto and extending over the entire length of the inlet box to block the guides in the operative position by means of claws 7 arranged adjacent and below the blocking bar 4. The claws 7 are shiftably and rotatably supported by a common shaft 8. Each claw 7 has a hooked general configuration to permit the guides to be retained in position even after the claws have been cleared of the pressure of the bar 4, as each claw is restrained during its rotation by a circular recess of a lug 17 of a safety lever 9 which, when released, permits the claw 7 to rotate and the retained wooden guide 10 to be freed by the force of its own gravity, leaving its place free for the insertion of a new guide which is secured in its operative position in the inlet box 16 by simply pressing down the lever 9 and closing the bar 4.

The heads of the wooden guides 10 present two portions 18 and 19 of different tapering. The more strongly tapered portion 18 forms a convenient plane for engagement of the blocking claw whereas the portion 19 of greater length and smoother tapering facilitates the introduction of the plate to be rolled toward the work rolls.

A transverse member 11 of metal, formed integrally with the upper platform (FIG. 1), completes the apparatus and serves as an abutment by engaging in a recess provided in the guides to firmly connect the latter with the platform with the aid of the pressure exerted by the claws 7 in turn subjected to the pressure of the bar 4.

The lower platform of the inlet box (FIG. 2) is stationary and the plate to be rolled runs on this platform toward the work rolls. As in the case of the upper platform the wooden guides 12 of the lower platform are provided with undercut recesses for the insertion of a metal abutment 13 to firmly secure the guides on the platform. A further metal transverse member 14 welded to the lower platform serves as a second abutment in cooperation with a corresponding recess in the wooden guides.

The invention makes the known clamps 15 superfluous due to the application of the transverse member 14 and thus provides the advantage of permitting a more rapid exchange or addition of guides on the platform. In fact, due to the employment of the pair of metal transverse members cooperating with corresponding recesses in the guides, the latter can be exchanged by simply taking the faulty guide away and putting a new one in its place on the platform.

In this way also the operations of enlarging or restricting the slide track are simplified as these operations can be carried out manually by sliding the guides transversely over their track on the transverse member engaging in the associated recesses in the guides.

Referring to the second embodiment of the invention shown in FIGS. 6 to 9, a support of the apparatus, indi-

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cated by 20, is formed of a sheet metal apron shown in dash lines and welded to the head of the upper platform (FIG. 1) of the inlet box. The support 20 carries at its free end a transverse bar 21 supporting hooked claws 22 coupled to the bar 21 merely by contact in the manner of a free toggle joint, and the ends of a freely rotatable eccentric shaft 23.

By means of the eccentric shaft 23 the claws 22 can be moved by mechanically or hydraulically operated blocking means (not shown) directly coupled to the eccentric shaft 23. An auxiliary handle 24 is secured to the eccentric shaft 23 and permits the manual actuation of the latter in addition to its automatic actuation for moving the claws 22 from their blocking position into the position for loosely supporting the guides 25. By the provision of the special hinge between the claws 22 and the transverse supporting bar 21 the claws 22 can be rotated and in addition be withdrawn from below without keys or other instruments and be freely shifted along the transverse bar 21 until they are in the correct position on the guide to be retained and blocked in position. In this manner the guide is still held also when the claw is in the released position.

As seen in FIG. 7, the claws 22 serving for retaining the guides in the blocked position work in the manner of a lever which rotates about the hinge formed by the projecting portion of the transverse bar 21 and transmits the pressure exerted by the eccentric shaft 23 to the head of the associated wooden guide so as to block the latter in position. The direction of the arrows indicates the direction in which the forces are exerted (black arrow) and the effects produced thereby (white arrow), the forces being produced by the rotary motion of the eccentric shaft 23 as will be evident from the changed position of the handle 24.

In FIG. 8 the claw 22 is shown in the released position in which the associated wooden guide 25 is merely loosely held. The rotation of the eccentric shaft 23 in the direction of the black arrow has changed the position of the claw 22 with the result that the pressure previously exerted by the claw on the head of the wooden guide 25 is released and the guide can be completely removed by simply manually shifting the claw 22. The direction of the white arrow indicates the direction in which the wooden guide will fall, but is still retained in position by the associated claw which abuts on the eccentric shaft with its other end.

This is the position in which all the operations required for exchanging and reinsertion of the wooden guides are carried out, as all the guides are in the released position, retained merely by the claws which can be easily shifted or removed to permit the handling of the wooden guides. Due to the particular configuration of the claws the wooden guides are prevented from falling.

The succession of operations necessary for exchanging one or more guides 25 on the platform can be seen from FIG. 9.

Supposing the claws 22 are in the released position (FIG. 8) in which they are no longer subjected to the pressure of the eccentric shaft 23, when the claw 22a is shifted laterally (FIG. 9) the guide 25a will fall due to its own weight and a new guide will be inserted in its place. When thereafter the claw 22a is restored to its position on the head of the new guide the latter will be held in place in alignment with the other guides 25 retained by the associated claws 22.

By tightening the apparatus all the claws will be moved from the released position (FIG. 8) to the blocked position (FIG. 9) and the entire platform will be ready for starting operation of the train of rolls.

Obviously modifications can be made in the construction of the various elements without departing from the principle of the invention and these elements may have a form and arrangement different from that described

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and illustrated without leaving the scope of the invention as defined in the appended claims.

I claim:

1. Apparatus to be attached to an inlet box of a cold-rolling train, comprising

a blocking bar connected to a set of hydraulically or mechanically operated elbow levers,

a series of claws for blocking and releasing a plurality of wooden guides for a metal plate to be rolled and passing between an upper and a lower platform formed by said guides,

a safety lever for each guide, provided with a lug having a circular recess permitting the complete release of the associated guide and exchange of the latter, said bar when being lifted serving to release simultaneously said series of claws so that they are still retained in a loose position in which they can be shifted transversely, and

a metal transverse member for the upper and the lower platform in substitution of the known clamps to delimit the forward and backward course of said guides which are thus retained in position and prevented from moving transversely of the direction of passage of the plate to be rolled and longitudinally of said transverse members.

2. Apparatus as claimed in claim 1, wherein a support for the apparatus is mounted on the head of the upper platform of the inlet box which also carries supporting blocks firmly secured thereto and provided with pivots for rotatably mounting said blocking bar.

3. Apparatus as claimed in claim 1, wherein a hydraulically or mechanically operated ram is provided for driving said set of elbow levers and said blocking bar connected thereto and extending over the entire length of the inlet box for blocking said guides by means of said claws disposed below said blocking bar.

4. Apparatus as claimed in claim 1, wherein the claws are rotatably and shiftably mounted on a common shaft.

5. Apparatus as claimed in claim 1, wherein each of the claws has a hooked end for holding the guides also after the claw has been released by the blocking bar and a safety lever is associated with each claw and permits the claw to be completely released to allow the guide retained thereby to fall due to its own weight.

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6. Apparatus as claimed in claim 1, wherein each of the guides has two adjacent portions of different tapering at its head end, one of said tapered positions being more strongly tapered than the other.

7. Apparatus to be attached to an inlet box of a cold-rolling train, as claimed in claim 1, wherein the operation of simultaneously and rapidly blocking or releasing the clamping of the upper platform of the inlet box for exchanging the wooden guides forming the platform or dimensioning their assembly on the platform for changing the type of working is carried out by employing hooked claws controlled by an eccentric lever adapted to be moved mechanically or hydraulically, said claws serving to force said wooden guides against the upper platform of the inlet box and also to release them so that they are still held in a position in which they can be easily removed manually.

8. Apparatus as claimed in claim 7, wherein supports carried at the head of the upper platform of the inlet box mount at their free ends a transverse bar for holding the hooked claws coupled thereto merely by contact in the manner of a free hinge, and the ends of the freely rotatable eccentric bar for controlling said claws.

9. Apparatus as claimed in claim 7, wherein the claws for holding the wooden guides serve as levers for transmitting, by rotation about a projecting rounded portion of a transverse supporting bar, the pressure exerted by the eccentric shaft to the head of the wooden guide, blocking the same in position.

10. Apparatus as claimed in claim 9, wherein the connection between the transverse supporting bar and the claw is obtained by a free toggle joint.

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U.S. Cl. X.R.

72—250; 226—196