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APPARATUS FOR THE HORIZONTAL STACKING OF SHEETS OF RIGID MATERIAL

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Fig.1.

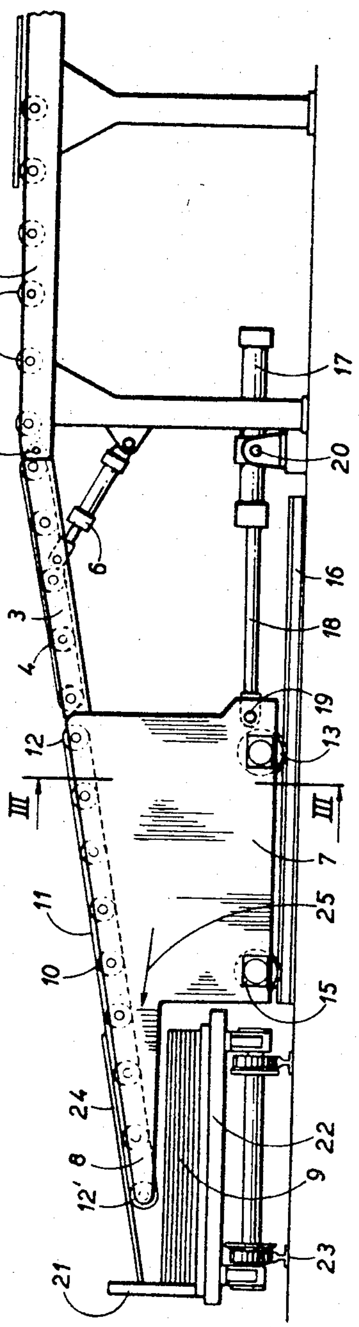

Fig.2.

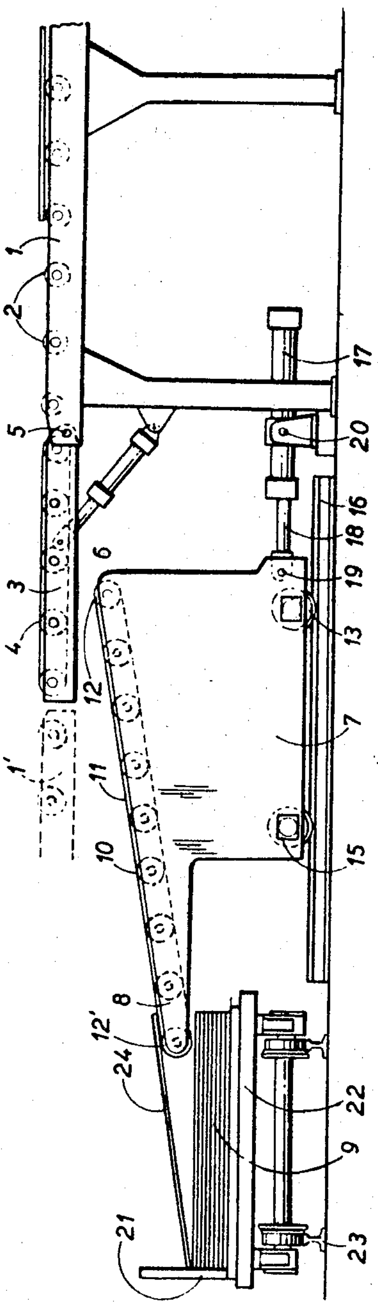

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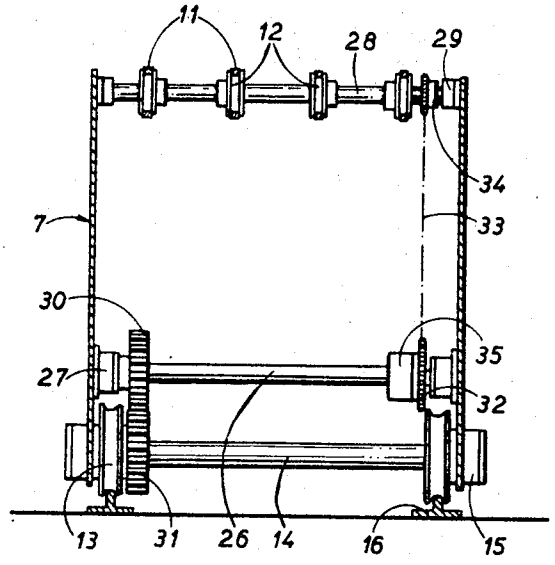
Fig.3.



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APPARATUS FOR THE HORIZONTAL STACKING OF SHEETS OF RIGID MATERIAL

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2 Claims. (Cl. 214—6)

ABSTRACT OF THE DISCLOSURE

An apparatus for the horizontal stacking of sheets of rigid material such as glass sheets in which the sheets are delivered one by one onto a descending inclined portion of a mobile carrier movable toward and away from a stack defining means. The inclined portion is provided with means for moving a sheet therealong and a lower end which projects over the stack defining means when the carrier is moved towards the stack defining means and away from the stack defining means when the carrier moves away therefrom. The carrier has means associated therewith for moving the carrier toward and away from the stack defining means and a mechanical connection between the carrier moving means and the sheet moving means functions to impart a movement to the sheet moving means for compensating for the movement of the carrier as it moves away from the stack defining means whereby the sheet undergoes no displacement caused by such movement of the carrier and is correctly deposited onto the stack.

The invention has for its object the provision of an apparatus for the horizontal stacking of sheets of rigid material, such as sheets of glass, which are delivered one by one by conveyor means such as rollers or endless belts.

Devices of this type may comprise a movable frame provided with a descending inclined surface having means adapted to move a sheet coming from an inclinable portion of the roller or endless belt conveyor. The frame is mounted on rollers and is adapted to effect a reciprocating movement in such a manner that the bottom end of the inclined surface is alternately above the stack and at a distance therefrom, with the sheet being delivered above the stack when the end of the inclined surface is situated above the latter and deposited on the stack when the end is withdrawn away from the stack. The withdrawal movement of the carriage for the purpose of moving the inclined surface away from the stack entails the risk of slightly carrying the sheet therewith, and as a consequence, the sheets are deposited in an irregular manner on the stack.

The present invention overcomes this difficulty. To accomplish this end, the apparatus comprises means imparting to the members adapted to move the sheet on the inclined surface, a movement which compensates for the displacement of the frame as it moves away from the stack, so that the sheet undergoes no displacement caused by the movement of the frame and is correctly deposited on the stack.

Such means comprises a mechanical connection between the members adapted to move a sheet on the inclined surface and the means for moving the frame, as well as a clutch adapted to be engaged at the moment when the frame starts to move away from the stack. The clutch may be controlled in any manner, such as hydraulically, pneumatically, mechanically, electrically, or otherwise, and its control may be manual or automatic.

The clutch is advantageously mounted on an intermediate shaft parallel to the shaft constituting the axle

on which are keyed the rollers serving for the movements of the frame, and also parallel to a shaft carrying the members adapted to move a sheet on the inclined surface. The intermediate shaft is connected mechanically, for example by gears or sprocket wheels, to each of the other two shafts in such a manner that in one case this connection is permanent and in the other is effected by the clutch.

Further objects and advantages of the invention will become more readily apparent to persons skilled in the art from the following description and accompanying drawings of a preferred embodiment of the invention and in which drawings:

FIGURE 1 is a view in elevation of an apparatus for stacking sheets of rigid material, with the end of the inclined surface being situated above the stack;

FIGURE 2 is a view in elevation of the same apparatus with the end of the inclined surface moving away from the stack, and

FIGURE 3 is a section on a larger scale taken along the line III—III of FIGURE 1 the view looking in the direction of the arrows.

The apparatus for the horizontal stacking of sheets is interposed in a conveyor **1** comprising driven rollers **2**, or at the end of a conveyor of this type, as illustrated by way of example in the Figures. The conveyor contains a roller platform **3** provided with rollers **4** or one or more endless belts and is adapted to pivot about a horizontal axis **5** under the control of a jack **6**. In the inclined position (FIGURE 1) the roller platform **3** connects the conveyor **1** to a movable frame or mobile carrier **7** and in the raised position enables the movable frame to perform a backward movement. It may optionally form a bridge between the conveyor **1** and a continuation **1'** (FIGURE 2) of the latter, passing above the place provided for the stacking of the sheets, when the stacking location is not situated at the end of the conveyor. It is also possible for a plurality of stacking devices to be provided in the conveyor and together serve to distribute the sheets and sort the sheets in accordance with selected criteria, such as size, quality, purpose, or other factors.

The movable frame **7** comprises a descending inclined surface extended at its end **8** so as to be capable of projecting over a stack of sheets **9**. The inclined surface is provided with members adapted to move a sheet, and in the present instance comprises rollers **10** supporting endless belts **11** passing around end rollers **12** and **12'**. The movable frame **7** is mounted on rollers **13** keyed on axles **14** adapted to turn in bearings **15** fastened to the frame. The reciprocating movement of the frame on a track **16** is controlled by a jack assembly **17** and its piston rod **18** is articulated at **19** to the frame with the body thereof connected to a foundation block by an articulation **20**.

The stack **9** of horizontal sheets is preferably formed in a stack defining means or box **21** which is partly mounted and placed on a truck **22** adapted to run on a track **23**.

A sheet **24** delivered by the conveyor **1** to the movable portion **3** when the portion **3** is in the raised position is able to reach the descending inclined surface of the frame **7** when the movable portion **3** can be inclined, that is to say when the frame **7** is advanced and the end **8** of the inclined surface extends over the stack **9** (or the bottom of the box **21** when the formation of the pile is commencing). The sheet descends the inclined surface of the endless belts **11** and its edge strikes against the rear wall of the box **21**. At this moment, the frame **7** starts its return movement which is made possible by the raising of the movable portion **3**, and when the extension **8** of the inclined surface of the frame has moved completely away from the stack the sheet

can be deposited on the latter, and braked by the cushion air existing between the stack and the sheet. If desired, the cushion of air may be augumented by a jet of air blown at that moment in the direction of the arrow **25** (FIGURE 1). As soon as the sheet **24** is deposited on the stack, the carriage **7** may advance again as the first phase of the next cycle of operation.

According to the invention, this apparatus for the horizontal stacking of sheets contains means for imparting to the endless belts **11** on the inclined surface of the frame **7** a movement in the opposite direction to that which the frame effects in order to move away from the stack. This movement of the endless belts prevents the sheet from being driven by the rearward movement of the frame and has the effect that the edge of the sheet remains constanly in contact with the rear wall of the box, thus ensuring that the sheet will be laid correctly on the stack.

Such means comprises an intermediate shaft **26** (FIGURE 3) rotatable in bearings **27** parallel a axle **14** and to the shaft **28** rotatable in bearings **29**, and having keyed thereon the rollers **12** around which the endless belts **11** pass. On the intermediate shaft are mounted a gear wheel **30** meshing with a gear wheel **31** keyed on the axle **14**, a sprocket wheel **32** connected by a chain **33** to a sprocket wheel **34** keyed on the shaft **28**, and a clutch **35**. In the embodiment illustrated, the gear wheel **30** is keyed on the shaft **26**, while the sprocket wheel **32** is loose and can be coupled to the shaft **26** by the clutch **35** at the moment the carriage **7** commences its return movement. The clutch **35** may be controlled in any desired manner, namely mechanically, hydraulically, pneumatically, electrically, or magnetically. The clutch may be brought into operation manually or automatically, and in the latter case advantageously in combination with the actuation of the controls for the movements of the jacks **6** and **17**. Hence it is easy for all of the movements to be carried out in a determined rhythm or in an irregular rhythm, and initiated for example by the arrival of a sheet on the movable portion **3** in the raised position.

The speed of the movement imparted to the endless belts **11** is substantially equal to the speed of the return movement of the frame **7**. By the suitable selection of the ratio between the gear wheels **30** and **31** or between the sprocket wheels **32** and **34**, it is easy to impart to the belts a speed such that the horizontal component of their speed will be identical with or very slightly greater than the speed of the return movement of the frame. The sprocket wheel **32** must be connected at the precise moment when the sheet **24** running due its own weight down the inclined surface of the frame strikes against the rear wall of the box **21**, while the disconnection may be effected at any moment between the moment when the stack is cleared completely by the rollers **12'** and the complete return movement of the frame **7**.

The invention is obviously not limited to the embodiment which has been described and illustrated by way of example, and modifications could be made thereto without departing from the scope of the invention.

I claim:

1. An apparatus for the horizontal stacking of sheets of rigid material such as glass sheets delivered one by one by conveying means, comprising a stack support, a stack defining means, a carrier capable of movement toward and away from the stack defining means to overlie said stack support in its motion toward said stack defining means, said carrier having an endless belt means forming a descending inclined conveyor portion for moving a sheet therealong, means operably connected to said carrier for moving the carrier toward and away from said stack defining means, said descending inclined portion being provided with a lower end adapted to project to a position adjacent the stack defining means when the carrier is moved towards the stack defining means and to be clear of said stack support when the carrier is moved away from the stack defining means, a mechanical connecting mechanism between the endless belt means for moving a sheet along the inclined portion and the means for moving the carrier, said mechanical connecting mechanism being operative upon movement of the carrier away from the stack defining means for imparting a movement to the endless belt means at a speed equal to but in a direction opposite to the movement of the carrier so that the sheet undergoes no displacement caused by such movement of the carrier and is deposited correctly on the stack, said mechanical connecting means including clutch means operative to interconnect said endless belt sheet moving means and carrier moving means only upon movement of the carrier away from the stack defining means, means to position successive sheets of material on said carrier including a roller platform to receive successive sheets of material to be stacked, said roller platform being mounted to lie horizontally when said carrier is moved away from said stack defining means, and is sloped toward said carrier when said carrier is in its position adjacent said stack defining means, and operating means for said roller platform to operate said roller platform in timed relation to said carrier.

2. The apparatus according to claim **1**, in which the clutch means is mounted on an intermediate shaft parallel to a roller carrying shaft serving for the movements of the carrier, and parallel to a shaft carrying the means for moving a sheet along the inclined surface, and the intermediate shaft being connected mechanically to each of said other two shafts, in such a manner that one of said mechanical connections is permanent and the other is by the clutch means.

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