June 23, 1953 J. W. KENYON 2,643,009

DEVICE FOR LOADING SHEETS OR PLATES ONTO CONVEYERS

Filed June 3, 1949 2 Sheets-Sheet 1

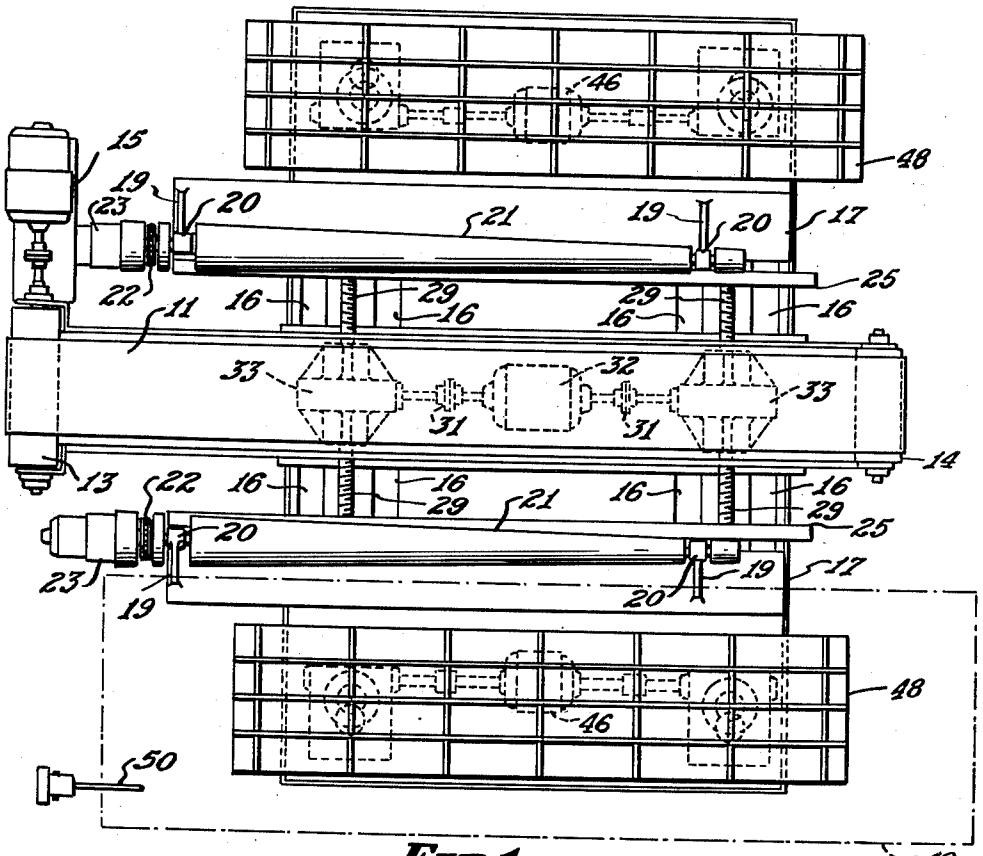


FIG. 1.

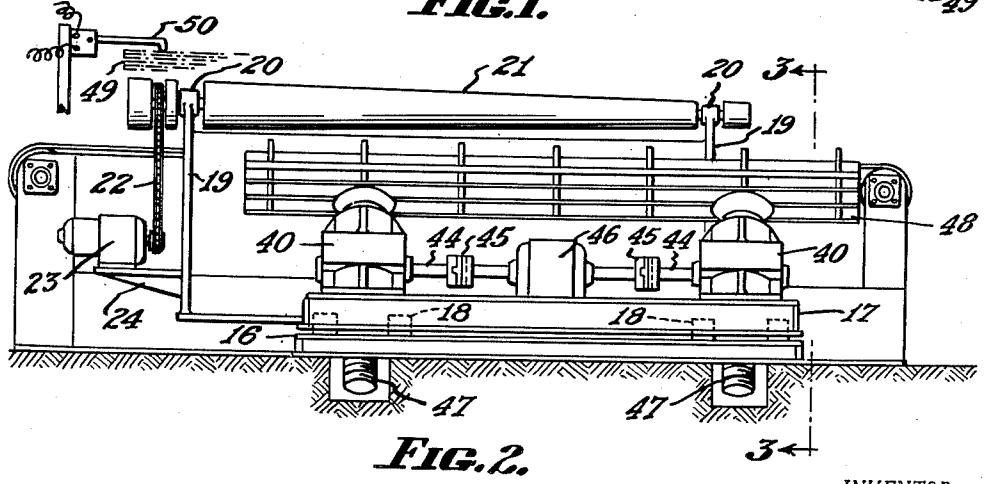


FIG. 2.

INVENTOR.
JOHN WARNER KENYON,
BY
Allen & Allen
ATTORNEYS.

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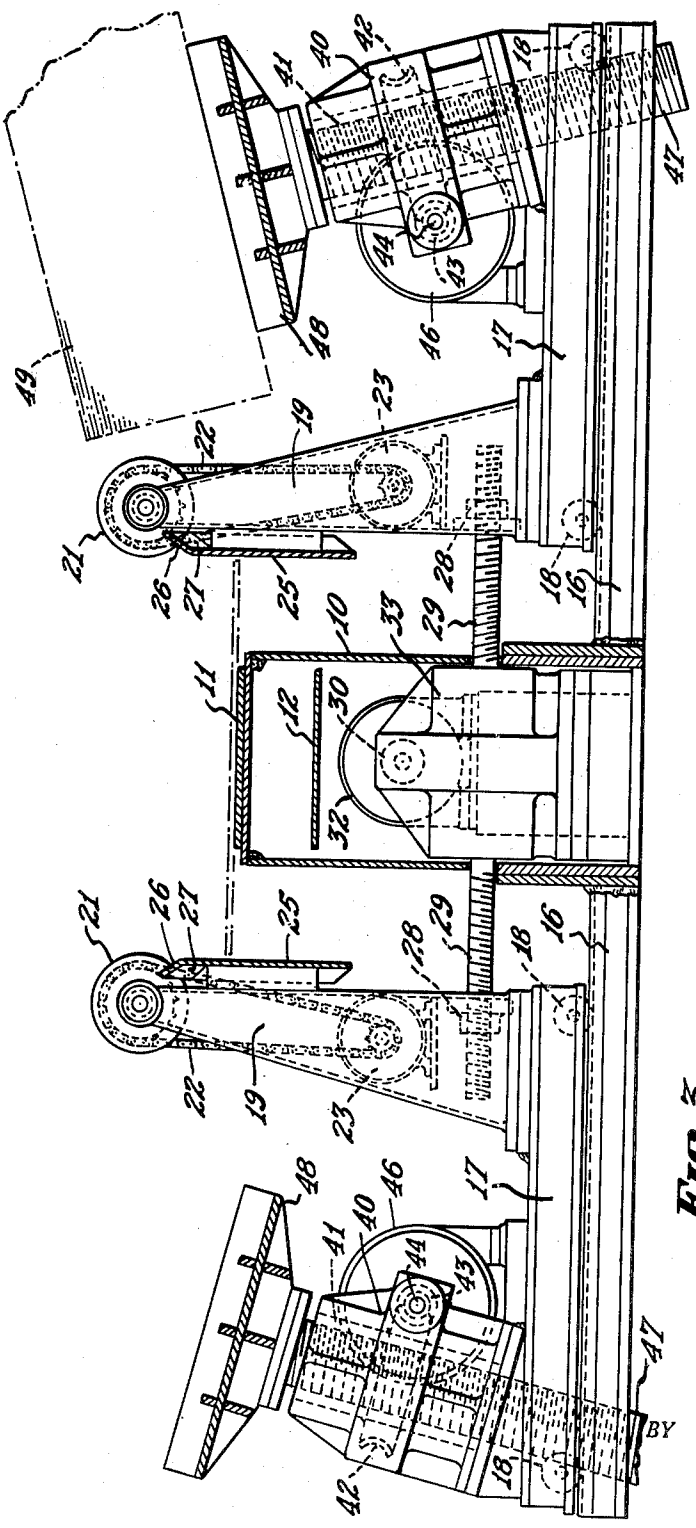


FIG. 3.

INVENTOR.
JOHN WARNER KENYON,
BY
Allen & Allen
ATTORNEYS.

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DEVICE FOR LOADING SHEETS OR PLATES ONTO CONVEYERS

John Warner Kenyon, Ashland, Ky., assignor to Armco Steel Corporation, Middletown, Ohio, a corporation of Ohio

Application June 3, 1949, Serial No. 97,042

16 Claims. (Cl. 214—8.5)

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This invention relates to a device for loading heavy sheets, plates and the like onto a conveyor. It finds particular usefulness in connection with the so-called shear line in steel mills or the like. By way of example a shear line may comprise a conveyor upon which the sheets are placed and which feeds them successively to a roller leveler and to one or more of a breakdown shear, a side shear, a double end cut shear, a multiple shear gauge, a reject table and a piling machine. Where relatively light or thin sheets are being handled, the problem of removing them from a stack onto a conveyor to start them into the shear line is not a great problem. But when heavy sheets or plates are being handled the problem becomes very much more difficult. From about 16 gauge on up and with plates varying in length from 80 inches to 300 inches, and in width from 30 inches to 60 inches, it often transpires that a pile of plates or sheets may comprise individual plates weighing as much as one thousand pounds.

It has been the practice to employ unskilled labor to lift the individual heavy sheets or plates from a pile on a loading table or the like on to the traveling conveyor which conducts the sheets or plates to one or more of the apparatuses in the shear line.

In most steel plants a loading table is provided on each side of the conveyor and sheets or plates may be loaded alternately from one side or the other, and in the past it has been found to necessitate the services of two or more men to handle the plates on each side of the conveyor. This work is dangerous to personnel and is very difficult and tiring work.

In the co-pending application of Willard M. Corbitt and Elmer C. Wenning, Serial No. 19,536, filed April 6, 1948, and now abandoned, there is disclosed and claimed an organization intended to overcome the difficulties and problems discussed above. The device of said co-pending application has proved successful and has greatly reduced the efforts required on the part of the workmen.

It is an object of the present invention to provide an improved device for loading sheets or plates from a pack stand onto a conveyor. It is another object of this invention to provide an arrangement whereby the relationship between the sheet to be fed and the tapered feed roll remains the same regardless of the number of sheets or plates remaining upon the stand.

It is yet another object of the invention to provide a device as outlined above wherein the

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sheets are held in an inclined position to further facilitate their feeding onto the conveyor.

Yet another object of the invention resides in the provision of an arrangement whereby the relationship between the pack stand and the tapered feed roll remains constant, whereas the distance of the feed roll and pack stand from the conveyor may be varied to suit sheets or plates of different widths.

Still another object of the present invention resides in the provision of side guides movable with the tapered feed roll, so that when a change from one size of sheet or plate to another is to be made, a single adjustment only is necessary.

These and other objects of the invention which I shall describe in more detail hereinafter, or which will become apparent as the description proceeds, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment.

Reference is made to the drawings wherein:

Figure 1 is a plan view of an exemplary organization;

Figure 2 is an elevational view of the same; and

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2 on an enlarged scale.

Briefly, in the practice of my invention I provide in combination with a conveyor, a movable support on each side thereof, each movable support carrying a mounting for a tapered feed roll and means for driving the feed roll and a pack stand. The movable supports are arranged for movement concurrently in opposite directions so that the respective tapered rolls and pack stands are always symmetrically disposed with relation to the conveyor axis. The pack stands according to the present invention are disposed at an angle so that the sheets or plates on the pack stand slope toward the conveyor thereby facilitating their removal and loading onto the conveyor. In addition, pneumatic pullers, as disclosed in said co-pending application, may be used to feed the plates from the pack stands to the conveyor.

This device as disclosed herein is useful for the feeding of either sheets or plates and it will be understood that I am using the terms herein interchangeably.

Referring now in more detail to the drawings, I have shown a conveyor framework generally at 10 upon which a belt conveyor runs, the upper flight of the belt conveyor being indicated at 11 and the lower flight at 12. The conveyor belt passes over rolls 13 and 14 as is conventional and a suitable motor and speed reducer is pro-

vided as generally indicated at 15 for driving the conveyor.

The framework includes pairs of rails extending at right angles to the path of movement of the conveyor. These rails are indicated at 16. On each side of the conveyor is provided a support and since these supports are identical, only a single one will be described, it being understood that all the features thereof are duplicated in the other. These supports are indicated at 17 and are provided with wheels 18 which ride upon the rails 16. Each of these supports carries a framework including the columns 19 which are provided with journals at 20 for the tapered feed rolls 21. The feed rolls 21 are suitably driven by means of a sprocket chain 22, driven by a motor and speed reducer indicated generally at 23. The motor 23 is mounted upon a bracket 24 constituting a part of the framework carried by the support 17. Extending between the columns 19 on each side of the conveyor is a side guide plate 25. The upper edge of each said plate 25 is bent in the direction of the respective feed roll as indicated at 26, and is of course disposed at an angle as indicated by the shaded area 27 in Figure 3, to accommodate the taper of the roll 21.

The frame on each side of the conveyor carries fixed thereto a pair of nuts 28 which coact with the respective screws 29. The screws 29, as will be clear from a study of the figures are oppositely threaded at their opposite ends. Each screw 29 at its center is secured to a worm wheel (not shown) which meshes with a worm indicated in broken lines in Figure 3 at 30. The two worms 30 are driven through couplings 31 by the motor 32. The worms 30 and the respective worm wheels are preferably enclosed within a gear housing indicated in the figures at 33.

From the foregoing description it will be clear that when the motor 32 is caused to operate it drives the worms 30 through the couplings 31 and that each worm 30 engaging with its respective worm wheel drives the two screws 29. Since these screws 29 are oppositely threaded at their opposite ends the result will be that the supports 17 together with all the apparatus mounted thereon will be caused to move in opposite directions. Thus, if the motor 32 turns in one direction the two supports 17 are brought closer together, whereas if the motor 32 turns in the opposite direction the two supports 17 are moved apart. The movement of the support 17 is by virtue of the rollers 18 riding upon the tracks 16 and is such that the supports will always be symmetrically disposed with respect to the conveyor 11.

Each of the supports 17 carries a pack stand which will now be described in more detail. On each of the supports 17 there is provided a pair of housings indicated generally at 40. Within the housing 40 there is rotatably mounted a nut 41 which nut has secured to it a worm wheel 42. Also provided in the housing 40 is a journal for a worm 43 on the shaft 44. The shaft 44 issuing from each of the housings 40 is connected through a coupling 45 to a motor 46, so that as the motor 46 rotates it drives the shaft 44 and worm 43, thereby rotating the worm wheel 42 and the nuts 41 in the respective housings 40.

Operatively engaged with each of the nuts 41 is a screw 47. The pack stand proper indicated at 48 is secured to the ends of the two screws 47. Thus as the nut 41 rotates the screws 47 are caused to move axially carrying with them the pack stand 48. A pack of sheets or plates to be loaded is indicated at 49.

It will be observed that the pack stands are angularly disposed. It may be said that the two screws 47 have their axes in a plane parallel to the path of movement of the conveyor and inclined to the vertical so as to slope with its upper end toward the feed roll and conveyor. In this way the planes of the sheets being loaded are inclined toward the feed roll and conveyor to facilitate loading of the sheets from the pack stand over the tapered feed roll on to the conveyor.

In order to maintain the level of the uppermost sheet on each pack stand substantially constant in relation to the tapered feed roll, I have provided for each pack stand a flag switch indicated generally at 50. This switch may be of the well known type arranged to throw a contact in one direction upon movement of the switch in one direction, and to throw the contact in the other direction upon movement of the switch in the other direction. It will be clear that as sheets are removed from the pack 49 the arm 50 will drop, thus causing the motor 46 to operate to elevate the pack stand 48 and the pack 49 resting thereon, so that the uppermost sheet in the pack will be maintained at substantially a constant level with respect to the tapered feed roll.

From the foregoing description it will be seen that I have provided an arrangement which makes the loading of sheets or plates from a pack onto a conveyor very much easier than anything that has been available heretofore. Not only is the level of the uppermost sheet in a pack always at the same level with respect to the feed roll adjacent thereto, but the relationship of the uppermost sheet and the feed roll is constant for any width sheet with relation to the conveyor 11. When it is desired to load sheets of different widths actuation of the motor 32 will cause the supports 17 to move toward each other or to move apart as may be required. In each case everything mounted upon the support 17 moves with it, and the two supports with all the apparatus mounted thereupon remain symmetrically disposed with respect to the conveyor axis.

It will be understood that jacking or pulling devices such as disclosed and claimed in the copending application above referred to may be used in the same manner with the device of the present invention to further facilitate loading.

To those skilled in the art it will be clear that numerous modifications may be made without departing from the spirit of my invention, and I therefore do not intend to limit myself except as set forth in the claims which follow.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a conveyor, a sheet loading organization comprising a tapered feed roll and a pack stand mounted upon a common support, said support being arranged for movement at right angles to the path of movement of said conveyor, the longitudinal axial plane of said pack stand being disposed parallel to said path of movement, and inclined to the vertical so that said pack stand slopes with its upper end toward said feed roll and conveyor, said pack stand being provided with means for elevating and lowering it in said plane.

2. A device according to claim 1, in which the axis of said tapered feed roll is disposed parallel to the path of movement of said conveyor, and in

which a side guide is mounted on said common support in a vertical plane parallel to said path of movement.

3. A device according to claim 2, in which driving means for said tapered feed roll are also mounted on said common support.

4. A device according to claim 1, in which control means are provided for said elevating and lowering means, said control means being arranged for actuation by the uppermost sheet of a pack on said pack stand, whereby as sheets are removed from said pack, the uppermost sheet or group of sheets is maintained at a substantially constant level with respect to the tapered feed roll.

5. In combination with a conveyor, a support movable at right angles to the path of movement of said conveyor, a pair of columns on said support, a tapered feed roll rotatably mounted in said columns with its axis parallel to the said path of movement, a side guide mounted on said columns in a vertical plane parallel to said path of movement, and an elevatable pack stand mounted on said support, the longitudinal axial plane of said pack stand being disposed parallel to said path of movement, and inclined to the vertical so that said pack stand slopes with its upper end toward said feed roll and conveyor.

6. A device according to claim 5, in which said pack stand is provided with a screw disposed in said plane and perpendicular to said path of movement, and a rotatable nut in operative engagement with said screw, and power means for rotating said nut.

7. A device according to claim 6, in which control means are provided for said power means, said control means being arranged for actuation by the uppermost sheet of a pack on said pack stand, whereby as sheets are removed from said pack, the uppermost sheet is maintained at a substantially constant level with respect to said tapered feed roll.

8. In combination with a conveyor, a sheet loading organization on each side of said conveyor, each said organization comprising a tapered feed roll and a pack stand mounted upon a common support, said supports being arranged for movement at right angles to the path of movement of said conveyor, the longitudinal axial planes of said pack stands being disposed parallel to said path of movement, and inclined with the upper ends of said pack stands toward each other, said pack stands being provided with means for elevating and lowering them in their respective planes.

9. A device according to claim 8, in which means are provided for concurrently moving said supports in opposite directions.

10. A device according to claim 9, in which the axes of said tapered feed rolls are disposed parallel to the path of movement of said conveyor, and in which a side guide is mounted on each of said supports in a vertical plane parallel to said path of movement.

11. A device according to claim 10, in which driving means for each of said feed rolls are also mounted upon the respective common supports.

12. A device according to claim 8, in which control means are provided for each of said elevating and lowering means, each said control means being arranged respectively for actuation by the uppermost sheet of a pack on its said stand, whereby as sheets are removed from each of said packs, the uppermost sheet of each pack is maintained at a substantially constant level with respect to its respective feed roll.

13. In combination with a conveyor, a support on each side thereof movable at right angles to the path of movement of said conveyor, a pair of columns on each of said supports, a tapered feed roll rotatably mounted in each pair of columns with its axis parallel to said path of movement, a side guide mounted on each pair of columns in a vertical plane parallel to said path of movement, and an elevatable pack stand mounted on each of said supports, the longitudinal axial planes of said pack stands being disposed parallel to said path of movement, and inclined with the upper ends of said pack stands toward each other.

14. A device according to claim 13, in which means are provided for concurrently moving said supports in opposite directions.

15. A device according to claim 14, in which each of said pack stands is provided with a screw disposed in its respective plane and perpendicular to said path of movement, and a rotatable nut in operative engagement with said screw, and power means for rotating said nut.

16. A device according to claim 15, in which control means are provided for each of said power means, said control means being arranged for actuation by the uppermost sheet of a pack on the respective pack stand, whereby as sheets are removed from said packs, the uppermost sheet of each pack is maintained at a substantially constant level with respect to its respective tapered feed roll.

JOHN WARNER KENYON.

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