April 29, 1930. A. R. McARTHUR 1,756,653

FURNACE CHARGING CONVEYER

Filed Oct. 19, 1928 2 Sheets-Sheet 1

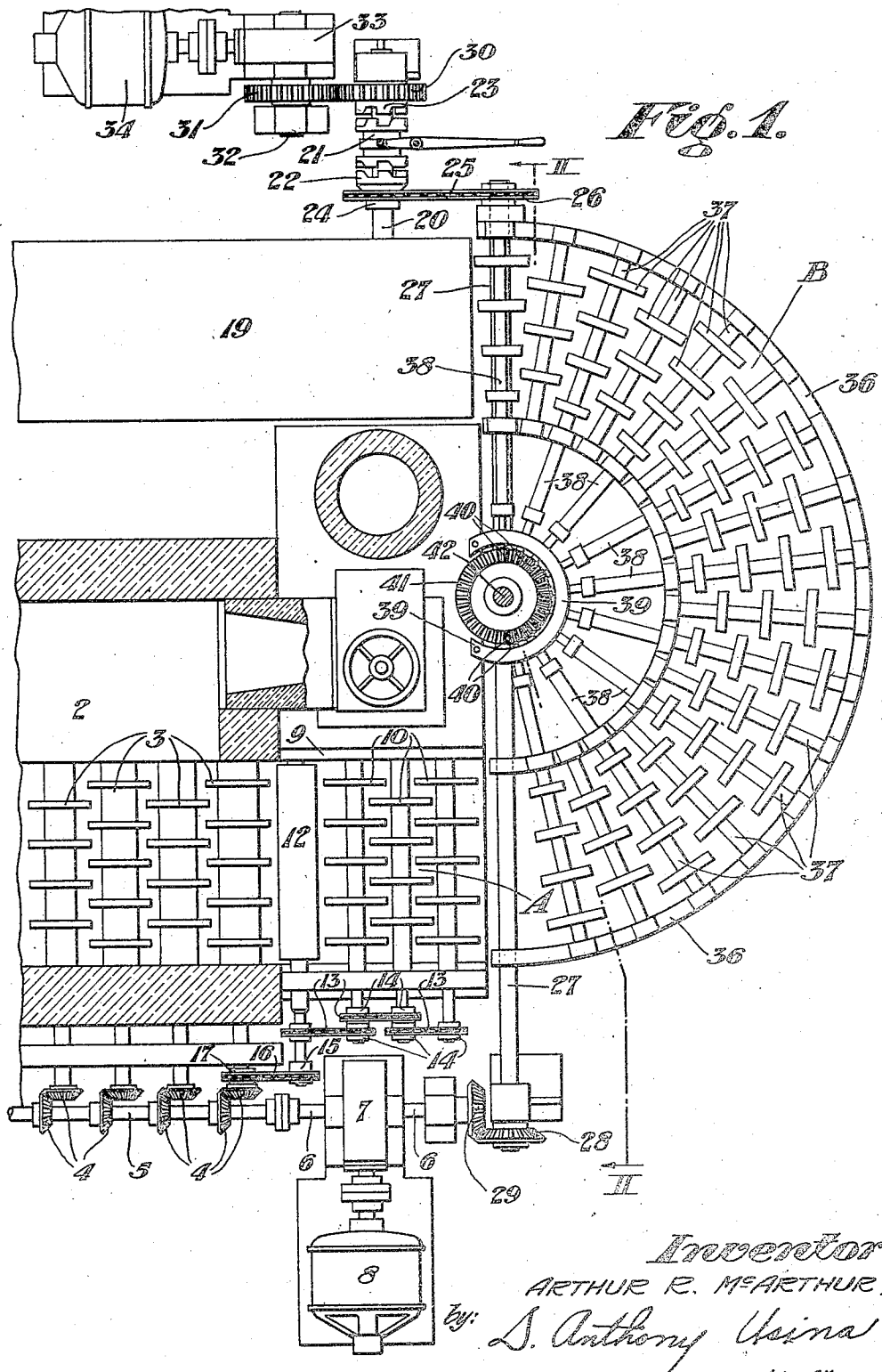


Fig. 1.

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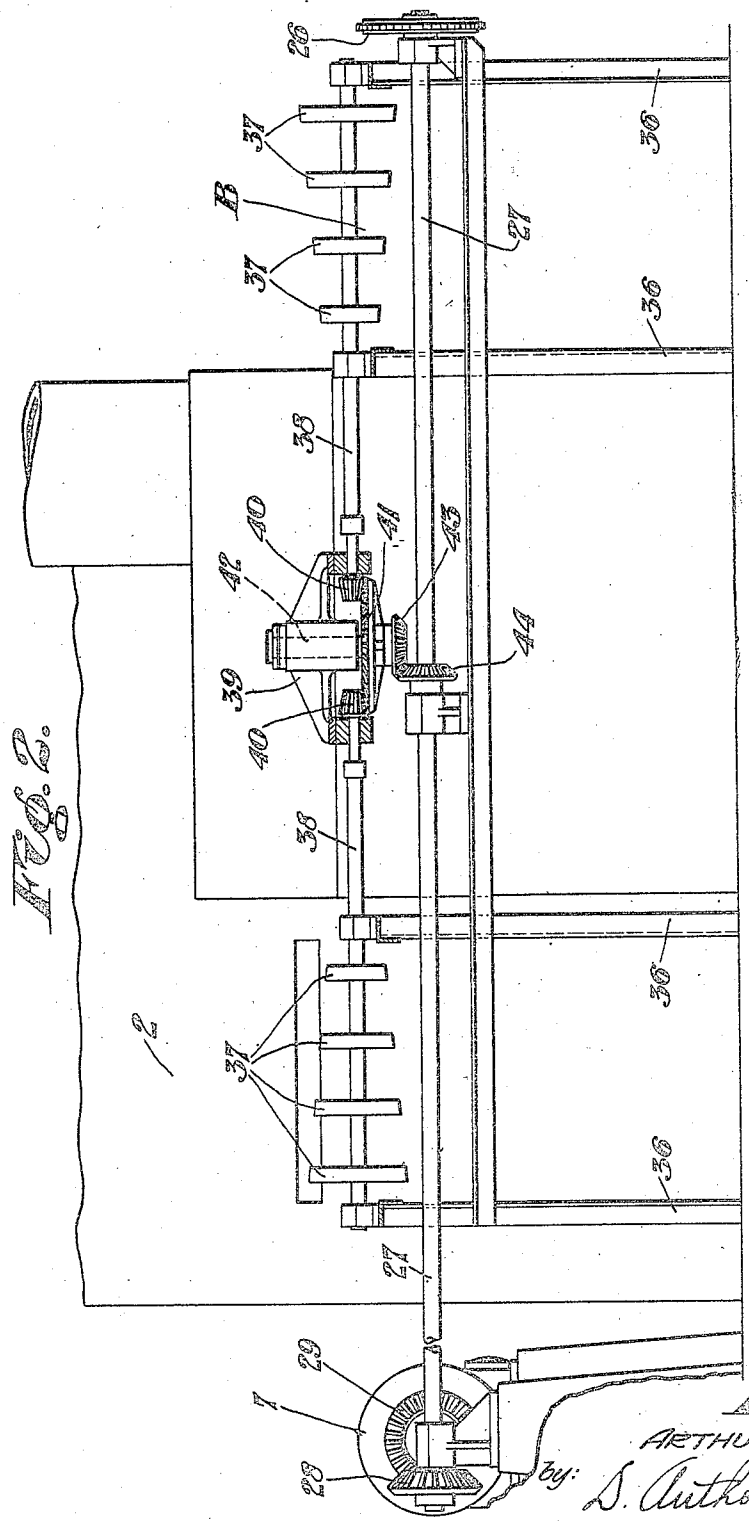


Fig. 2.

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UNITED STATES PATENT OFFICE

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FURNACE-CHARGING CONVEYER

Application filed October 19, 1928. Serial No. 313,545.

This invention relates to pack heating furnaces and more particularly to a charging conveyer for pack heating furnaces, and has for its object the provision of a conveyer unit which will cooperate with other conveyer units associated with the furnace to automatically charge the packs into the furnace.

Heretofore, pack heating furnaces of the class to which the charging conveyer of this invention is associated have been charged manually. The packs to be charged into the furnace have been heretofore conveyed onto a platform or table at the charging end of the furnace from the doubler and shear by a mechanical conveyer, and an operator was stationed at the table to grasp the packs by means of a pair of tongs and feed them into the furnace. Tin mill practice has been continually improved within the past two or three years in an endeavor to reduce the manual labor necessary in the manufacture of sheets, and automatic mechanism has been supplied to handle the sheets and packs of sheets wherever possible. Heretofore there has been a break in the mechanical handling of the packs at the charging end of the furnace, since no satisfactory conveyer or mechanical handling apparatus could be designed that would feed the packs into the furnace.

The present invention provides a mechanical feeder or conveyer which is sufficiently compact, properly timed and composed of relatively strong parts so as to meet the demands of the mill practice.

In the drawings:

Figure 1 is a sectional plan view of the charging end of a furnace having my invention applied thereto.

Figure 2 is a sectional elevation taken on the line II—II of Figure 1.

Referring more particularly to the drawings, the numeral 2 designates the pack heating furnace as a whole, which is of the side combustion chamber type, although any standard type of pack heating furnace may be substituted therefor. The furnace 2 is provided with a series of disk type conveyer rollers 3 along its entire length adapted to convey the packs to be heated through the furnace. The rollers 3 have their shafts extended through the furnace and operatively connected by gears 4 with a drive-shaft 5. The drive-shaft 5 is coupled to one end of a drive-shaft 6 of a speed reducing unit 7 which, in turn, is coupled to a motor 8.

The feed or charging end of the furnace is provided with a feed-in table A composed of a frame 9 on which are journaled a plurality of disk-type conveyer rollers 10 and a solid roller 12. The shaft of the roller 12 and the shafts of the rollers 10 are all interconnected by chains 13 and sprockets 14 so that said rollers will operate in unison, and the shaft of the roller 12 is provided with a sprocket 15 which is connected by a chain 16 to a sprocket 17 on the shaft of the rearmost conveyer roller 3 of the furnace, so that the rollers 10 and 12 will be operated simultaneously and in unison with the rollers 3 in the furnace.

A belt or other standard conveyer unit 19 is mounted along the one side of the furnace and extends substantially parallel therewith and is adapted to convey the packs from the doubler and shear, located at the floor level to the one side and adjacent the forward or discharge end of the furnace, up to the level of the feed table at the charging end of the furnace.

The head-shaft 20 of the conveyer unit 19 is provided with a double faced clutch member 21 adapted to engage with separately driven clutch members 22 and 23.

The clutch member 22 is provided with a sprocket 24 which is connected by a chain 25 with a sprocket 26 on a drive-shaft 27 which extends across the back of the furnace and is connected by gears 28 and 29 to the end of the shaft 6 of the speed reducer 7 opposite the shaft 5. The clutch member 23 is provided with a gear 30 which is meshed with a gear 31 on the shaft 32 of a speed reducing unit 33 which is coupled to a motor 34. The drive from the motor 34 is materially faster than the drive from the shaft 27 and is used to hasten the delivery of packs to the furnace when the delivery of the packs to the conveyer unit 19 has been delayed.

A semi-circular conveying unit B is mount-

ed at the rear or charging end of the furnace and has one end in alinement with the conveyer unit 19 and its other end in alinement with the feed-in table A, so as to form an automatic or mechanical connecting link between the conveyer 19 and the table A.

The semi-circular conveying unit B is composed of a frame 36 and a plurality of tapered disk type conveying rollers 37 which are journaled in said frame and have their smallest ends along the side of the conveyer nearest the furnace. Alternate ones of the rollers 37 are power rollers and the other rollers are idler rollers. The power rollers 37 have their shafts 38 extended and journaled in a ring-like bearing bracket 39. Each of the shafts 38 of the power rollers 37 is provided at its inner or furnace end with a pinion 40, which pinions are meshed with a ring gear 41 keyed on a shaft 42 suspended from the dome portion of the ring-like bracket 39. A bevel gear 43 is also keyed on the lower end of the shaft 42 and is meshed with a gear 44 on the shaft 27.

In operation the motor 8 will first be started to drive the conveyer unit rolls 3 in the furnace, the conveying unit B and the conveyer unit 19.

Packs of sheets or plates will be fed manually upon the conveyer unit 19 at suitably spaced intervals until the furnace is completely filled. After the furnace is completely filled the motor 8 will be deenergized and the conveyers stopped until the packs are sufficiently heated for rolling.

When the packs are heated the motor 8 will be operated at intervals by a manually operated control (not shown) operated by the roller. Operation of the motor 8 will advance the entire conveying mechanism one step or sufficient to discharge one pack and charge or enter another pack into the furnace.

The discharged pack will be rolled, doubled and sheared in the usual manner and will be delivered by the doubler and shear operator onto the conveyer unit 19 for recharging into the furnace.

By the use of this apparatus, the services of an operator to charge the doubled and sheared packs into the furnace is dispensed with and the feeding of the packs is entirely automatic.

In case the operator doubling and shearing the packs should be delayed in placing the packs on the conveyer 19, so that the spacing of the packs on the conveyer 19 is irregular, he may remedy this defect by energizing the motor 34 and engaging the clutch members 21 and 23 so as to drive the conveyer 19 independently of the other units until the proper spacing results, after which he will deenergize the motor 34 and again engage the clutch parts 21 and 22.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited thereto, since various modifications may be made without departing from the scope thereof as defined in the appended claims.

I claim:

1. A semi-circular connecting conveyer unit serving to connect two parallel conveyer units, said semi-circular unit comprising a frame, a plurality of tapered conveying rollers journaled transversely of said frame with their smallest diameter ends at the inner side of said frame, alternate ones of said rollers being idler rollers and the other of said rollers being driven rollers, said driven rollers having the inner ends of their shafts extended materially beyond said frame, bevel pinions on said extended ends of said shafts, a ring gear meshed with all of said pinions, and means for rotating said ring gear.

2. A semi-circular connecting conveyer unit serving to connect two parallel conveyer units, said semi-circular unit comprising a frame, a plurality of tapered disk-type conveying rollers journaled transversely of said frame with their smallest diameter ends at the inner side of said frame, alternate ones of said rollers being idler rollers and the other of said rollers being driven rollers, said driven rollers having the inner ends of their shafts extended materially beyond said frame, a bearing bracket, said extended ends of said roller-shafts being journaled in said bracket, bevel pinions on said extended ends of said shafts, a vertical shaft journaled in said bracket, a ring gear on said shaft and meshed with said bevel pinions, and means for rotating said vertical shaft.

In testimony whereof, I have hereunto set my hand.

ARTHUR R. McARTHUR.