Nov. 27, 1951 A. J. CARR 2,576,281

CORRUGATING MACHINE

Filed June 9, 1950

FIG. 1

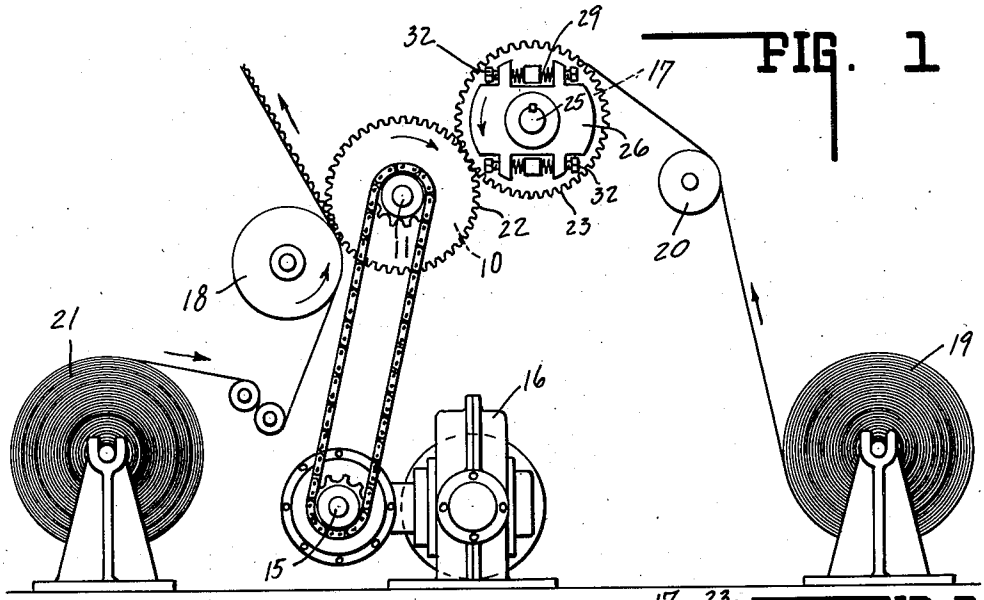


FIG. 2

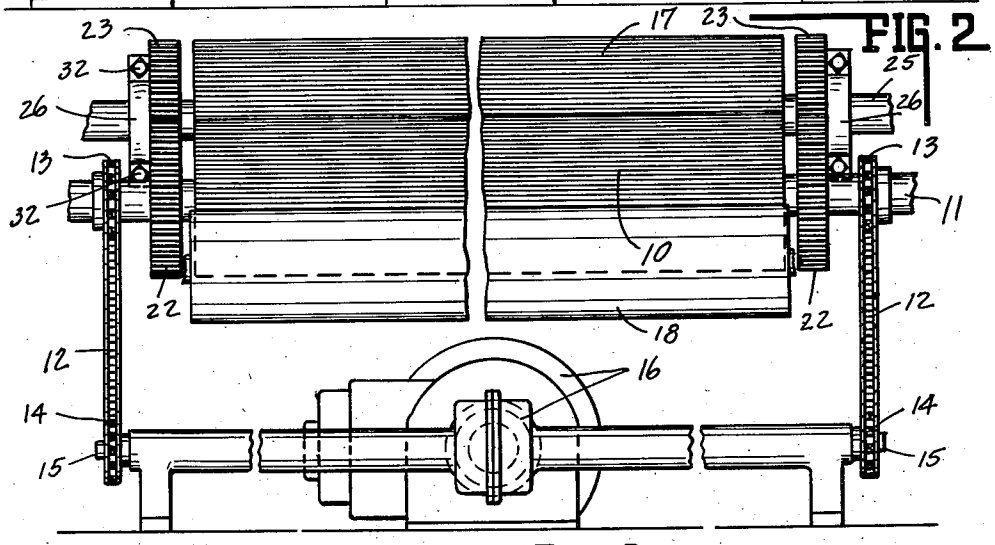


FIG. 3

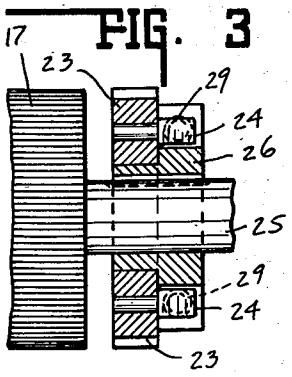
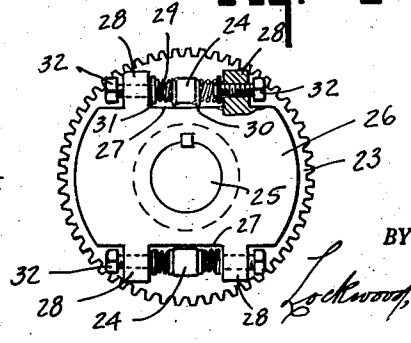


FIG. 4



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Patented Nov. 27, 1951 2,576,281

UNITED STATES PATENT OFFICE

2,576,281

CORRUGATING MACHINE

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Application June 9, 1950, Serial No. 167,128

10 Claims. (Cl. 154—30)

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The present invention relates to improvements in drives for the corrugating rolls of machines for forming corrugated board.

In the present commercial type of corrugated machines there is provided a pair of corrugating rolls between which the paper stock is fed for the purpose of forming corrugations therein and in addition thereto a pressure roll between which and one of the corrugating rolls is fed the liner, which liner has previously had glue applied to its contact face.

In commercial practice one of the corrugating rolls is, as a rule, driven from the other corrugating roll in order that they may be driven in timed relation to one another and in order that the corrugations of one roll may fit between the corrugations of the other roll.

Great difficulty has been experienced in driving these rolls at relatively high speed even though the rolls may be driven by intermeshing gears at both ends of the rolls. Due to irregularity in the teeth of the gears, the necessarily lost motion between the teeth of one set of gears and the teeth of the other set of gears the corrugations may not always center and as a result there is a tendency to cut the stock or cause high and low corrugations in the stock. Furthermore such a drive will not compensate for differences in the thickness of the stock fed to the rolls.

It is one of the objects of the present invention to provide a drive from one corrugating roll to the other wherein lost motion between the gears may be compensated for.

Another object of my invention is to provide a drive wherein there is no twisting torque imposed upon the shaft of the driven roll which torque would necessarily twist the corrugations and prevent them from centering.

Other objects and features of the invention will be set forth more fully hereinafter in the specifications.

For the purpose of disclosing the invention I have illustrated, more or less diagrammatically, an embodiment of the invention in the accompanying drawings in which Fig. 1 is a side elevation of the necessary elements of a corrugating machine for the purpose of illustrating my invention.

Fig. 2 is an end view thereof.

Fig. 3 is a sectional view of the connection between the driven gear and driven shaft of the driven corrugated roll.

Fig. 4 is an end view of said connection.

In an embodiment of the invention illustrated there is provided a center corrugating roll 10 mounted on a suitable shaft 11. This roll is driven through the medium of driving chains 12 connecting sprockets 13 on the shaft 11 with sprockets 14 on a driving shaft 15. The driving

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shaft 15 is driven from a suitable motor through a differential reduction gear unit 16.

Cooperating with the center corrugating roll 10 is a top corrugating roll 17 and likewise cooperating with the center corrugating roll is a pressure roll 18.

In the operation of so much of the structure as has been described the paper to be corrugated is fed from the corrugated stock roll 19 over an idler 20 and thence over the top corrugating roll and between the top corrugating roll and the center corrugating roll 10. The paper then passes between the center corrugating roll 10 and the pressure roll 18. At the same time liner stock is fed from a liner stock roll 21 between the pressure roll and the center corrugating roll, this liner stock having been previously coated on its contact face with an adhesive.

The drive between the center corrugating roll 10 and the top corrugating roll 17 consists of two pairs of driving gears 22 and 23. The gear 22 is fixed on the shaft 11 and is adapted to mesh with the gear 23 which in turn drives the shaft 13. This gear 23, however, on its outer face is provided with a pair of lugs 24 and secured to the shaft 25 of the top corrugating roll 17 is a driving head 26. This head 26 is provided with flattened surfaces as at 27. On each of these surfaces is formed a pair of lugs 28 which receive between the same the lugs 24. Interposed between the lugs 24 and the lugs 28 are coil springs 29—29 which at one end bear on circular bosses 30 on the lugs 24 and at the opposite ends bear on washers 31 mounted on screws or bolts 32 extending through the lugs 28.

I thus provide a resilient connection between each of the gears 23 and the shaft 25 to thereby compensate for irregularities in the drive between the gears 22 and the gears 23. This resilient connection also permits a certain relative compensating movement between the top corrugated roll 17 and its shaft 25 whereby irregularities in the thickness of the corrugating stock may be compensated for.

It is obvious that instead of the gears 22 and 23 sprockets may be substituted therefor, the sprockets being connected by a driving chain.

It will also be understood that the differential gearing drive unit 16 provides a compensating means for accommodating irregularities in the opposite driving connection between the shaft 15 and the shaft 11.

The invention claimed is:

1. A corrugating machine comprising in combination, a pair of corrugating rolls have interdigitating corrugating ribs, means for driving one of said rolls and means for driving the other of said rolls from the first roll including a resili-

ent driving connection between said driven roll and its driving member.

2. A corrugating machine comprising in combination, a pair of corrugating rolls mounted on shafts having their axes parallel and having interdigitating corrugating ribs, means for driving the shaft of one of said rolls and means for driving the shaft of other of said rolls from the shaft of the first roll including a pair of members drivingly connected and drivingly connected to their respective shafts, the driving connection between one of said rolls and its shaft including a resilient coupling between its driving member and the shaft.

3. A corrugating machine comprising in combination, a pair of corrugating rolls mounted on shafts having their axes parallel and having interdigitating corrugating ribs, means for driving the shaft of one of said rolls including a differential gearing, a pair of shafts driven thereby and a driving connection between each of said shafts and the opposite ends of the shaft of said roll, the drive between said roll and the second roll including a driving connection between the opposite ends of the shafts of said rolls and including a resilient driving connection between the driven member of said driven roll and its shaft.

4. A corrugating machine comprising in combination, a pair of corrugating rolls mounted on shafts having their axes parallel and having interdigitating corrugating ribs, means for driving one of said rolls from the other including a driving connection at each end of the rolls between the shaft of the driving roll and the shaft of the driven roll, and a resilient coupling between the driven member and the driven shaft of the driven roll.

5. A corrugating machine comprising in combination, a pair of corrugating rolls mounted on shafts having their axes parallel and having interdigitating corrugating ribs, driving members connected to the shaft of one of said rolls at the opposite ends of said roll, driven means resiliently connected to the shaft of the other of said rolls and disposed at opposite ends of said rolls, and a driving connection between said driving means and said driven means.

6. A corrugating machine comprising in combination, a pair of corrugating rolls mounted on shafts having their axes parallel and having interdigitating corrugating ribs, driving members mounted on the shafts of one of said rolls, driven members mounted on the shafts of the other of said rolls, and means for connecting said driven members respectively with the shaft of said second mentioned roll including a lug on the face of said driven members respectively, a driving head mounted on the shaft of said driven roll and a pair of lugs on said pulley receiving between them said first mentioned lug, and a pair of springs interposed between the opposite faces of said first mentioned lug and the opposed faces of said second mentioned lugs.

7. A corrugating machine comprising in combination, a pair of parallel shafts, a corrugating roll mounted on each of said shafts, each roll having axially disposed corrugating ribs on the periphery thereof, said rollers being spaced to cause the ribs of one roll to intermesh with the ribs of the other roll; means for positively driving each end of the shaft of the first roll and a driving connection between each end of the shaft of the first roll with each end of the shaft of a second roll, including a driven member at each end of the shaft of the second roll, and a driving connection between each end of the shaft of the first roll with each of the driven members and a resilient connection between said driven means and the shaft of the second roll effective in either rotative direction.

8. A corrugating machine comprising in combination, a pair of parallel shafts, a corrugated roll mounted on each of said shafts, each roll having axially disposed corrugating ribs on the periphery thereof, said rolls being spaced to cause the ribs of one roll to intermesh with the ribs of the other roll; a driving shaft for driving a first roll, a differential drive for driving the opposite ends of said shaft, driving means between the opposite ends of said shaft and the opposite ends of the shaft of the first roll; a driving connection between each end of the shaft of said first roll and each end of a second roll, including a driven member at each end of the shaft of the second roll, a driving connection between each end of the shaft of the first roll and each of the driven members, and a resilient connection effective in either rotative direction between the driven members of each end of the second roll shaft and each end of the second roll shaft.

9. A corrugating machine comprising in combination, a pair of parallel shafts, a corrugated roll mounted on each of said shafts, each roll having axially disposed corrugating ribs on the periphery thereof, said rolls being spaced to cause the ribs of one roll to intermesh with the ribs of the other roll; a driving shaft, a differential gearing for driving the opposite ends of said driving shaft; a drive connection between each end of said driving shaft with each end of the shaft of a first roll, a driving connection between each end of said first roll and each end of said second roll, including a driven member at each end of said second roll and driving means between each of said driven members and each end of the shaft of said first roll, and a resilient driving connection between each of said driven members with the ends of the shaft of said second roll.

10. A corrugating machine comprising in combination, a driving shaft, a differential gearing for driving the opposite ends of said driving shaft, a pair of parallel shafts, a corrugating roll mounted on each of said shafts, each having axially disposed corrugating ribs on the periphery thereof, said rolls being spaced to cause the ribs of one roll to intermesh with the ribs of the other roll; a driven member at each end of the second shaft; a driving gear rotatably mounted on each end of said second shaft, each of said members having spaced apart stops and each of said gears having axially disposed lugs; coiled springs disposed between said lugs and said stops in a driving gear at each end of the first shaft intermeshing with the gears on the opposite ends of the second shaft.

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