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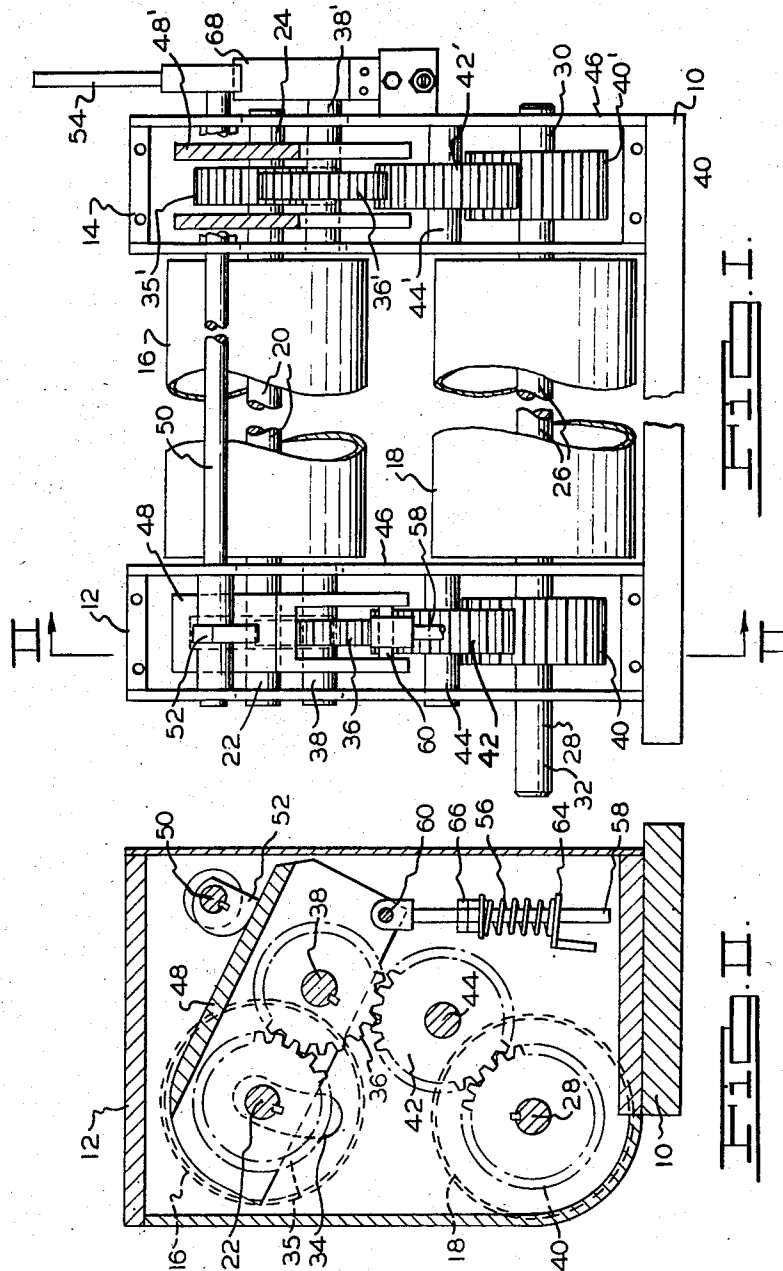
J. V. KOPPLIN

2,693,273

FELT FEED MECHANISM

Filed April 9, 1952

2 Sheets-Sheet 1



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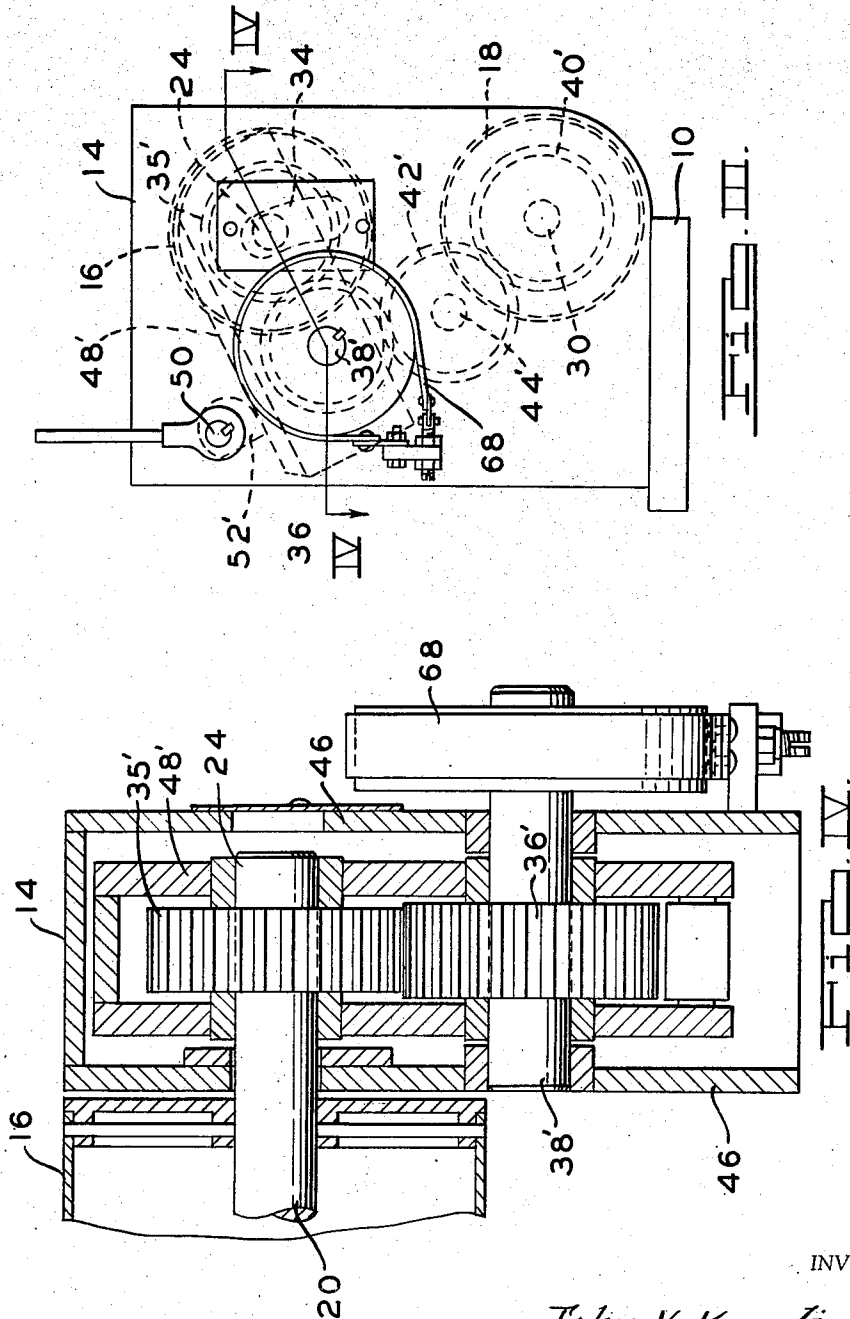
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FELT FEED MECHANISM

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2 Claims. (Cl. 203—263)

This invention relates to apparatus for feeding sheet material, which requires to be handled in different thicknesses, and in particular to the feeding of felt material, in connection with which variations in thickness of from $\frac{1}{32}$ " to $\frac{1}{4}$ " are encountered in practice.

Apparatus at present employed to feed sheet felt material comprises a pair of feed rolls having a pair of interconnected gears which, in order to accommodate for changes in thickness of the felt, and the consequential necessity of varying the spacing of the feed rolls, have specially deep pitch gear teeth, with the gears on the same centers as the feed rolls, and with the gear teeth meshing with one another at radially different points as the spacing of the feed rolls is adjusted. This is not a satisfactory gear drive and it is the object of the invention to improve thereon by providing for adjustment of the feed rolls to take place within the limits involved and yet enable an efficient gear drive connection to be maintained for all adjustments of the feed rolls.

It is an important object of the invention to provide gear drive feed roll apparatus in which the spacing of the feed rolls is capable of being varied with the use of constant pitch line mesh gears.

A further object of the invention is to provide a gear driven feed roll apparatus having an upper feed roll which is movable to vary its spacing with respect to a feed roll beneath and in which both feed rolls are positively driven at a constant speed for all spacings.

Yet a further object of the invention is to provide a gear drive for feed rolls which are capable of having their spacing varied automatically by the feeding of different thickness material between the feed rolls with the gear wheels, however, being in constant pitch line mesh.

Further objects and advantages of the invention, residing in the construction, arrangement and combination of parts, will appear clear from a consideration of the following description of one practical form of the invention with reference to the accompanying drawings and from the appended claims.

In the drawings,

Fig. I is a side elevational view of a felt feed roll apparatus in accordance with the invention, with the center portions of the feed rolls cut away to facilitate illustration and with the end cover plates of the gear housings also removed to show the internal gear trains.

Fig. II is a section on the line II—II of Fig. I.

Fig. III is a view looking on the outside end of the right-hand gear housing of Fig. I, and

Fig. IV is an enlarged sectional plan on the line IV—IV of Fig. III.

Referring to the drawings, 10 indicates a base having a pair of spaced apart end casings 12 and 14 upstanding therefrom and supporting in the space between them a pair of feed rolls, comprising an upper feed roll 16 and a lower feed roll 18.

The upper feed roll 16 is supported upon a central shaft 20 and has end extensions 22 and 24 which extend into the end casings 12 and 14, respectively.

The lower feed roll 18 is supported upon a central shaft 26 and has end extensions 28 and 30 which extend into the end casings 12 and 14, respectively, with the shaft extension 30 having a portion 32 which extends outside the end casing 14 and serves for connection to a motive source or prime mover (not shown).

The upper feed roll shaft extensions 22 and 24 carry similar spur gears 35, 35' and are mounted for free swing-

ing movement in suitable slots 34 provided within the end casings, said swinging movement taking place about a center coincident with the common axes of similar spur gears 36 and 36' carried for rotation upon stub shafts 38 and 38' fixedly mounted in the gear casing end walls 46. Said slots may be of arcuate form as shown, with clearance being provided with respect to the shaft extensions 22, 24.

The lower feed roll shaft extensions 28 and 30 carry similar spur gears 40, 40', respectively, in mesh with similar spur gears 42, 42' mounted upon stub shafts 44, 44' fixedly mounted in the gear casing end walls 46.

Each gear casing, therefore, houses a similar train of four inter-meshing spur gears of which one gear, i. e. the gears 35 and 35', are mounted for swinging movement about fixed centers, corresponding to the axes of the shafts 38, 38'. It is possible, however, to carry out the invention with the use of only one gear train, i. e. a gear train at one end only of the feed rolls.

For the purpose of supporting the gears 35 and 35' for said swinging movement the gears are mounted by their shaft extensions 22, 24 in substantially U-shape frame sections 48, 48', respectively, mounted within the corresponding gear end casings 12, 14 for pivotal movement about the fixed spur gear shafts 38, 38' as centers. In Fig. I the frame section 48' at the right is shown with its upper wall (the base of the U) broken away.

The frame sections 48, 48' are mounted for independent swinging movement about their shafts 38, 38' and are capable of being automatically swingable between the permitted minimum and maximum spacings of the feed rolls 16, 18 in accordance with variations in the thickness of the material fed between the feed rolls.

50 indicates an overhead rocker shaft mounted to extend between the gear casings and carrying cams 52, 52' engageable with the upper closed ends of the frame sections 48, 48', respectively. At one end, the rod 50 carries a rocker handle 54 by which the rod 50 can be rocked in one direction or the other to either position the cams for engagement with their frame sections, or to position the cams clear of the frame sections. In the position, as shown in Figs. I and II, the cams 52 push down on the frame sections 48, 48' so as to hold these sections in position in which the feed rolls 16, 18 are prevented from closing together from a position in which the thus adjusted feed rolls are at a distance apart which cannot be reduced.

For the purpose of maintaining an effective downwardly applied load upon the upper feed roll 16 there is provided the coil spring 56 mounted about a rod 58 pivotally connected at one end, as indicated at 60, with the bottom of the frame section 48 so as to depend from this frame section and having its lower end guided for angular motion with respect to an appropriately slotted fixed guide plate 64. The coil spring 56 bears at one end against this guide plate 64 and at its opposite end against a nut 66 adjustable along the rod 58 to vary the initial loading on the coil spring.

An adjustable brake band 68, directly effective with respect to the gear 36', serves to take out undesirable back-lash in the rotation of the gear trains.

Having thus described my invention what I claim as novel and wish to secure by Letters Patent is as follows:

1. In apparatus for feeding material, such as felt, of varying thickness, a pair of feed rolls, means mounting said feed rolls for rotation to feed the material therebetween, said means including shafts and a gear wheel on each shaft, one said shaft being rotatable about a fixed axis and the other shaft being mounted for swinging movement to vary the gap defined between the feed rolls for receiving the material therebetween, a constant mesh gear train including the gear wheels on said shafts and further gear wheels in mesh with one another and one in mesh with each gear wheel on said shafts, said further gear wheels having fixed axes, frame structure, means mounting said frame structure for swinging movement about the fixed axes of the said further gear wheels which are in mesh with the gear wheels on said swingable feed roll shaft, said shaft being mounted upon said frame structure, guide means, said swingable shaft being engaged in said guide means for guiding the shaft in its

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swinging motion, spring connection means operatively connected with said frame structure to constantly urge said structure in the direction in which the swingable feed roll is moved towards the fixed feed roll, and adjustable stop means engageable with said frame structure to arrest movement of the swingable feed roll in said direction, said stop means being adjustable to permit said frame structure to be adjusted to the desired size of the gap between the feed rolls.

2. Apparatus as claimed in claim 1, said spring connection means comprising a rod pivotally connected with said frame to depend therefrom, a guide structure guiding

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the lower portion of said rod in the adjusting movement of said frame structure, adjustable stop means on said rod and a coil spring mounted about said rod between said guide structure and said stop means.

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