

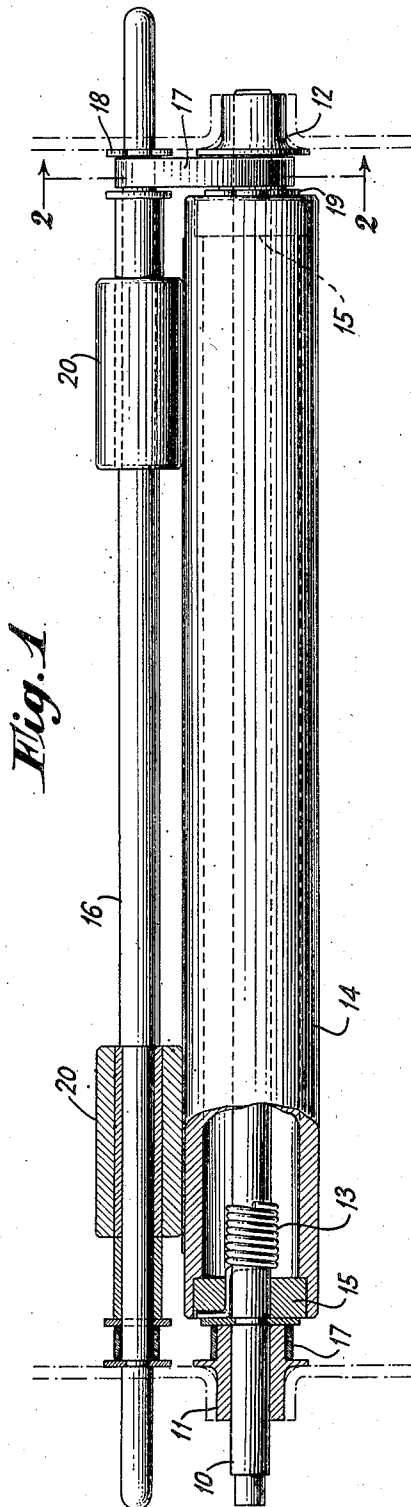
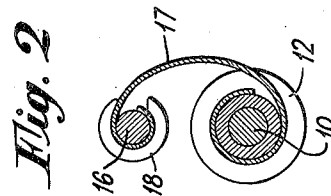
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RECORDING MATERIAL FEED APPARATUS

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RECORDING MATERIAL FEED APPARATUS

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This invention relates broadly to material guiding and feeding apparatus, and more particularly to an apparatus adapted to feed sheet material in one direction and allow its ready transposition from one position to another at will.

The device hereinafter disclosed is particularly adapted for use as a paper or other plane recording medium guiding and feeding device for use with photoradio or facsimile machines. Such machines are well known per se, and the particular feeding apparatus described herein is particularly suited for use in conjunction with that type of facsimile receiver which is disclosed by U. S. Patent Re. 20,152, granted to C. J. Young on October 27, 1936. In a facsimile machine such as disclosed in the aforesaid patent, a sheet of paper or another plane recording medium is passed between a carbon sheet and a drum on which is superimposed a helix or spiral which is rotated in synchronism with a transmitting apparatus. Adjacent the carbon paper is a striker or presser bar which is adapted to construct mechanical impulses which correspond to light impulses or variations picked up by the transmitter. As a result, the paper has to be fed or drawn through the machine at a definite rate; and it is an object of this invention to provide a feeding and guiding mechanism which will perform this function.

In such apparatus it oftentimes becomes desirable and/or necessary to pull the sheet material forward at a speed much greater than that at which it is normally fed in order to avoid recording on such portions of the recording sheet or paper where stock defects appear, or, for instance, at the end of receipt of a facsimile picture it may be desirable to draw the material forward both for the purposes of inspection or for severing the produced record or picture from the roll of material. It would be most difficult, if not impossible, to do this were not some means provided whereby the feed and guide means could be disconnected from the normal driving apparatus for a short interval and, accordingly, it is another object of this invention to provide a guiding and feeding mechanism which will perform these functions.

The material upon which the record is to be produced is normally fed between two sets of tubular or cylindrically shaped rollers. In this particular apparatus one of the rollers is driven and the other is actuated by frictional engagement with the driven roll. It is obviously necessary to maintain the two sets of rollers in cooperative relationship with each other in a re-

silient fashion and, accordingly, it is another of the objects of my invention to provide an apparatus in which this is done.

In general the apparatus comprises a drive shaft which is driven at a predetermined rate by the driving motor of the machine. Surrounding a portion of this drive shaft and maintained at a definite spacing with regard thereto is a rotatable cylindrical member whose outer surface forms one of the guiding and feeding rollers. Fastened to the aforementioned cylinder is one end of a driving spring. The driving spring is also partially coiled about the drive shaft in such a fashion that it frictionally engages the drive shaft sufficiently to transmit the normal necessary driving power between the drive shaft and the aforementioned cylinder. The spring is so wound that the force of retention on the paper in being fed is in such a direction as to wind the spring more closely about the shaft.

Closely adjacent the periphery of the cylindrical member is another shaft member, and fastened about the outer surface of the second mentioned shaft are a plurality of rubber or other resilient tubular or cylindrical members which engage the outer surface of the driven cylinder. Joining the two shafts together is a bow spring whose ends are bent so as to form two enclosed circles or apertures. Each of the drive shafts passes through one of the apertures in the bow spring and thus, the two shafts are resiliently forced together. Therefore, the rubber bearing members on the second shaft are maintained in frictional relationship with the periphery of the driven cylinder and hence rotate in accordance therewith. With this type of construction, whenever the paper or other plane recording material is pulled forward independently of any driving force the direction of the force on the driven cylinder is in exactly the opposite direction to that of the force of retention of the paper. Accordingly, the force now will be in a direction such as to tend to unwind the spring frictionally engaged with the driving shaft and, hence, instead of being maintained in engagement therewith, the spring will slip about the drive shaft and the driving apparatus of the device will be unaffected.

My invention will best be understood by reference to the drawing in which:

Fig. 1 shows one embodiment of my invention, and

Fig. 2 shows the bow spring arrangement.

Referring to Fig. 1, a drive shaft 10, which may be joined to an electric motor or another prime

mover is passed through bearing member 11 to a second bearing member 12. Wound about the drive shaft is a spring 13 having one end joined to an otherwise freely rotatable cylindrical member 14. This cylindrical member is spaced from the drive shaft and supported by a member 15.

Adjacent the cylinder is a second shaft 16. In cooperative relationship with both the drive shaft 10 and the shaft 16 is a bow spring 17 whose configuration will be shown more in detail hereinafter in Fig. 2. One end of the bow spring is wound about the shaft 16 and the other end is wound about a guide 19 co-operating with the shaft 10. Thus, there is a tendency for the two shafts to be pressed together resiliently. Held on the shaft 16 are a plurality of rubber rollers 20 in the form of hollow cylinders and as the two shafts tend to come together, due to the action of the bow spring, naturally, the movement will be limited by the dimensions of the rubber rollers which will be pressed down into frictional engagement with the outer surface of the cylinder 14.

Referring to Fig. 2, there is shown the bow spring arrangement. The spring 17 is shown in its co-operating relationship with the guides 18 and 19, and the position of the shafts 10 and 16 with respect thereto is clearly illustrated.

The operation of the device then will be as follows: The force of retention, or in other words the frictional force of the paper on the periphery of the cylindrical member 14, will be in such a direction as to tend to wind the spring 13 more closely about the shaft 10. As a result, its frictional hold will increase and when the shaft is turned, the power will be transmitted through the spring as a driving member to the periphery of the rotating cylinder 14. Now, if the paper be pulled forward, the force on the periphery of the drum of the cylinder 14 is just opposite to the direction of the force of retention of the paper during normal drive. Accordingly, the force exerted in this direction tends to unwind the spring from the drive shaft 10. As a result, the spring will slip about the drive shaft and no power will be transmitted back through the shaft to the prime mover. Hence, there has been provided an apparatus which drives at a definite rate in one direction but readily slips when a force is applied in the other direction or, according to this invention, when the paper is pulled forward by hand.

It will be noted from Fig. 2 that the bow spring 17 is wound directly about the shaft 16 but is wound about a bushing on the shaft 10. The reason for so arranging the device is in order to keep the spring 17 from having a direct contact with the driven shaft 10 because otherwise the spring would be subject to distortions in shape and also would tend to feed along the shaft and bind against the shaft. Therefore, the bushing is provided both to properly align the spring and to furnish a resilient press engagement with the shaft.

It will be appreciated that other equivalents may be used without departing from the spirit and scope of my invention, and accordingly I do not limit myself to the specific limitation shown, as for instance it will be appreciated that other materials might be easily substituted for the rubber rollers 20 or a different type spring substituted for the bow spring without departing from the inventive concept.

What I claim is:—

1. A material feeding and guiding apparatus

comprising a plurality of co-operating bearing surfaces adapted to support and feed said material therebetween, a drive shaft, and resilient means joined to one of said bearing surfaces and frictionally engaged with said drive shaft.

2. A material feeding and guiding apparatus comprising a plurality of co-operating bearing surfaces adapted to support and feed said material therebetween, a drive shaft, and spring means joined to one of said bearing surfaces and frictionally engaged with said drive shaft.

3. A material feeding and guiding apparatus comprising a plurality of co-operating bearing surfaces adapted to support and feed said material therebetween, a drive shaft, resilient means joined to one of said bearing surfaces and frictionally engaged with said drive shaft, and means for driving said drive shaft.

4. A material feeding and guiding apparatus comprising a plurality of co-operating bearing surfaces adapted to support and feed said material therebetween, a drive shaft, spring means joined to one of said bearing surfaces and frictionally engaged with said drive shaft, and means for driving said drive shaft.

5. A material feeding and guiding apparatus comprising a drive shaft, an elongated cylinder mounted rotatably about said shaft, resilient means joined to said cylinder and frictionally engaged with said drive shaft, a second shaft mounted substantially parallel and adjacent to said drive shaft, a plurality of resilient bearing members mounted on said second shaft, and resilient means for resiliently engaging frictionally the bearing surfaces of the cylinder with the plurality of bearing members.

6. A material feeding and guiding apparatus comprising a drive shaft, an elongated cylinder mounted rotatably about said shaft, spring means joined to said cylinder and frictionally engaged with said drive shaft, a second shaft mounted substantially parallel and adjacent to said drive shaft, a plurality of resilient bearing members mounted on said second shaft, and resilient means for resiliently engaging frictionally the bearing surfaces of the cylinder with the plurality of bearing members.

7. A material feeding and guiding apparatus comprising a drive shaft, an elongated cylinder mounted rotatably about said shaft, resilient means joined to said cylinder and frictionally engaged with said drive shaft, a second shaft mounted substantially parallel and adjacent to said drive shaft, a plurality of resilient bearing members mounted on said second shaft, resilient means for resiliently engaging frictionally the bearing surfaces of the cylinder with the plurality of bearing members, and means for driving said drive shaft.

8. A material feeding and guiding apparatus comprising a drive shaft, an elongated cylinder mounted rotatably about said shaft, spring means joined to said cylinder and frictionally engaged with said drive shaft, a second shaft mounted substantially parallel and adjacent to said drive shaft, a plurality of resilient bearing members mounted on said second shaft, resilient means for resiliently engaging frictionally the bearing surfaces of the cylinder with the plurality of bearing members, and means for driving said drive shaft.

9. A material feeding device comprising a plurality of cylindrical bearing surfaces frictionally engaging each other and between which the material is adapted to be placed, a driving means

for rotating one of the bearing surfaces relative to the other, and a resilient means connected rigidly to one of the bearing surfaces and frictionally connected with the driving means.

5 10. A material feeding device comprising a plurality of cylindrical bearing surfaces frictionally engaging each other and between which the material is adapted to be placed, a driving means

for rotating one of the bearing surfaces relative to the other, and a resilient means connected rigidly to one of the bearing surfaces and frictionally connected with the driving means to drive the bearing surface to which it is joined 5 in one direction only.

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