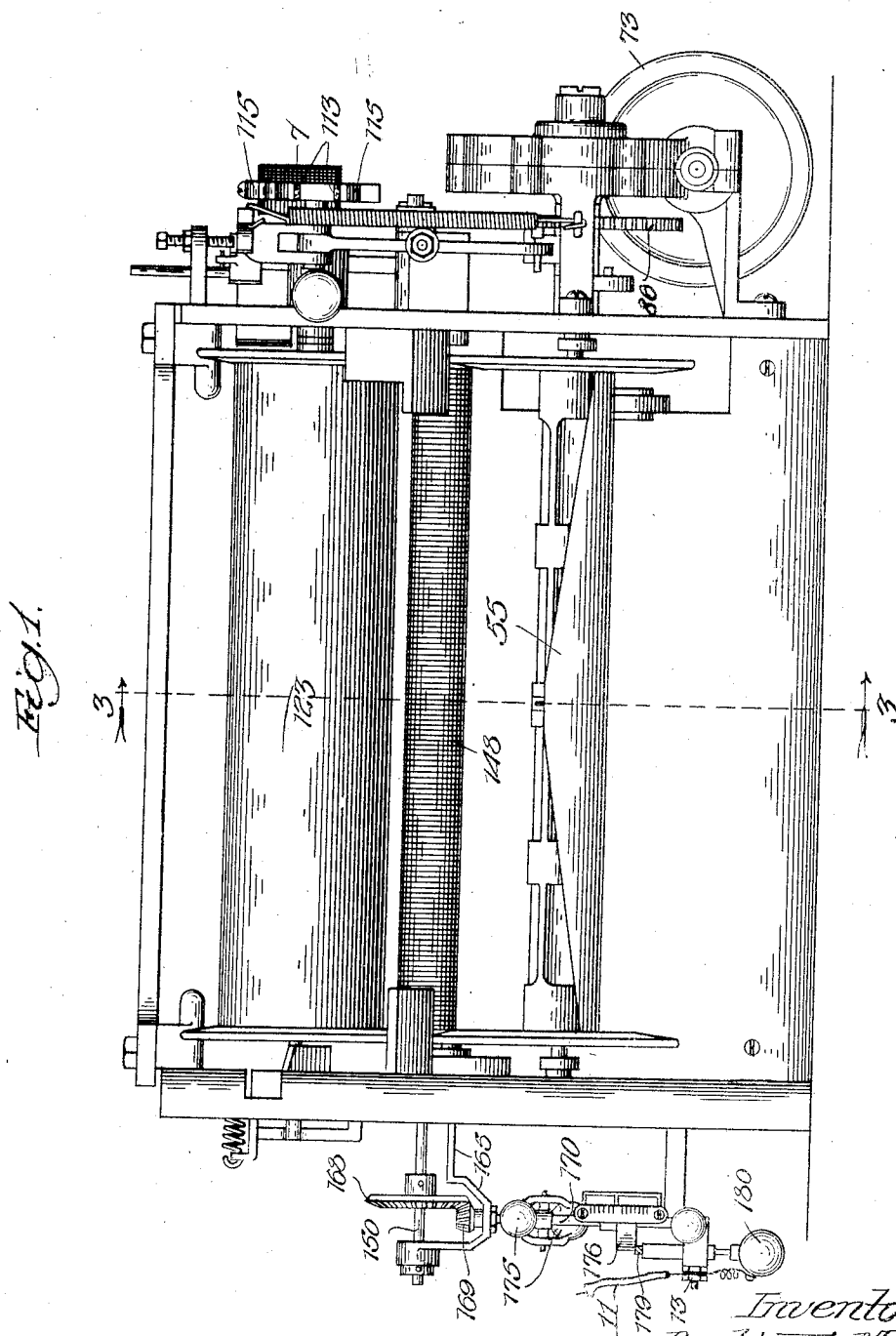


Jan. 30, 1923.

1,443,584

B. E. MILLS.  
MUSIC SHEET FEEDER.  
FILED AUG. 3, 1921.

3 SHEETS-SHEET 1



*Inventor:*  
*Bertie E. Mills,*  
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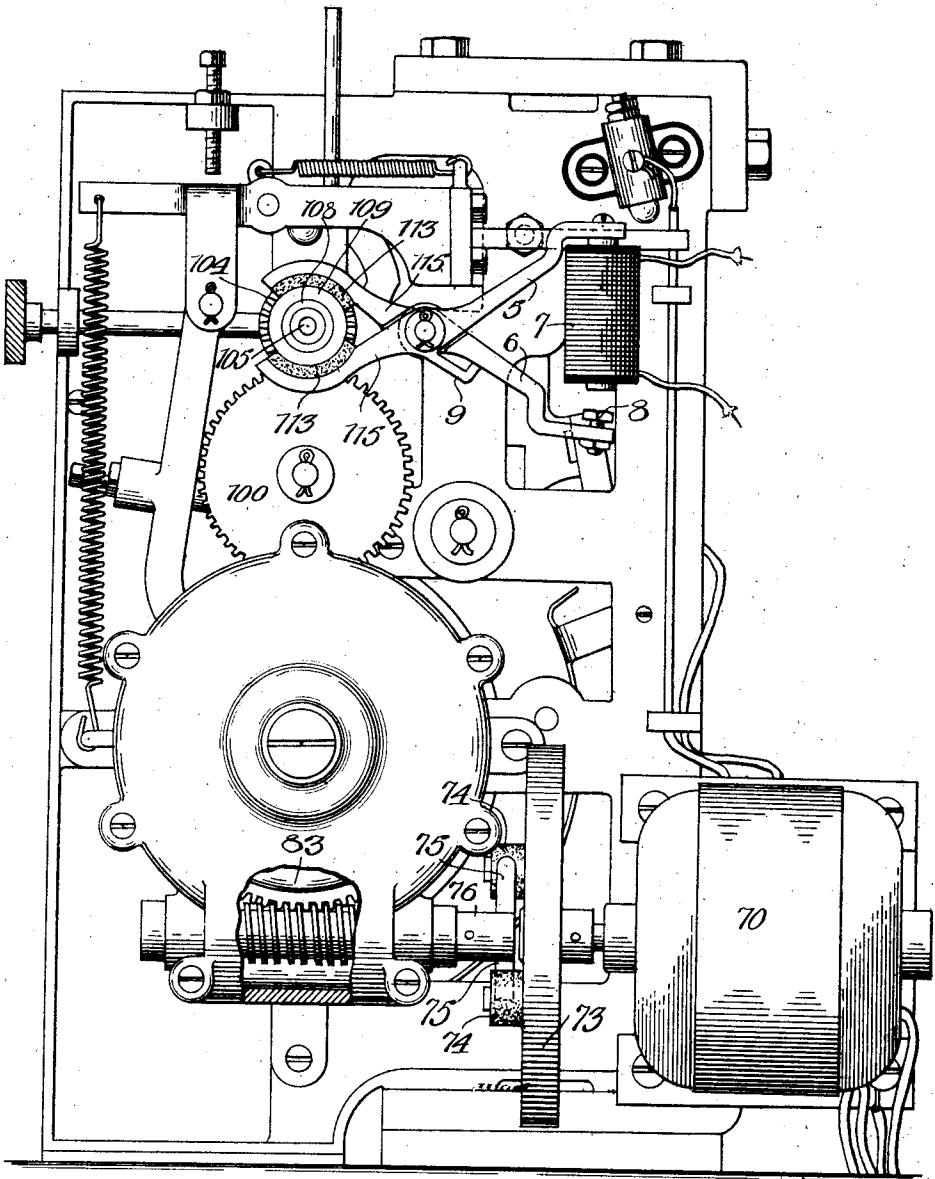
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3 SHEETS-SHEET 2.

*Fig. 2.*



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3 SHEETS-SHEET 3

Fig. 3.

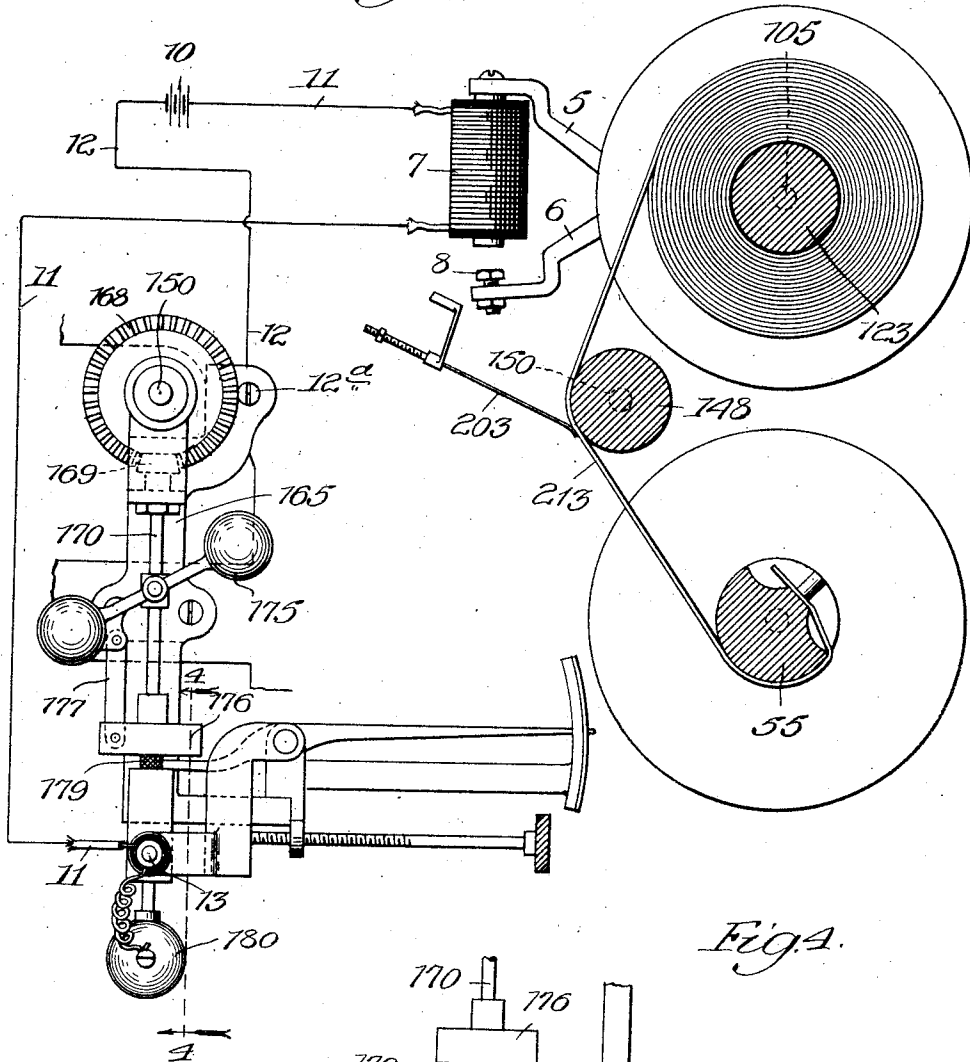
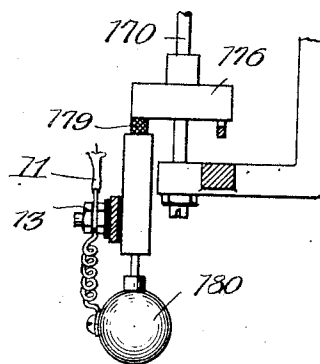


Fig. 4.



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## UNITED STATES PATENT OFFICE.

BERTIE E. MILLS, OF CHICAGO, ILLINOIS, ASSIGNOR TO MILLS NOVELTY COMPANY,  
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## MUSIC-SHEET FEEDER.

Application filed August 3, 1921. Serial No. 489,469.

*To all whom it may concern:*

Be it known that I, BERTIE E. MILLS, a citizen of the United States, residing at 231 South Green Street, Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Music-Sheet Feeders, of which the following is a specification.

My invention relates to an improvement in the music-sheet feeder of U. S. Letters Patent No. 1,302,439, dated April 29, 1919, to H. K. Sandell; and it relates particularly to an improvement in the friction-clutch feature which co-operates with the music-roll drive-shaft.

In the accompanying drawings, Figure 1 is a view in front elevation of the music-sheet feeder embodying my improvement; Figure 2 is a view of the same in end elevation; Figure 3 is a section on line 3—3, Fig. 1, diagrammatically illustrated, and Figure 4 is a section on line 4—4 of Fig. 3.

With the exception of my improved feature, the mechanism may be that shown and described in the Letters Patent to which reference is made; so that only so much of the said mechanism illustrated in the present drawings need be described herein as is required for understanding the construction and operation in connection therewith of my improvement.

To facilitate identifying parts with the aforesaid patent, the reference-numerals in the latter are employed in the following description on corresponding parts to be described in connection with the present drawings.

The armature-shaft of the electric motor 70 carrying the fly-wheel 73 is provided with the studs 74 for engaging the T-head 75 of the worm-shaft 76 meshing with the housed worm-wheel 83 to drive the feed-roll 55 for taking up from the music-roll 123 the music-sheet 213. The sheet crosses the contact-roll 148 in driving contact therewith and against which the contact brushes, one of which is represented at 203 (Fig. 3), act through the sheet-perforations. On the outer end of the music-roll drive-shaft 105 carrying the pinion 104, to which rotation is imparted by the gear 86 for rewinding the music-sheet through the idler 100, is provided the clutch-device which is the subject of my present improvement, hereinafter de-

scribed, but which involves the cylindrical member 108 on the shaft 105 and the outer ring 109, adapted to be locked together as shown and described in said patent, the outer ring serving as a brake-drum against which bear the opposed leather brake-shoes 113 carried by the curved ends of a pair of arms 115.

The stub-shaft 150 extending from an end of the contact-roll 148 and having a bearing in the governor-frame 165, carries the bevel gear 168 meshing with the bevel pinion 169 on the vertical shaft 170, which carries the wobble-governor 175. Below this governor, on the governor-shaft 170, is mounted the sliding contact-collar 176 connected with the governor by the link 177 and bearing against the contact-brush 179 in the upwardly projecting end of the pendulum 180.

I have extended the brake-shoe arms 115 scissors-like to provide the arm-extensions 5 and 6. On the terminal end of the arm 5 is rigidly suspended an electromagnet 7 to present the lower end of its core to an adjustable armature 8, shown as the head of a bolt supported in the corresponding end of a lower arm-extension 6. The electromagnet is thus floatingly supported to vibrate with the clutch-members, and its weight holds the lower brake-shoe on the ring 109, but without material braking pressure, while that of the upper brake-shoe is maintained on the ring by a stop-finger 9 extending from one arm 115 underneath the extension of the other arm and serving, besides, to prevent sagging of the latter.

As represented in the diagrammatic view (Fig. 3), the electromagnet 7 is included in the circuit of a source of electrical current indicated at 10.

The wire 11 leads from one side of the source of current-supply through the electromagnet and through the insulated binding-post 13 to the pendulum-ball 180, from which it connects through the frame at 12 with the wire leading to the opposite side of the current-source. Thus with each of the rapidly repeating contacts between the brush 179 and collar 176 the electromagnet is energized to attract the armature and thereby cause the braking pressure of the shoes 113 to be applied.

While the present purpose of the clutch is also that of the clutch in the aforesaid patent,

namely, to brake the shaft 105 to maintain a degree of tension on the travelling music-sheet that will cause it to exert the degree of friction on the contact-roller 148 necessary for driving the latter, my improvement performs the additional function of automatically varying the braking pressure on the music-roll in the ratio of variations in its diameter produced by the unwinding of the sheet therefrom; and this is accomplished in the present instance by the governor-mechanism as follows:

As the feed-roll 55 increases in diameter in winding the music-sheet thereon from the music-roll, the feed-roll speed must lessen in order to maintain uniformity of the predetermined speed (say, of eleven feet per minute) of the sheet across the contact-roll, and the speed of the feed-roll is regulated by the governor. As the feed-roll diameter increases and therefore tends to feed the sheet faster, it necessarily turns the contact-roll 148 faster and causes the governor to raise the collar 176 and break contact with the brush 179, which contact normally gives the motor 70 full current. Each time the contact is broken (as it may be a thousand times, during paying out of the sheet from the music-roll), the motor is fed through a resistance (denoted 303 in Fig. 40 of the aforesaid patent), thereby reducing the motor-speed to slow that of the sheet until the governor again makes the circuit-closing contact to again speed up the motor. The feed of the sheet is thus maintained practically uniform, as explained in the said patent.

Obviously, when the diameter of the sheet on the music-roll is relatively large and that on the feed-roll is relatively small, the maximum brake-pressure is required and the governor acts to cause more current to be supplied for driving the feed-roll, the contacts between the collar 176 and brush 179 being then of relatively long duration, whereby the energizings of the electromagnet are correspondingly long and the clutch-pressure is accordingly long. As the diameter of the sheet on the feed-roll 55 increases, the contact-durations lessen, thereby decreasing the durations of the energizing effect on the electromagnet and accordingly those of the clutch pressure.

I realize that among the advantages of my invention, it affords the peculiar advantage, whether embodied in the mechanism herein illustrated and described or in other suitable form, of automatically varying the braking pressure on the roll in the ratio of variations in its diameter of the music-sheet by unwinding therefrom. I do not, therefore, intend to limit my invention to the details of the construction herein shown except as pointed out in the appended claims, in which it is my intention to claim all the

novelty inherent in the invention as broadly as permissible by the state of the art.

I claim:

1. In a music-sheet feeder, the combination with rotatory sheet-connected music and take-up rolls, of a clutch-device comprising brake-shoes embracing said music-roll, and means connected with the brake-shoes operating to vary their pressure on the music-roll in the ratio of decrease of the diameter of the sheet thereon by paying out therefrom.

2. In a music-sheet feeder, the combination with rotatory sheet-connected music and take-up rolls, of a magnetic clutch-device comprising brake-shoes embracing said music-roll and carrying an electromagnet, an electric circuit including said electromagnet and means included in said circuit operating to vary the pressure of the brake-shoes on the music-roll in the ratio of decrease of the diameter of the sheet thereon by paying out therefrom.

3. In a music-sheet feeder, the combination with rotatory sheet-connected music and take-up rolls, an intermediate roll rotated by the sheet in travelling across it, and governor-mechanism geared to said intermediate roll and contained in an electric make-and-break circuit controlled by the rotation thereof, of a magnetic clutch device comprising brake-shoes bearing on said music-roll and an electro-magnet included in said circuit and connected with said brake-shoes to vary their pressure on the music-roll in the ratio of decrease of the diameter of the sheet thereon by paying out therefrom.

4. In a music-sheet feeder, the combination with rotatory sheet connected music and take-up rolls, an intermediate roll rotated by the sheet in travelling across it, and governor-mechanism geared to said intermediate roll and contained in an electric make-and-break circuit controlled by the rotation thereof, of a magnetic-clutch device comprising scissors-like brake-shoes embracing said music-roll and having an armature on one arm and on the other arm an electromagnet included in said circuit.

5. In a music-sheet feeder, the combination with rotatory sheet-connected music and take-up rolls, an intermediate roll rotated by the sheet in travelling across it, and governor-mechanism geared to said intermediate roll and contained in an electric make-and-break circuit controlled by the rotation thereof, of a magnetic-clutch device comprising brake-shoes provided on scissors-like arms to embrace said music-roll, said arms having extensions the lower of which carries an armature and the upper an electromagnet included in said circuit, and a stop extending from one arm underneath the extension of the other arm.

BERTIE E. MILLS.