

W. G. BETZ.

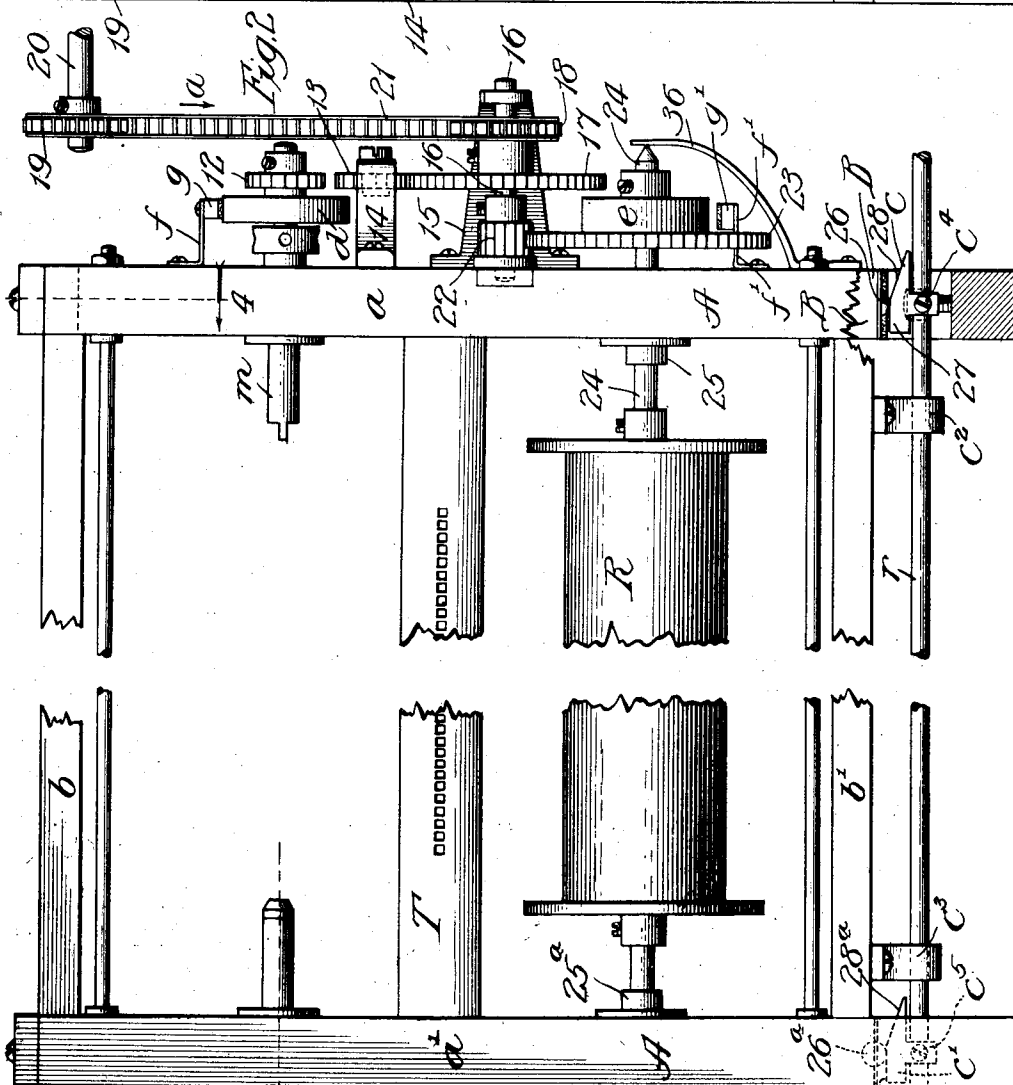
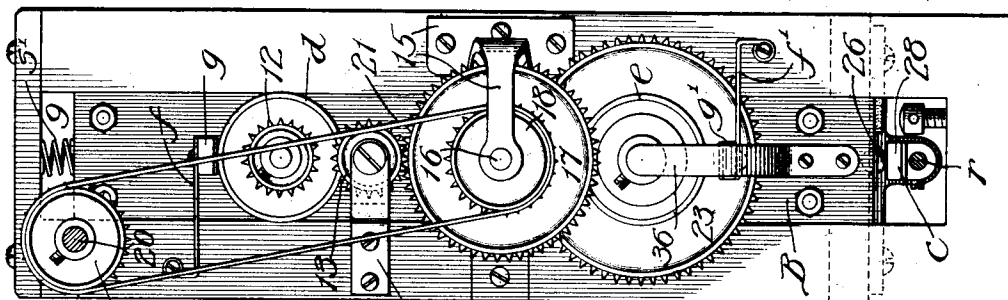
WIND AND BEWIND MECHANISM FOR MECHANICAL MUSICAL INSTRUMENTS.

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998,743.

Patented July 25, 1911.

2 SHEETS—SHEET 1.



Witnesses:
John Enders
Chas. H. Bull

Fig. 1.

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UNITED STATES PATENT OFFICE.

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WIND AND REWIND MECHANISM FOR MECHANICAL MUSICAL INSTRUMENTS.

998,743.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed December 31, 1909. Serial No. 535,845.

To all whom it may concern:

Be it known that I, WILLIAM G. BETZ, a citizen of the United States, residing at the town of Steger, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wind and Rewind Mechanism for Mechanical Musical Instruments, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to the wind and rewind mechanism of mechanical musical instruments for drawing perforated music sheets from detachable music rolls over the apertures of a tracker bar to operate pneumatic mechanism and for quickly rewinding the same when the tune is finished.

The primary object of the invention is to provide durable, accurate and simple mechanism of this character, having capacity for adjustment, and easy, noiseless and prompt in operation, dispensing with slidable gears, which are apt to rattle or get out of repair.

Other objects will be described hereafter and more particularly pointed out in the claims.

In the accompanying drawings, I have shown my invention in one of its preferred forms.

Figure 1 is a broken front elevation of wind and rewind mechanism embodying my invention applied to a piano; Fig. 2 is an end elevation of the same looking on the right hand side of Fig. 1; Fig. 3 is a broken elevation of the parts shown on the right hand side of Fig. 1 showing the position which these parts assume in the rewind position; Fig. 4 is a sectional view of Fig. 5; Fig. 5 is a sectional view on line 5 of Fig. 4; Fig. 6 shows a modified form of means for adjusting the tracker bar; Fig. 7 is a sectional view on line 7 of Fig. 6 and Fig. 8 is a sectional view on line 8 of Fig. 1 illustrating a well known type of mechanism for detachably securing the music roll.

In the drawings, A indicates a stationary foundation frame adapted to be secured to the frame of the instrument in any suitable manner, comprising the side walls *a a'* and the cross pieces *b b'*. A shifting frame or carrier B supporting the wind and rewind

rolls is supported within the stationary frame A in yielding supports which afford a lateral adjustment of frame B in respect to frame A. The frame B fits within openings 9 cut longitudinally in the side walls *a a'* of frame A. It has sufficient vertical play or shifting movement to engage and disengage gears which impart alternately wind and rewind motion as hereinafter described. This vertical play or movement is sufficient to entrain and disentrain gears carried on the frame B and gears carried on the frame A. During the wind and rewind operations the frame B is held securely between tension devices or springs rigidly secured to the cross piece *b* and bearing against the frame B and the surfaces of the beveled shoes or cams *C C'* slidably supported in yokes *C²* and *C³* secured to cross piece *b'*. One of the springs or tension devices is shown in Figs. 2 and 4. A like spring (not shown) is similarly placed near the opposite end of cross piece *b*.

I prefer to obtain capacity for vertical sliding of the frame B within frame A by providing as shown in Fig. 5, a plurality of pivots or pins 10 rigidly secured to the slidable frame B and projecting loosely into the loop *l* of the spring clips 11 fitted within the openings 9 and pressing against the oppositely disposed walls of the frame in the openings 9. These spring clips I prefer to construct as shown in Fig. 5, with a top loop *l* loosely embracing the pins or pivots 10 and convex sides *o* curved toward the points of frictional support on the walls of the openings 9. This method of mounting not only allows for the vertical movement of the sliding frame, but provides capacity for a lateral elastic adjustment governed by an adjusting device hereinafter more fully described.

m indicates the shaft to which the music roll is coupled in cooperation with a rotating spring-pressed hollow thimble *m'* shown in Fig. 8. These means for rotatively securing the music roll are common to many mechanical musical instruments and need not be further described. The shaft *m* is mounted in suitable bearings on the wall *a* of the slidable frame B. Its right hand outer end

is provided with a gear 12 in vertical alignment with a gear 13 mounted on bracket 14. This bracket is rigidly secured to the wall *a*. A bracket 15 below the bracket 14 secured to the wall *a* carries in suitable bearings a shaft 16; upon it is mounted in vertical alignment with the gear 13 a gear 17. On the outer end of shaft 16 is mounted a gear 18 in alignment with a gear 19 mounted on the main drive shaft of the air motor (not shown). Gears 18 and 19 are rotatively connected by chain 21.

On shaft 16 is mounted in suitable bearings a gear 22 in alignment with a gear 23 on shaft 24 of the rewind roll R. Shaft 24 is mounted in bearings 25^a on opposite walls of the slidable frame B. When power is applied through shaft 20 to drive chain 21 in the direction of the arrow *a* the above described gears intermesh according to the position assumed by frame B, to form first, a train to wind the rolls, and second, to break this train and form a train to rewind the rolls. In the position assumed by the parts in Fig. 1, frame B is elevated, thereby bringing gear 22 into intermeshing engagement with gear 23 to drive the wind or take up roll R in the direction of the arrow *b*. Frame B is elevated by longitudinal sliding of the rod *r* from left to right which causes the ball bearing contact surfaces 26 26^a on the bottom of walls *a a'* to travel up the inclined surfaces 28, 28^a onto the surfaces 27 27^a of the beveled shoes or cams *c c'*. These cams embrace the rod *r* and are secured thereto by thumb screws *c⁴ c⁵*. The rod *r* is operated by a hand lever not shown. By shifting the rod *r* from right to left from the position shown in Fig. 1, the bearings or contact surfaces 26, 26^a, pressed by the tension of the springs *s s'* ride down the inclined surfaces 28, 28^a of the cams *c* and *c'* and assume the position shown in Fig. 3. This sliding movement is sufficient to bring the gears 23 and 22 out of intermeshing engagement and the gears 12 and 13 into intermeshing engagement. As the power applied through the chain 21 is continuous during the wind and rewind operations, the motion of the shaft *m* and the shaft 24 is at once reversed and the music sheet rewound upon the music or rewind roll. In order to arrest the motion of the music roll or rewind shafts preparatory to changing the direction of rotation as above described, I prefer to mount upon the shaft *m* a disk *d* and upon the shaft 24 a disk *e* and to attach upon suitable brackets *f f'* the frictional brakes *g g'*. These brakes or brake surfaces are in alignment with the disks and set at such distances from them that when the parts are in the position shown in Fig. 1 the brake *g* and the disk *d* are in frictional contact and the brake *g'* and the disk *e* are out of contact. When,

however, the parts assume the position shown in Fig. 3 (the rewind position) the brake *g'* and disk *e* are in contact, and the brake *g* and disk *d* are out of contact. This insures an even stretch or tension on the music sheet.

As shown in Figs. 1 and 6, the tracker bar T is mounted in the usual manner upon the stationary frame A. Figs. 6 and 7 illustrate a method of obtaining manually a lateral adjustment of the frame B in respect to the tracker bar, for the purpose of correcting any defective registration between the perforations of the music sheet and the apertures of the tracker bar. I prefer to accomplish this adjustment by providing upon the side of the frame B a bearing plate 29 and upon the wall *a'* of the frame A brackets 30 and 31 in which a rod 32 is mounted, secured by nut 33. This rod may be rotated by means of a handle 34. In contact with the bearing plate 29, and rigidly mounted upon the rod 32 is an eccentric or cam surface 35. By turning the handle 34 from right to left the cam may be turned to press the frame B away from rod 32 toward the opposite side of frame A, and by reversing this motion it may allow it to follow the cam under the tension exerted by a spring 36, secured to bracket 37 secured to the wall *a* of the frame A. This provides means for adjusting the frame B in respect to the tracker bar to allow for correction of registration during mechanical playing.

I am aware that many modifications of my invention will suggest themselves to those skilled in the art and I do not wish to be understood as limiting myself to the preferred form shown in the foregoing description and drawings. But

What I claim is:

1. In a musical device of the class described, a stationary frame, a shifting frame or carrier therein, wind and rewind shafts mounted in said carrier, driven gears mounted on said shafts, driving gears mounted on said stationary frame and means for sliding said carrier alternately to entrain said gears to rotate said shafts in one direction and thereafter to break this entrainment and entrain them to reverse said rotation for the purposes described.

2. In a device of the class described, a stationary frame, a tracker bar rigidly supported thereon, the side walls of said frame having longitudinal openings, and a movable frame adapted to carry a music sheet and having capacity for lateral and vertical movement in said openings substantially as and for the purposes described.

3. In a device of the class described, a stationary frame carrying driving gears, a movable frame slidably mounted therein and carrying two driven gears, a tracker

bar mounted on said stationary frame, wind and rewind rolls mounted on said movable frame and means for sliding said movable frame simultaneously to entrain one of said driven gears and disentrain the other with said driving gears and to reverse this operation substantially as and for the purposes described.

4. In a device of the class described, a stationary frame, driving gears mounted thereon, a movable frame mounted on yielding supports on said stationary frame, driven gears mounted on said movable frame, wind and rewind rolls carried thereon, a tracker bar on said stationary frame, and means for shifting said movable frame on its supports a distance sufficient to alternately engage and disengage said driven gears from said driving gears to operate said wind and rewind rolls.

5. In a mechanical musical instrument, a stationary frame having openings in its side walls, a movable frame or carrier provided with projecting pins secured thereto, spring clips fitted within said openings having top loops adapted to embrace said pins loosely and convex sides curved toward the points of frictional support on opposite walls of each of said openings, wind and rewind shafts mounted in said movable frame or carrier, driven gears on said shafts, driving gears on said stationary frame and means for sliding said movable frame or carrier alternately to entrain said gears to rotate said shafts in one direction and thereafter to break this entrainment and entrain them to reverse said rotation.

6. In a mechanical musical instrument, a stationary frame, elastic supports therein, a tracker bar secured to said frame, a movable frame mounted in said supports, wind and rewind rolls mounted on said movable frame, a tension device adapted to hold said movable frame in contact with a cam, a cam and driving gears mounted on said stationary frame, driven gears on said movable frame and means for operating said cam against the force exerted by said tension device to entrain and disentrain the gears on said stationary frame with the gears on said movable frame.

7. In a mechanical musical instrument, a stationary frame adapted to carry a tracker bar and having openings in its side walls, a movable frame adapted to carry wind and rewind rolls provided with projecting pins secured thereto, spring clips fitted within said openings, having top loops adapted to embrace said pins loosely, and convex sides curved toward the points of frictional support on opposite walls of each of said openings, whereby said movable frame has capacity for both lateral and longitudinal movement in said stationary frame.

8. In a mechanical musical instrument, a

frame A with openings 9 therein, a tracker bar T mounted on said frame, a movable frame B provided with pins, wind and rewind rolls thereon, spring clips frictionally supported on frame A in said openings adapted to afford elastic bearings for said pins, means for shifting frame B vertically and means for adjusting it laterally.

9. In a mechanical musical instrument, a stationary frame carrying driving gears, a movable frame slidably mounted therein in elastic bearings and carrying two driven gears and means for shifting said movable frame to entrain one and disentrain the other of said driven gears with said driving gears and for reversing this operation substantially as described.

10. The combination of a movable frame or carrier for the wind and rewind rolls of mechanical musical instruments mounted on a stationary support in elastic bearings having capacity for yielding to both vertical and lateral movement of said frame, a cam mounted on stationary supports in contact with the side of said frame and adapted to shift it laterally, and a spring adapted to maintain said contact substantially as described.

11. The combination of a movable frame or carrier for the wind and rewind rolls of mechanical musical instruments mounted in a stationary support in elastic bearings having capacity for yielding to both vertical and lateral movement of said frame, a cam mounted on stationary supports in contact with the side of said frame and adapted to shift it laterally, a spring adapted to maintain said contact, a cam mounted on stationary supports in contact with an end of said frame and adapted to shift it laterally, and a tension device adapted to maintain said contact.

12. In a device of the class described, a movable frame for the wind and rewind rolls of mechanical musical instruments mounted on stationary supports in bearings having capacity for yielding to permit vertical movement of said frame, contact points on said frame, a spring adapted to hold said points on cams, cams and means for operating them to shift said frame vertically substantially as described.

13. In a musical device of the class described, a movable frame, wind and rewind shafts rotatively mounted on said frame, a tension device adapted to force said frame against a cam surface, a cam surface adapted to force said frame against the tension of said device, means for operating said cam, wind and rewind gears mounted on said shafts cooperating with power driven mechanism, whereby operation of said cam applies power to drive said shafts alternately to wind and rewind for the purposes described.

14. In a musical device of the class described, in combination with stationary supports, a movable frame mounted therein, elastic bearings therefor, gears mounted on shafts journaled on said movable frame in alinement with other gears mounted on said supports, means for moving said frame vertically to engage different sets of said gears and simultaneously disengage other

sets, whereby said shafts are alternately wound and rewound for the purposes described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WILLIAM G. BETZ.

Witnesses:

ROBERT CATHERWOOD,
NELLIE R. CALLAHAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."