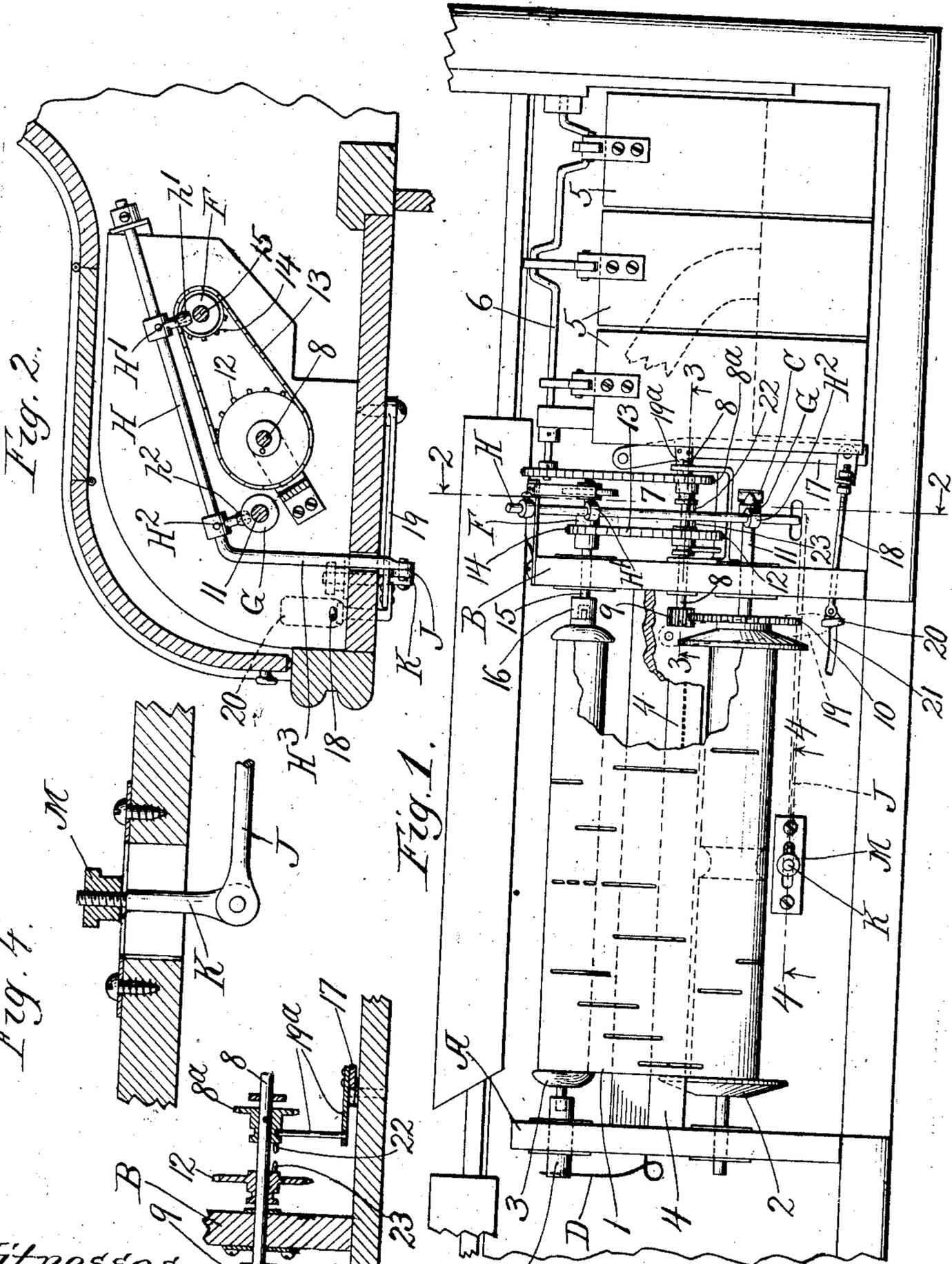


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P. B. KLUGH.  
ADJUSTING DEVICE FOR MUSICAL INSTRUMENTS.  
APPLICATION FILED JUNE 3, 1905.



Witnesses,  
Edward T. Wray.  
J S Abbott

Inventor,  
Paul Bron Klugh  
Buxton Buxton  
his Atty's.

# UNITED STATES PATENT OFFICE.

PAUL BROWN KLUGH, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CABLE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## ADJUSTING DEVICE FOR MUSICAL INSTRUMENTS.

No. 849,737.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed June 3, 1905. Serial No. 263,630.

To all whom it may concern:

Be it known that I, PAUL BROWN KLUGH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Adjusting Devices for Musical Instruments, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to mechanism for carrying and propelling the perforated sheet for controlling automatic musical instruments. Its purpose is primarily to provide for adjusting the sheet to the tracker-board to cause perfect registration of the apertures of the one with the other, and also to shift the registration from aperture to aperture for transposing the music. The means adopted for accomplishing this primary purpose also accomplish a secondary purpose in connection with the shifting of the driving power from the rewinding to the take-up roll, as more particularly pointed out in the following description.

The invention consists of the features set out in the claims.

In the drawings, Figure 1 is a plan view of a portion of the roll-operating or sheet-propelling mechanism of an automatic player embodying my invention. Fig. 2 is a section at the line 2 2 on Fig. 1. Fig. 3 is a detail section at the line 3 3 on Fig. 1. Fig. 4 is a detail section at the line 4 4 on Fig. 1.

The perforated controlling-sheet 1 is carried and propelled by the customary take-up roll 2 and rewind-roll 3, intermediate which is the fixed tracker-board 4, over which the sheet is drawn in one direction or the other by the operation of the rolls, respectively. A pneumatic motor, whose successively-operating bellows 5 5 5 and triple-crank shaft 6 sufficiently identify it as a familiar type of motor, furnishes the power for driving the rolls through the medium of the train 7, of which certain parts only need be particularly mentioned, as they are concerned in the particular invention to be herein claimed. The shaft 8 of this train, it will be understood, is continuously driven by chain over the wheel 8<sup>a</sup>, pinned fast to the shaft, (see Fig. 3,) and the pinion 9 at the inner end of this shaft meshing with the gear 10 on the shaft 11 of the take-up roll 2 drives said roll for propelling the controlling-sheet 1 in the direction for

playing. The rewind-roll 3 is driven by means of a sprocket-wheel 12, which is loose on the shaft 8, and from which the chain 13 extends around the sprocket-wheel 14 on the spindle 15, which has the chuck or driving-head 16 for engaging said rewind-roll. The lever 17, operated by the link 18, connected to the stop-lever 19, whose stop-finger 20 protrudes through the slot 21 in the stop-board by means of the finger 19<sup>a</sup> engaging the grooved hub of the gear 8<sup>a</sup>, shifts the shaft 8 to the left for carrying the pinion 9 out of mesh with the gear 10, and the same movement of the shaft carries the clutch member 22, rigid with the shaft 8, into engagement with the clutch member 23, rigid with the gear 12, and so transmits the driving-power to the rewind-roll at the same time that it is disconnected from the take-up roll by the disengagement of the pinion 9 from the gear 10.

The shaft 11 on the take-up roll 2 is free to move endwise in its bearings in two cheeks A and B, and at the right-hand end it protrudes past the cheek B, and being tapered to a point bears against the face of a spring C. The shaft or spindle 15 for driving the rewind-roll is movable endwise in its bearings. A spring D, mounted on the left-hand cheek A, operates against the left-hand bearing E of the rewind-roll to thrust said bearing, and thereby the roll and the spindle 15 at the opposite end, to the right. The shaft or spindle 15 and the shaft 11 of the take-up roll are provided with collars F and G, and in bearings suitably mounted on the cheek B there is a rock-shaft H, having short lever arms or fingers H<sup>1</sup> and H<sup>2</sup>, which extend, respectively, at the right of the collar F and at the left of the collar G, so that when the position of the rock-shaft H is fixed said lever arms or fingers H<sup>1</sup> and H<sup>2</sup> limit the thrust of the shaft 11 and spindle 15, respectively, derived from the springs C and D and determine the position longitudinally of the take-up and rewind rolls, respectively.

It will be seen that if the shaft is rocked in one direction the rewind-roll will be forced against the spring D to the left, and the take-up roll will be permitted to yield to the action of its spring C for movement in the same direction an equal amount, and when the shaft is rocked in the reverse directions reverse movements of the rolls will follow, the take-up roll being in that case forced against the

action of its spring and the rewind-roll permitted to yield to the action of its spring. By the rocking of the shaft H, therefore, the two rolls will be moved simultaneously and equally longitudinally with respect to the tracker-board, and thereby the apertures in the sheet may be adjusted thus in respect to the tracker-board, or the adjustment shifted to change the registration for transposition within the limit of the movement which can be thus caused by the rock-shaft, and it will be seen that the limit of range of such movement can be made anything, more or less, as desired, by the adjustment of the rock-shaft H with respect to the two shafts to be moved by it, so as to permit the use of longer or shorter lever-arms H' H<sup>2</sup>. The width of the pinion 9 will be made such as to permit such range of movement as the other devices are adapted to cause without carrying the gear 10 out of mesh with said pinion when the stop 20 is set for playing.

It will be noticed that the pinion 9 is moved to the left for disengagement from the gear 10 when the stop 20 is set for rewinding, and it follows that in moving the stop in the opposite direction to bring the pinion back into engagement with the gear, if the teeth do not happen to stand at position for immediate meshing in the sideward movement of the pinion, the collision of the pinion against the side of the gear will move the gear and the roll in the direction which is resisted by the spring C and in which, therefore, the gear can yield as the spring C permits. Since the pinion is constantly rotating, it will come into mesh almost instantly, and the purpose of permitting the gear thus to yield in case of lateral collision of the pinion therewith is that thereby the operating connections are not strained during the instant of collision, as is liable to happen when no provision is made for such yielding of the gear, because the operator is liable to move the stop so quickly and forcibly that bending of the connections or distortion or dislocation of the gear or pinion may be caused before the continuing rotation of the pinion brings it into mesh. For operating the rock-shaft H it has a lever-arm H<sup>3</sup>, which extends down through the stop-board and below the latter is connected by a link J with a stop-rod K, which extends up through the stop-board and through a slotted plate held mounted on the top of the board, above which said stop-rod has a thumb-nut M, operating on the reduced and threaded terminal rod K to clamp the rod to the stop-plate at any point to which it may be adjusted. In case the perforated controlling-sheet is irregular or warped so that the lines of perforations do not run true the operator holding the stop-rod K by means of a thumb-nut and having the latter slacked, so as not to clamp it to the plate, can shift the rolls back and forth the small

amount necessary to keep the perforations of the controlling-sheet registering with the ducts of the tracker-board. Ordinarily it will be sufficient to adjust the rolls when the controlling-sheet is first put in place and clamp the nut M to hold the rolls in the position to which they may be thus adjusted.

To diminish the friction that might be caused between the fingers H' and H<sup>2</sup> and the collars F and G, respectively, these fingers may be provided with an antifriction-roll h' h<sup>2</sup>, respectively, whose axes are substantially radial to the shafts F and H, respectively, the rolls being convex outwardly in radial section, so as to present their surfaces properly to the flanges at the different angles at which the pressure may be exerted in the different adjustments of the rock-shaft H.

I claim—

1. In an automatic musical instrument or player, in combination with a fixed tracker-board, a controlling-sheet cooperating therewith; rolls by which said sheet is propelled; shafts or spindles by which the rolls are carried and rotated, movable longitudinally in their respective bearings; springs which yieldingly resist the movement of said shafts respectively in opposite directions, and means for moving the shafts at will against the action of their respective springs.
2. In an automatic musical instrument or player, in combination with a controller-sheet roll or spool and supports for the same two springs acting in opposition to each other for longitudinal pressure on the spool, and means by which such pressure is transmitted to the spool.
3. In an automatic musical instrument or player, in combination with a controller-sheet take-up and rewind rolls or spools and supports for the same; springs which act in opposition to each other for longitudinal pressure upon both rolls, and means for transmitting such pressure to the rolls.
4. In an automatic musical instrument or player, in combination with a controller-sheet, roll or spool and supports for the same, two springs acting in opposition to each other for longitudinal pressure on the spool; means by which such pressure is transmitted to the spool interposed between one of the springs and the spool, and means for adjusting said interposed element.
5. In an automatic musical instrument or player, in combination with a controller-sheet roll or spool and supports for the same, two springs acting in opposition to each other for longitudinal pressure on the spool; means by which such pressure is transmitted from one of the springs to the spool, said transmitting means being movable with and in opposition to the pressure of the spring, and means for securing it in adjusted position within the range of said movement.
6. In an automatic musical instrument or

player, in combination with a controller-sheet, take-up and rewind rolls and supports for the same, springs acting in opposition to each other for longitudinal pressure on the  
 5 spools, one spring being mounted for pressing one of the spools longitudinally in one direction and the other for pressing the other  
 10 spool longitudinally in the opposite direction, and connections by which the pressure of each spring is transmitted to the other  
 15 spool.

7. In an automatic musical instrument or player, in combination with a controller-sheet, take-up and rewind rolls or spools, a  
 15 spring acting upon one of the spools for longitudinal pressure in one direction, and a second spring acting upon the other spool for longitudinal pressure in the opposite direction; connections for transmitting the pressure of each spring to the opposite end of the  
 20 other roll from that at which the other spring acts on such other roll, said connections being adjustable and adapted to be secured in adjusted position to limit the pressure transmitted from either spring to the opposite roll.  
 25

8. In an automatic musical instrument or player, in combination with controller-sheet, take-up and rewind rolls, shafts or spindles for rotating said rolls, and springs mounted  
 30 for pressure longitudinally in opposite directions upon the respective shafts or spindles; flanges on said shafts or spindles adapted for lateral pressure; connections between the  
 35 two shafts or spindles mounted for lateral pressure on such flanges at opposite sides thereof respectively in opposition to the pressure of the respective springs, and means for adjusting and securing said connections to limit the transmission of the pressure of the  
 40 springs in opposition to each other.

9. In an automatic musical instrument or player, in combination with controller-sheet take-up and rewind rolls or spools, supporting bearings or spindles for the same and

springs acting upon the supporting bearings  
 45 or spindles at the opposite ends of said rolls respectively for pressing them in opposite directions longitudinally; connections between the spring-pressed bearing or spindle of one  
 50 roll and the bearing or spindle of the corresponding end of the other roll for transmitting the pressure of one spring-pressed part to the other, and means for adjusting and securing said connections.

10. In an automatic musical instrument or  
 55 player, in combination with controller-sheet take-up and rewind rolls or spools, bearings or spindles for supporting the same; springs acting for pressure longitudinally with respect to the rolls; a rock-shaft extending  
 60 transversely of the spindles at one end of the rolls having lever-arms by which it engages said spindles or bearings for pressure thereon in opposite directions opposed to the pressure of the springs respectively, and means  
 65 for rocking and securing said shaft.

11. In an automatic musical instrument or player, in combination with the controller-sheet take-up and rewind rolls or spools, spindles or bearings for supporting the same; springs acting for longitudinal pressure in  
 70 opposite directions upon the spindles or bearings of the respective rolls; connections for engaging the spindles or bearings at the same end of the two rolls adapted for moving said  
 75 spindles respectively in opposite directions against the pressure of the respective springs; an adjustable stop for moving said connections and means for securing said stop in adjusted position.  
 80

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 22d day of May, A. D. 1905.

PAUL BROWN KLUGH.

Witnesses:

CHAS. S. BURTON,  
 J. S. ABBOTT