March 27, 1928. 1,664,010

E. H. WELCH

MUSIC TIME COUNTING DEVICE

Filed Jan. 22 1925 2 Sheets-Sheet 1

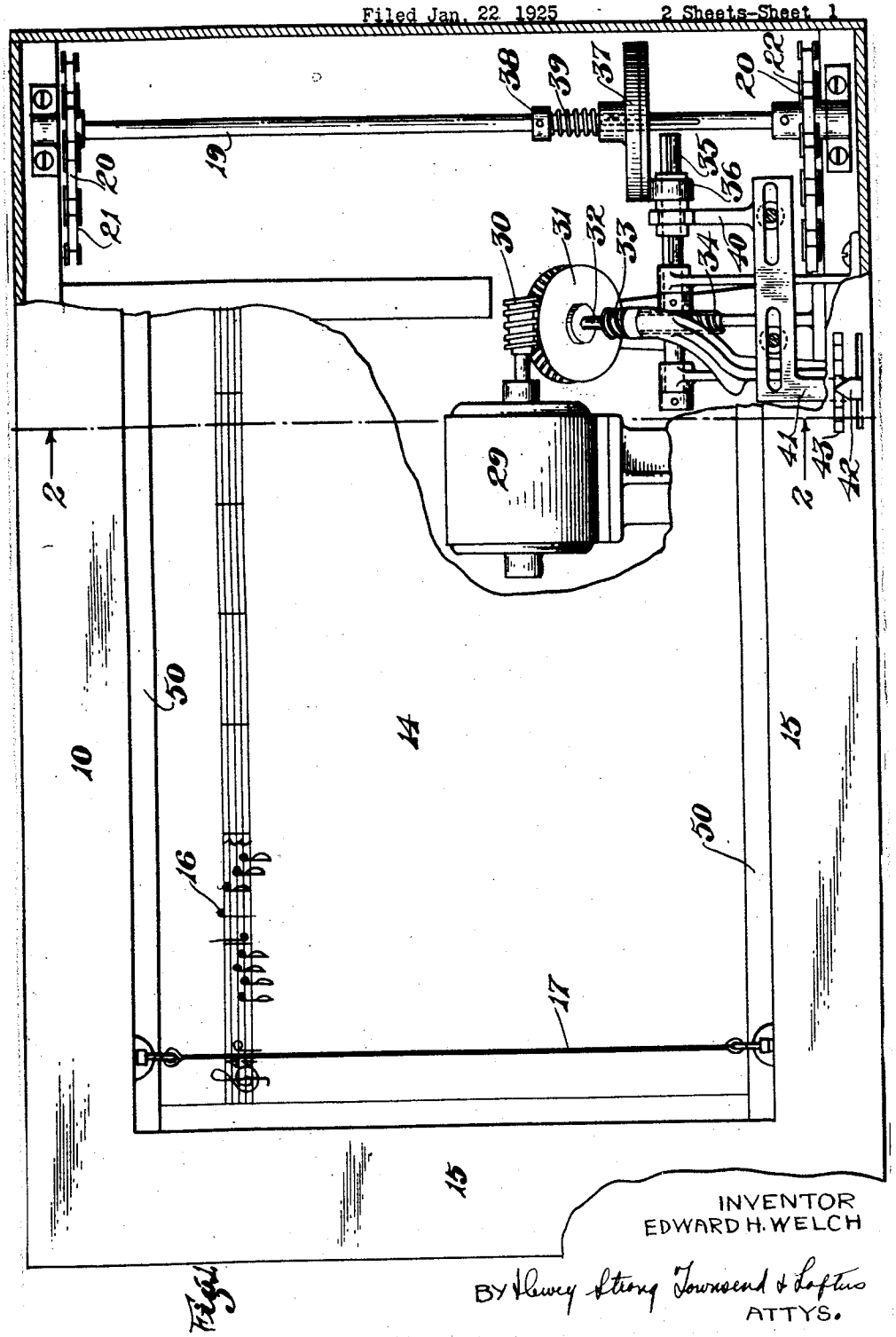


Fig. 1.

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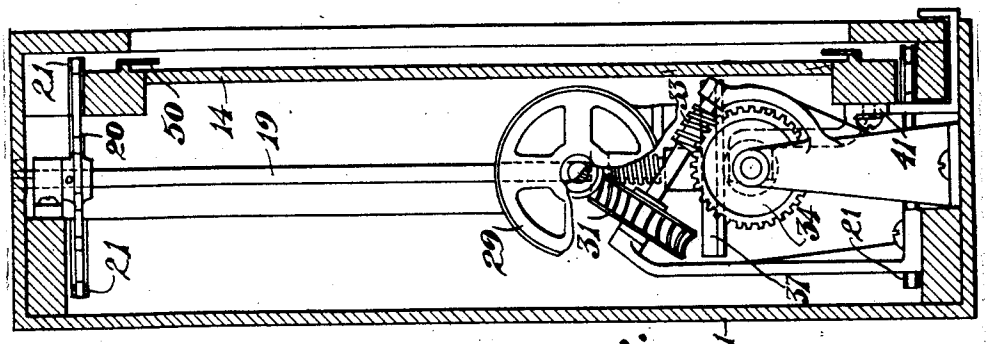


Fig. 2.

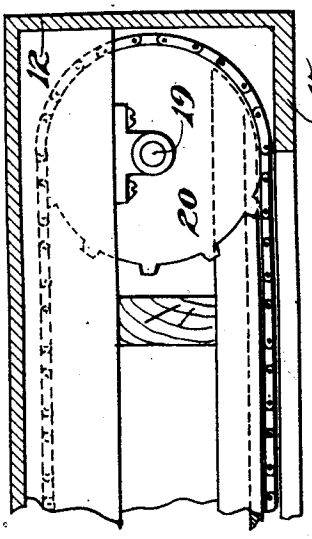


Fig. 3.

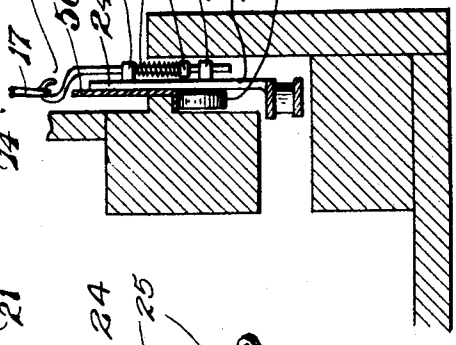
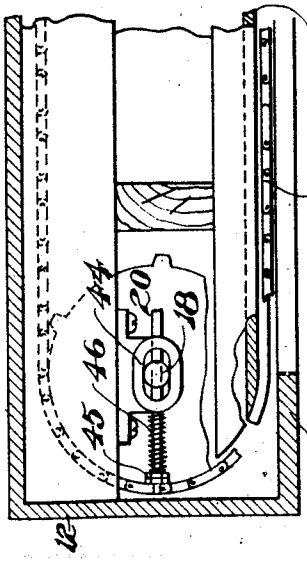


Fig. 4.



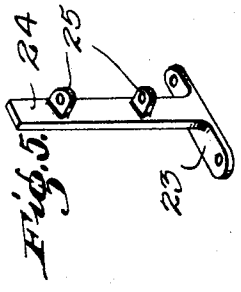


Fig. 5.

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Patented Mar. 27, 1928. 1,664,010

UNITED STATES PATENT OFFICE.

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MUSIC-TIME-COUNTING DEVICE.

Application filed January 22, 1925. Serial No. 4,032.

This invention relates to music time counting devices adapted to assist students and musicians in playing written music in correct time.

It is the principal object of the present invention to generally improve devices of the character referred to, whereby to provide a music time counting device capable of cooperating with written music to correctly indicate when each note is to be played and the length of time during which notes of various values are to be sounded.

In carrying out this object I provide written music on which the notes are spaced apart according to their value. An indicating mechanism is provided which cooperates with this written music. This mechanism is fitted with an indicator which passes at a predetermined rate of speed over the written music. As the indicator aligns with the different notes they are sounded and held until the indicator aligns with the succeeding note.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a front elevation of my improved device with parts broken away to more clearly disclose certain of the operating parts.

Figure 2 is a vertical section through the device taken on line 2—2 of Fig. 1.

Figure 3 is a plan section taken just below the top portion of the case.

Figure 4 is an enlarged view of the connection between the indicating wires and the continuous chains.

Figure 5 is a detailed perspective view of the clips which are employed to connect the indicating wires to the continuous chains.

Referring more particularly to the accompanying drawings, 10 indicates a suitably constructed cabinet having a back panel 11, sides 12 and a music rack 14. This latter is set slightly within the front of the cabinet and is surrounded by front panels 15. These panels 15 are secured to the marginal edges of the cabinet to conceal the mechanism within the latter.

The written music for use in connection with my improved mechanism is disclosed in simple form in Fig. 1 of the drawings. The notes are imprinted on the staff at distances apart corresponding to their value. For example, if the note 16 is a quarter note the distance between it and the succeeding note will be twice what it would be if it were an eighth note. In the present instance, I have arranged the spacing between the notes to correspond with fractions of an inch. Each measure being two inches long for four-four time. The notes are placed at distances dividing the measure according to their value. In Fig. 1 the first measure is composed of a half note placed adjacent the bar. As this note should be held half the time of the measure, the succeeding note is placed at the center of the measure. The remaining notes are eighth notes and the spaces between them are equal to one-eighth the length of the measure.

Regardless of the value of the note, the distance between it and the succeeding one equals that portion of the measure which the value of the note represents.

To indicate to the user of the device when each note is to be played and how long each note should be sounded, I have provided a plurality of indicating wires 17. These wires extend vertically and are adapted to pass in a horizontal direction over the written music during certain portions of their cycle of operation.

The indicating wires pass over the written music from left to right. When the first indicating wire aligns with the bar of the first measure, the first note is played and sounded until the wire aligns with the second note and so on. When the wire reaches the last bar, the succeeding wire aligns with the first bar and the second line of the music may be played.

In the present instance three indicating wires spaced equal distances apart are employed. However, the number of wires used depends upon the size of the rack and the width of the written music to be played.

To operate the indicating wires 17, I arrange vertical shafts 18 and 19 within opposite ends of the cabinet. The ends of these shafts are equipped with sprocket gears 20 over which endless chains 21 and 22 are led. From Figure 2 it is apparent that these chains are disposed one at the top and one at the bottom of the cabinet and that they are disposed in a horizontal plane.

The indicating wires 17 are connected at opposite ends to the pair of chains by a connection shown in Figure 4. Reference being had to this figure it will be seen that a clip 23 is substituted for one of the chain links and is formed with a flat portion 24 which

extends vertically. This portion 24 is formed with bearing ears 25 in which the shank of a hook 26 is slidably mounted. The shank of this hook is fitted with a shoulder 27 between which and one of the bearing ears an expansion spring 28 is interposed. The hooked end of the hook is connected with the indicating wire.

It is obvious that as the hooks on the upper and lower chains are spring pressed in opposite directions, the wires 17 will be maintained taut.

It should be stated that the shaft 19 is the chain drive shaft and the sprockets at its ends are fixed thereon. The shaft 19 is driven through a variable speed transmission by an electric motor 29 mounted within the cabinet. The shaft of this motor 29 is fitted with a worm 30, which meshes with a worm gear 31. This worm gear is fixed on a shaft 32 which is fitted with a worm 33, which is in mesh with a worm gear 34 fixed on a counter shaft 35. A friction pinion 36 is feathered on this counter-shaft in a position where it will engage the friction surface of a friction gear 37 which is feathered on the chain drive shaft 19. To insure a correct amount of friction between the friction pinion and gear, a collar 38 is pinned on the drive shaft 19. Interposed between this collar and the gear 37 is an expansion spring 39 which constantly tends to press the gear in firm engagement with the friction pinion on the counter-shaft.

To change the speed of the indicating wires 17 the friction pinion 36 may be adjusted radially of the friction gear. To accomplish this I connect a shifting yoke 40 to the friction pinion 36. This yoke 40 is slidably connected to the cabinet frame and is provided with a lever 41 which extends through the front of the cabinet and is bent to form a pointer 42. This pointer cooperates with a calibrated scale 43 which will indicate the speed of the indicating wires 17 when the pointer is in a set position. By moving this pointer laterally of the cabinet, the friction pinion 37 will be adjusted radially with respect to the friction gear 38 and the speed ratio between the counter-shaft and the chain drive shaft 19 will be correspondingly changed.

The sprockets on the chain shaft 18 are idler sprockets. This shaft is supported in bearings 44, which are constructed in a manner permitting spring tension to be placed on the pair of continuous chains through the shaft and the idler sprockets thereon. The construction of these bearings is disclosed in Figure 3 where it will be seen that the bearings are formed with a slotted opening in which the ends of the shaft are mounted. The ends of the shaft are fitted with transverse pins which extend laterally through the bearings and are fitted at their outer ends with nuts 45. Expansion springs 46 are interposed between the nuts at the ends of these transverse pins and the bearing so as to place the continuous chains under tension.

In operation of the device, a sheet of music upon which the notes are laid off as described, is arranged on the music rack with its upper and lower edges inserted in upper and lower guides 50 secured on the rack. The outer edges of these guides act as tracks upon which rollers 51 bear. These rollers are carried by the connections between the indicating wires and the chains and prevent the chains from sagging at points intermediate the sprockets.

It is obvious that all the mechanism is concealed by the front panels with the exception of the indicating wires. By arranging the music rack slightly within the front of the cabinet, the wires 17 will pass over the music rack in succession.

When the motor is started the friction pinion 37 may be adjusted relatively to the friction gear 38 to obtain the desired speed. The device is then ready for use. The person using the device sounds each note when the indicating wire reaches it and holds the sound until the wire aligns with the following note. This will give the proper and exact length of time in which each note is intended to be sounded throughout the entire piece. The first note following the bar at the beginning of each measure is to be sounded when the indicating wire reaches the bar. When the wire reaches the end of the last bar another of the wires will have aligned with the beginning of the first bar so that the line may be repeated or a second line played in correct time.

It is to be understood that other driving means may be substituted for the electric motor. For example, a spring motor may be used if desired. Also, a hand crank may be fitted to the shaft 19 if desired. I have arranged for this by forming a squared portion on the upper end of the shaft 19 which may be engaged by a hand crank if desired. In such a case the friction pinion 37 is thrown out of mesh with the friction gear 38.

It is obvious that by the provision of my improved device, students and musicians may be taught to play music in absolutely correct time.

While I have shown the preferred form of my invention, it is to be understood that various changes in its construction may be made without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A music time counter comprising a

music rack upon which music may be arranged with the staffs disposed longitudinally of the rack, a pair of continuous chains disposed one at each side of said music rack and parallel with the staffs on the music, indicating members extending between said chains over said rack and the music thereon whereby said indicating members will indicate the notes on each staff of the music on the rack, said indicating members being disposed at equally spaced distances apart, spring-pressed connections connecting the ends of the indicating members to the chains whereby the indicating members will be under tension and will not vibrate during the operation of the device, the connections at the opposite ends of said indicating members and the chains being spring-pressed in opposite directions, and means for operating said chains in unison at a desired rate of speed.

2. A music time counter comprising a music rack upon which music is to be arranged with the staffs extending longitudinally of the rack, a pair of continuous chains disposed one at each side of the music rack and parallel with the staff of the sheet music arranged on the rack, indicating wires extending transversely across the rack, hooks connecting the opposite ends of the wires to the chains, the hooks of each wire being spring-pressed in opposite directions to place said wires under tension whereby to prevent them from vibrating during the operation of the device, and means for driving said chains in unison at a desired rate of speed.

3. A music time counting device comprising a music rack upon which a sheet of music may be arranged in a manner that the staffs thereon will be arranged longitudinally of the rack, a pair of continuous chains disposed in parallelism one at each side of the music rack and parallel with the staffs on the sheet of music on the rack and in substantial alignment therewith, indicating wires extending between said chains and transversely across said rack at equally spaced intervals, spring-pressed means connecting the ends of said wires to said chains and maintaining said wires taut, spring means for automatically taking up the slack in the chains, and a variable speed transmission for transmitting motion to said chains to operate them in unison.

4. A music time counter comprising a music rack, a pair of continuous chains lying at opposite sides of said rack with one side parallel to and substantially in alignment with one surface of the rack, indicating wires extending between said chains at equally spaced intervals to pass over the surface of the rack when the chains are in motion, spring pressed means connecting the ends of said wires to said chains and maintaining said wires taut, spring means for automatically taking up slack in the chains and a variable speed transmission for transmitting motion to said chains to operate them in unison, said variable speed transmission comprising a chain drive shaft common to both chains, a friction gear fixed on said shaft, a motor, a counter-shaft driven by said motor, a friction pinion feathered on the countershaft to engage said friction gear, and means for shifting said pinion radially of the gear to change the ratio between the countershaft and the chain drive shaft.

5. A music time counter comprising a cabinet, a music rack disposed within the front of the cabinet, a pair of parallel guides adjacent the top and bottom of said rack, a pair of continuous chains disposed in a horizontal plane within the cabinet and one at the top and one at the bottom of the rack and with one side disposed parallel to and substantially in alignment with one surface of the rack, indicating wires connected at opposite ends to said chains at spaced distances apart to pass over the surface of the rack when the chains are in motion, rollers at the ends of the wires bearing on said guides to prevent sagging of the chains, a chain drive shaft common to both chains, and means for driving said shaft at a desired rate of speed.

6. A music time counter comprising a cabinet, a music rack disposed within the front of the cabinet, a pair of parallel guides adjacent the top and bottom of said rack, a pair of continuous chains disposed in a horizontal plane within the cabinet and one at the top and one at the bottom of the rack, indicating wires connected at opposite ends to said chains at spaced distances apart, said chains being positioned relative to the rack so that the wires will pass over the front of said rack when the chains are operated, rollers at the ends of the wires bearing on said guides to prevent sagging of the chains, a chain drive shaft common to both chains, a friction gear fixed on said shaft, a motor, a countershaft driven by the motor, a friction pinion feathered on the countershaft in engagement with the gear, and means operative from the exterior of the cabinet for shifting said pinion radially of the gear to change the speed ratio between the gear and pinion.

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