No. 745,424. PATENTED DEC. 1, 1903.

G. H. DAVIS.

TRACING MACHINE.

APPLICATION FILED JAN. 3, 1903.

NO MODEL.

Fig. 1.

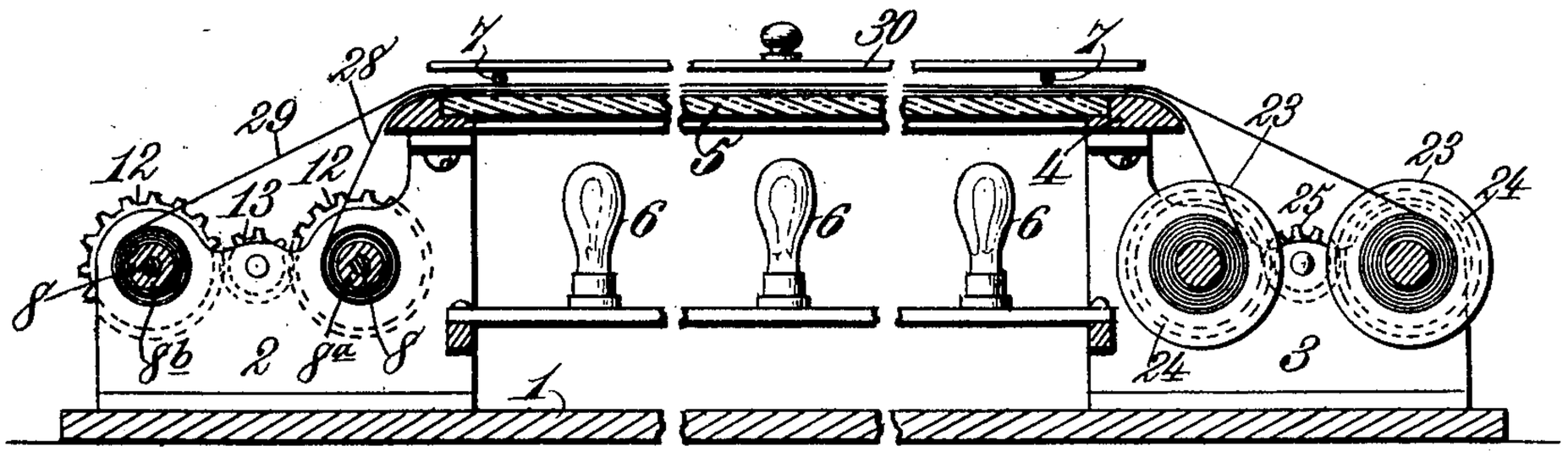


Fig. 2.

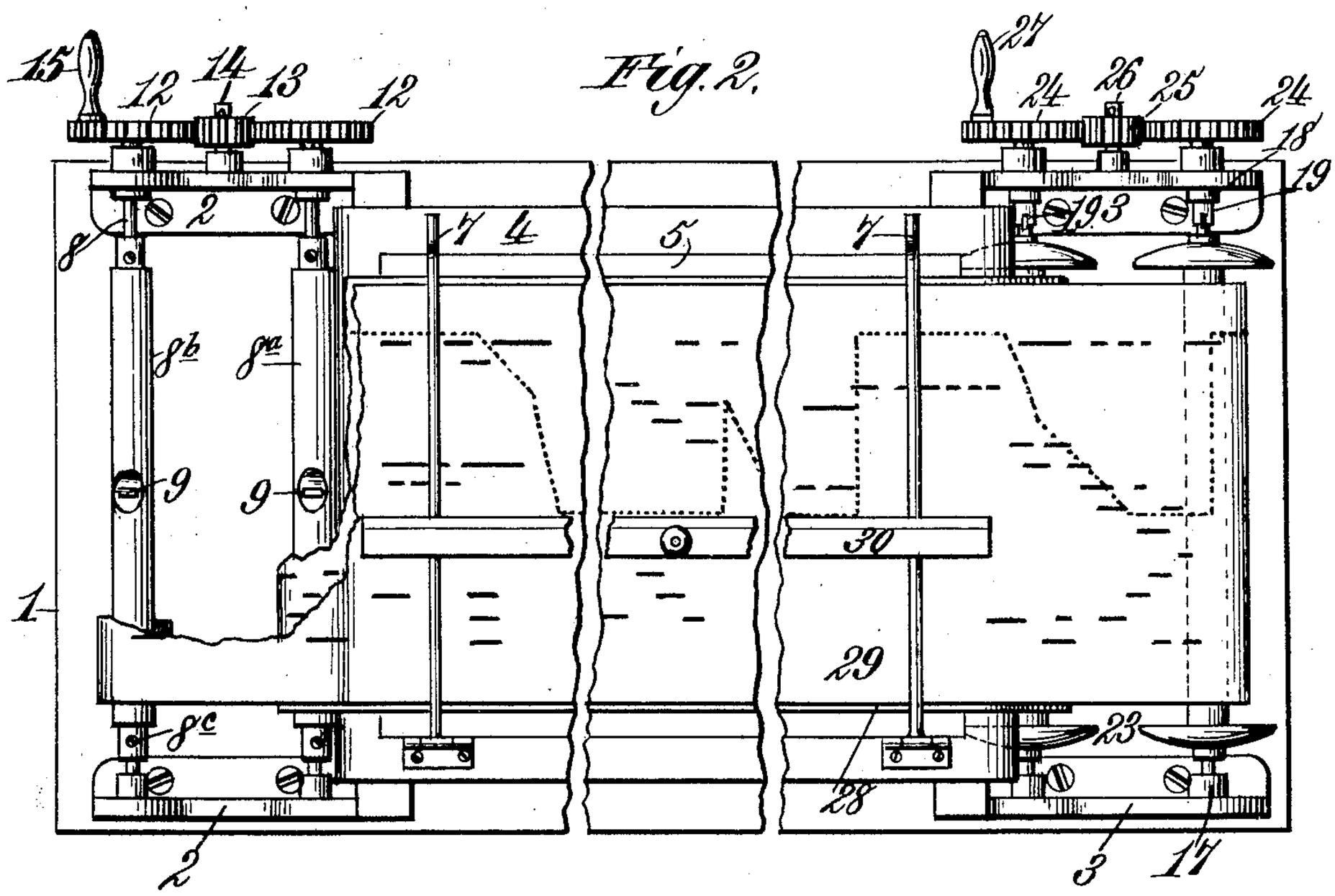
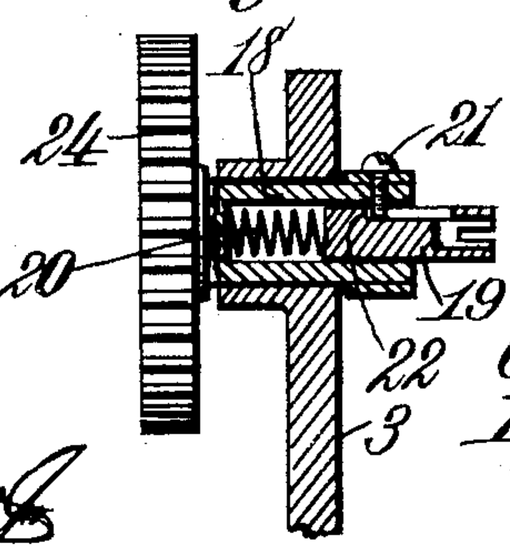


Fig. 3.



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No. 745,424. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

GEORGE HOWLETT DAVIS, OF WEST ORANGE, NEW JERSEY.

TRACING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 745,424, dated December 1, 1903.

Application filed January 3, 1903. Serial No. 137,686. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOWLETT DAVIS, a citizen of the United States, residing at Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Tracing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to an improved apparatus designed principally to facilitate the marking or tracing of expression-lines on perforated music-sheets employed in connection with self-playing musical instruments, although it may be employed and will be found useful in other fields of work where it is desired to make tracings of subjects contained on long pattern-sheets.

As is well-known in the art, perforated music-sheets for controlling the operation of the sound-producing devices in self-playing musical instruments are usually provided on one face with a zigzag line or dotted line, which line indicates to the operator or performer what particular expression devices are to be actuated at a particular time to obtain varied musical effects in playing; and it is the object of this invention to provide a simple and easily-operated apparatus to facilitate the copying or tracing of such zigzag expression-lines upon a perforated music-sheet, the said copy or tracing being taken from what is usually termed a "master-sheet"—that is, a sheet upon which the zigzag expression-line has been previously laid out in an accurate manner. Heretofore and prior to my present invention it has been the usual custom in marking these expression-lines on music-sheets to first provide a sheet with a perforated zigzag line, termed a "stencil," such stencil being, of course, as long as the perforated music-sheet to be marked. The music-sheet is then laid full length upon a long table with the perforated stencil superposed thereon, and a hand-operated inking or impression roller is then run over the zigzag line of perforations in the stencil, which results in imprinting upon the music-sheet a zigzag line corresponding to the zigzag perforations in the stencil. As will be apparent, this operation is not only slow and tedious, requiring the use of long tables in carrying out the printing operation, but it necessitates, in the first instance, the making of the stencil-sheet, which is made by punching out the line of perforations singly by a hand-punch, which operation is slow, tedious, and costly. By my present invention I do away entirely with a perforated stencil-sheet, which at once reduces the first cost in the marking of these music-sheets, and, secondly, I am able to dispense with the use of the long tables upon which the printing is done according to the old method.

Briefly and generally stated, my invention comprises a transparent plate or surface, means, such as delivery-spools, for supporting a master-sheet and a music-sheet at one end of said transparent plate, means, such as take-up rolls, at the other end of said plate upon which said sheets may be wound, and means for simultaneously rotating said spools and rolls, so as to enable the sheets to be moved together in either direction.

The invention comprises other novel features in the construction of the apparatus, which will be hereinafter described and then more definitely pointed out in the claims following the detailed description.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of the apparatus described. Fig. 2 is a top plan view, and Fig. 3 is a detail sectional view, of one of the yielding sockets for the music-sheet spools.

Referring now to the drawings, the reference numeral 1 designates a base, having at each end thereof on opposite sides brackets 2 2 3 3, said brackets being of any preferred construction. Supported upon these brackets is a frame 4, preferably made of wood and having its opposite ends beveled, as shown in Fig. 1 of the drawings. The said frame 4 carries a transparent plate or surface 5, preferably of glass, although other transparent material may be employed, and below the said transparent plate or surface I prefer to arrange one or more lamps 6, electric lamps being shown in the present instance, although it will be obvious that any suitable form of lighting device may be employed. Hinged to the top of the frame 4, at one side thereof, are

two rods or supports 7, which rods extend across the face of the transparent plate 5, as more clearly shown in Fig. 2 of the drawings. The purpose of these rods 7 will be hereinafter more particularly explained.

Journaled in the brackets 2 are shafts 8, upon which are rotatably mounted rolls or sleeves 8^a 8^b, each of which is provided with a hook 9, to which may be attached one end of the master-sheet and music-sheet, respectively. The rolls or sleeves 8^a and 8^b are rotatably mounted upon the shafts 8 for a purpose presently to appear and may be secured to said shafts, so as to rotate therewith by means of set-screws 8^c. Upon one end of each of the shafts 8 is a gear-wheel 12, which gear-wheels are in mesh with an intermediate gear 13, mounted upon a stub-shaft 14, projecting from one side of one of the brackets 2. One of the gear-wheels 12 is provided with a handle 15, as shown, and the construction is such that upon turning the handle 15 said gear-wheels 12 will be rotated in unison to wind the master and music sheets upon the rolls.

One of the brackets 3 at the opposite end of the machine is provided with two socket-pieces 17, and the other bracket is provided with rotary bearings 18, in each of which is rotatably mounted a yieldable socket-pin 19, said pin being normally forced outward by means of a spring 20, said outward movement being limited by means of a screw 21, abutting against a shoulder 22 on the said socket-pin, all as more clearly shown in Fig. 3. The said socket-pieces 17 and socket-pins 19 are constructed to removably receive a flanged journal-pin on the spools 23, upon which are mounted, respectively, the master-sheet and the sheet to be marked or traced. On the outer end of each rotary bearing 18 is fixed a gear-wheel 24, which gear-wheels mesh with an intermediate gear 25, mounted upon a stub-shaft 26. One of the gears 24 is provided with a handle 27, by means of which both of the gears 24 may be rotated in unison.

In operation the spool 23, containing the master-sheet 28, is placed in its bearings, and one end is drawn over the transparent plate or surface 5 and secured to the hook 9 on the roll 8^a. In a like manner the perforated music-sheet 29, upon which the zigzag line is to be traced, is mounted in its bearings and the forward end drawn over the master-sheet 28 and transparent plate 5 and secured to the hook 9 on the roll 8^b. The rods or supports 7 are then moved over flat upon the music-sheet and master-sheet and serve to hold the same smoothly upon the transparent plate 5. A straight edge or ruler 30 is then placed upon the rod 7, which serves to support the same out of surface contact with the music-sheet to be marked or traced. Any suitable marking device may be employed in connection with the apparatus. When the music-sheet and master-sheet are in place, as above indicated, it will be apparent that the zigzag line, or, in fact, any line or mark upon the master-sheet, can be seen through the music-sheet and an absolutely correct tracing or copy made thereof on the music-sheet. As the lines or marks are traced the two sheets are moved simultaneously, or, in other words, are wound upon the rollers 8^a and 8^b by simply rotating the gears 12 through the medium of the handle 15. This operation continues until the tracing operation is complete, which will leave both the master-sheet and the music-sheet upon the rolls 8^a and 8^b. In order to rewind the sheets upon the spools 23, it is simply necessary to rotate the gear 24 in a reverse direction through the medium of the handle 27. When the sheets are entirely rolled upon the spools, the spool containing the music-sheet may be removed and a new one substituted therefor and the operation repeated.

While I have shown and described the transparent plate 5 as being mounted in a horizontal position above the lamps 6, it will be obvious that I may mount the transparent plate on an incline and dispense entirely with the lamps, the particular manner in which the transparent plate 5 is mounted not being an essential feature of the invention.

It is important that the rolls or sleeves 8^a and 8^b be rotatably mounted upon the shafts 8, so that more or less of the music-sheet or the master-sheet, as the case may be, may be "taken up" at the commencement of the tracing operation in order to bring the perforations of the two sheets in true and accurate register, and thus cause the zigzag line to be traced at the proper points along the sheet relatively to the music-perforations.

Having described my invention, what I claim is—

1. In a machine of the class described, a flat transparent surface over which may be moved a master-sheet and a sheet to be marked, means for holding said sheets in flat contact upon said surface, and means for simultaneously moving said sheets over said transparent surface.

2. In a machine of the class described, a transparent surface over which may be moved a master-sheet and a sheet to be marked, take-up rolls for said sheets, and means for simultaneously rotating said rolls at a uniform speed to cause the sheets to move together.

3. In a machine of the class described, a transparent surface over which a master-sheet and a sheet to be marked may be moved, separate delivery and take-up rolls for said sheets, and means for rotating said rolls at a uniform speed.

4. In a machine of the class described, a transparent surface over which a master-sheet and a sheet to be marked may be moved, separate delivery and take-up rolls for said sheets, and means for simultaneously rotating said rolls at a uniform speed.

5. In a machine of the class described, the

combination with a transparent surface, of a pair of delivery-rolls removably mounted in bearings at one end of said surface, and intermediate gearing between said rolls to cause the latter to rotate together at a uniform speed.

6. In a machine of the class described, the combination with a transparent surface, of a pair of fixed and a pair of rotary socket-bearings arranged at one end of said surface, and means for simultaneously rotating said rotary bearings at a uniform speed.

7. In a machine of the character described, the combination with a transparent surface, of a pair of fixed and a pair of rotary socket-bearings arranged at one end of said transparent surface and a train of intermeshing gears connecting said rotary socket-bearings to cause the latter to rotate at a uniform speed.

8. In a machine of the character described, the combination with a transparent surface, of a pair of rotary shafts journaled in bearings at one end of said surface, a roll mounted upon each shaft, one of said rolls being rotatably adjustable relative to the other roll, a hook carried by each roll, and means for securing said adjustable roll to its shaft in any of its positions of adjustment.

9. In a machine of the character described, the combination with a transparent surface, of a pair of rotary shafts journaled in bearings at one end of said surface, a roll rotatably adjustable upon each of said shafts, means for securing each roll to its shaft, and means for causing the said shafts to rotate together at a uniform speed.

10. In a machine of the character described, the combination with a transparent surface unobstructed from above, of a pair of independently rotatable rolls located at one end of said surface, means for securing each roll in its adjusted position relative to the other roll, means carried by each roll for attaching thereto one end of a sheet, and intermediate gearing between said rolls for simultaneously rotating them at a uniform speed.

11. In a machine of the class described, the combination with a transparent surface, of a pair of rotary shafts journaled in bearings at one end of said surface, a roll rotatably adjustable upon each shaft, means for simultaneously rotating said shafts at a uniform speed, and socket-bearings at the other end of said transparent surface adapted to receive spools.

12. In a machine of the class described, a transparent surface over which a master-sheet and a sheet to be marked may be moved, hinged supporting-rods adapted to rest upon said surface, and delivery and take-up rolls for the sheets mounted respectively at opposite ends of said transparent surface.

13. In a machine of the class described, a transparent surface over which a master-sheet and a sheet to be marked may be moved, supporting-rods hinged to said transparent surface and adapted to be brought to rest upon said sheets, a pair of rolls at each end of said transparent surface, upon which said sheets may be wound and unwound, and means for simultaneously rotating each pair of rolls.

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

G. HOWLETT DAVIS.

Witnesses:
H. B. SEYMOUR,
HOWARD L. LOWE.