

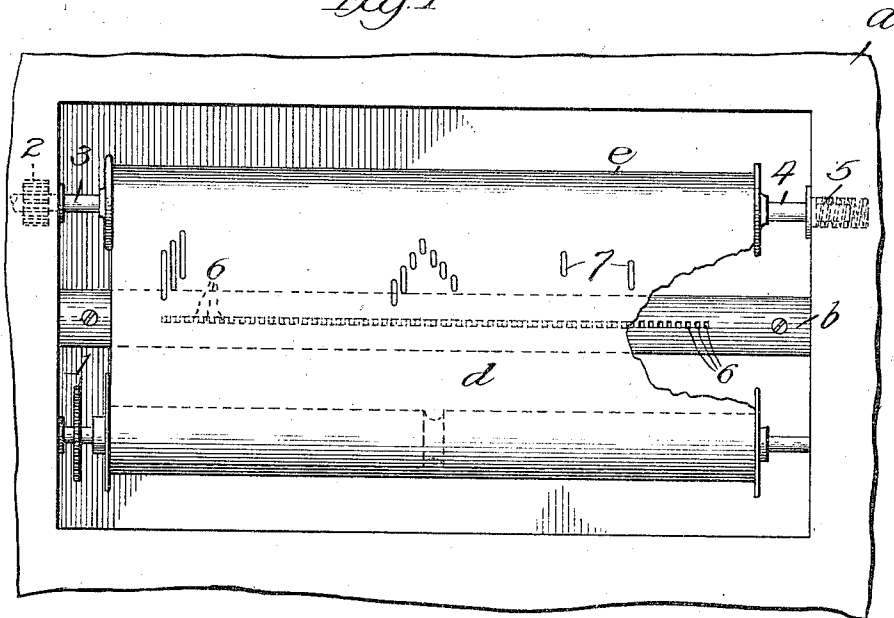
A. A. FRIESTEDT.  
NOTE SHEET SPOOL.  
APPLICATION FILED OCT. 29, 1910.

1,043,173.

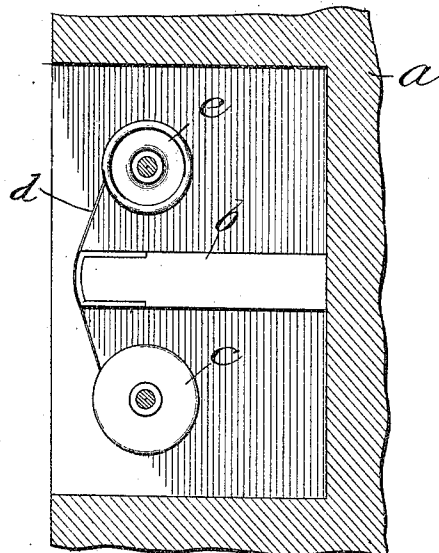
Patented Nov. 5, 1912.

2 SHEETS—SHEET 1.

*Fig. 1*



*Fig. 2*



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2 SHEETS—SHEET 2.

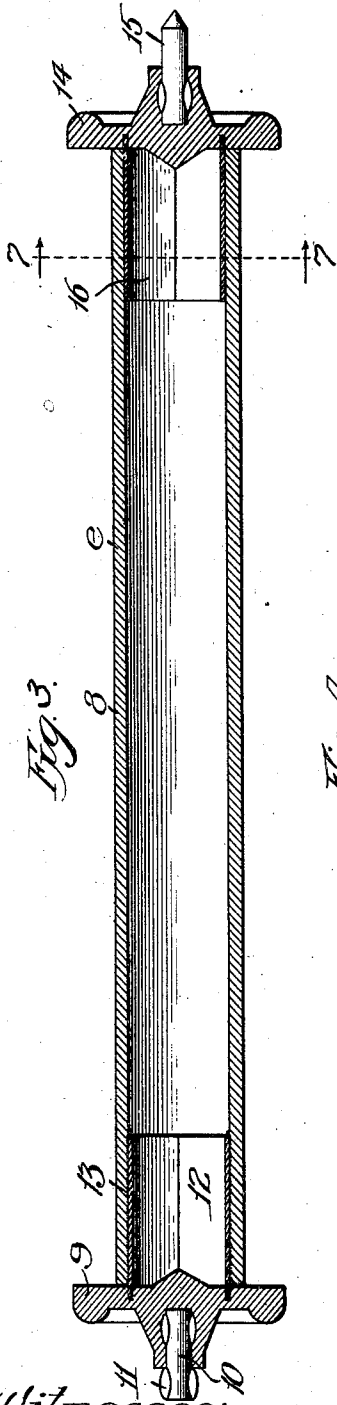


Fig. 3.

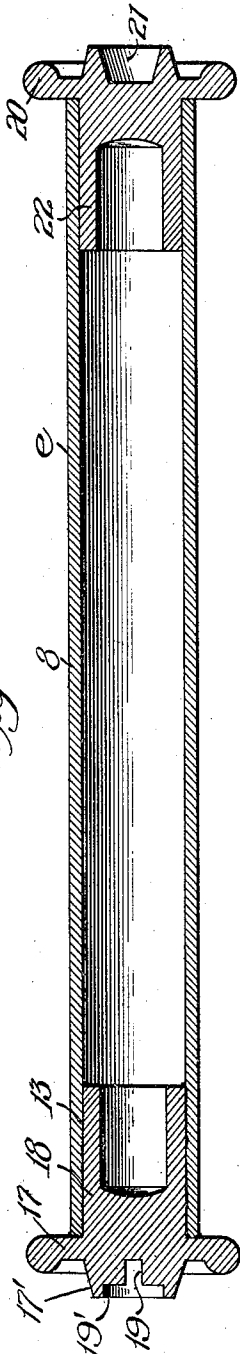


Fig. 4.

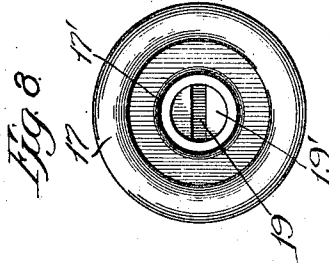


Fig. 5.

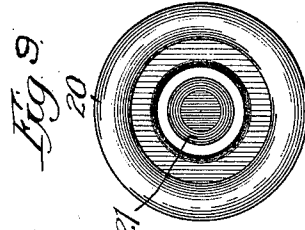


Fig. 6.

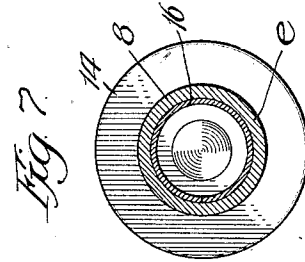


Fig. 7.

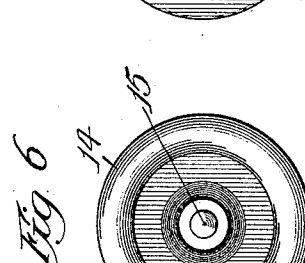


Fig. 8.

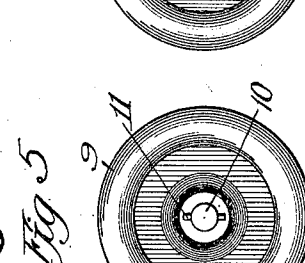


Fig. 9.

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# UNITED STATES PATENT OFFICE.

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## NOTE-SHEET SPOOL.

1,043,173.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed October 29, 1910. Serial No. 589,664.

*To all whom it may concern:*

Be it known that I, ARTHUR A. FRIESTEDT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Note-Sheet Spools, of which the following is a specification.

This invention pertains to note-sheet spools of the character designed and adapted for use in connection with piano-players, player-pianos, orchestrions and other automatic musical instruments, and aims to produce a spool which shall possess advantageous characteristics and embody certain novel features of construction to be hereinafter more fully set forth.

One of the objects of the present invention is the provision of a note-sheet spool which will deliver the note-sheet across the tracker-board of the instrument in absolute alinement and with invariable accuracy and precision, thereby eliminating from automatic players of the character indicated the tracker mechanism which has heretofore been considered a necessary adjunct to all machines of this character utilizing perforated note-sheets.

Another object is to provide a spool, the driving head of which will be impervious and relatively inexpandible so that it will be unaffected by changes in atmospheric conditions, such as changes both in temperature and humidity.

Additional objects are, to provide a spool of strong and durable construction which shall be cheaper to manufacture and of more ornate appearance than any spool heretofore constructed and the heads of which shall be hard, smooth and unyielding so as not to mutilate or in any way injure or interfere with the edges of a note-sheet which is being wound on or unwound from the spool.

Other objects and advantages of this invention will become apparent as it is better understood by reference to the following description when taken in connection with the accompanying drawings illustrating preferred embodiments thereof.

Referring to the drawings—Figure 1 is a front elevation of so much of an automatic musical instrument as is necessary to an understanding of my invention. Fig. 2 is an end elevation thereof. Fig. 3 is a longitudinal sectional view of one type of spool

embodying my invention. Fig. 4 is a similar view of a modification thereof. Fig. 5 is an end elevation looking at the driving end of the spool shown in Fig. 3. Fig. 6 is a similar elevation of the opposite end of the spool shown in Fig. 3. Fig. 7 is a sectional view on the line 7—7 of Fig. 3; Fig. 8 is an end elevation looking at the driving end of the spool shown in Fig. 4; and Fig. 9 is a sectional view looking at the opposite end of the spool shown in Fig. 4.

On the drawings, referring particularly to Figs. 1 and 2 thereof, *a* designates the frame or body of any well known or preferred type of musical player, said frame having fixedly secured thereto the ordinary tracker-board *b*. The usual winding roll *c* upon which the perforated note-sheet *d* is wound during the operation of the instrument, is rotatably mounted in suitably fixed bearings carried by the frame. The note-sheet is delivered across the tracker-board from a note-sheet spool which I have designated generally as *e*.

Suitable driving mechanism (not shown) is adapted to mesh with the gear 1 secured on the winding-roll shaft to impart a positive rotation to the roll when the instrument is operated. A gear 2 or other device adapted to be operated by the driving mechanism, is secured upon driving spindle 3 for the purpose of positively rotating the note-sheet spool to rewind the note-sheet onto the spool from the winding roll. The opposite end of the spool is supported by a spindle or pintle 4 which is urged into engagement with the end of the spool by an expansion spring 5.

The mechanism which has thus far been described in a general way is of usual construction and may be patterned after any of the well known types. The driving gears 1 and 2 in the present instance are shown as located at the left side of the instrument but obviously they might be, and in many types of instruments are, located at the right side. In some types of instruments chain and sprocket mechanism is employed in lieu of the gears shown, but it will be understood that the particular driving mechanism employed is not of material consequence to the present invention.

In an instrument of the general character indicated the tracker-board *b* is provided with a series of openings 6 arranged longi-

itudinally of the tracker-board and in the newer types of machines these openings are spaced 9 to the inch, giving a total of 88 openings on the tracker-board sufficient to control the manipulation of the entire key-board of an ordinary piano. The note-sheet *d* is provided with the required perforations 7 which are spaced across the sheet so as to correspond with the openings in the tracker-board.

The satisfactory operation of an instrument of this character requires the note-sheet to be guided with accuracy and precision across the tracker-board so that the note-sheet perforations will exactly aline with their respective openings in the tracker-board and, because of the narrowness of the tracker-board openings and note-sheet perforations, the slightest lateral deviation of the note-sheet from its proper path will materially affect the musical qualities of the instrument. This guiding of the note-sheet so as to feed the perforations across the tracker-board in exact alinement with their respective openings, is accomplished in my invention by the note-sheet spool alone; whereas, prior to this time, because of the character of the note-sheet spools heretofore in use, it has been impossible to effect a proper guiding of the note-sheet without the assistance of a special tracker mechanism.

Tracker mechanism of various kinds have been devised, the most successful, however, being constructed and arranged to effect the guiding by moving the note-sheet spool longitudinally in one direction or the other so as to rectify the sheet when laterally displaced during the operation of the instrument. In order to adjust the spool, the driving spindle 3 which is constructed to engage with the driving head of the spool has been mounted so as to be capable of longitudinal adjustment, and mechanism controlled by the lateral position of the note-sheet on the tracker-board has been provided to accomplish this longitudinal adjustment. The note-sheet spool is maintained in engagement with the driving end of the spindle 3 by the expansion spring 5 which urges the spindle 4 against the other end of the spool.

The note-sheet spools themselves, which have been in use prior to my invention, so far as I am aware, comprised a tubular body portion provided with a wooden head at each end. The deviations of the note-sheet from its proper alinement across the tracker-board necessitating the employment of a tracker mechanism, resulted directly from the structural inaccuracies and the variations resulting from the expansion and contraction, under changing atmospheric conditions, of these wooden spool-heads. My invention aims, however, to

produce a spool, the heads of which can be cast in a single operation thereby greatly reducing the time and labor required in its production and which will be of exactly the required dimensions and proportions; and furthermore, the heads of my improved spools are made of impervious and inexpandible material which will not be affected either by changes in the temperature or humidity of the atmosphere.

Figs. 3 to 8 inclusive, of the drawings illustrate two modifications of my improved spool, one of which is equipped with a feathered driving key and the other of which is provided with a key-slot. Referring more particularly to Fig. 3, 8 designates the main body portion of a note-sheet spool which is made preferably of paper, paste-board, pulp or other suitable material arranged in tubular form. The head 9, which is molded, cast or pressed, is composed of a solid piece of electrose or other impervious and inexpandible material shaped to provide a guiding flange and a hub providing an abutment at its outer end and is equipped with a feathered driving key 10 provided with feathers or wings 11 adapted to be engaged with the usual spool driving spindle 3 of a musical instrument. A cylindrical extension 12, which, in this modification is made of sheet metal, projects inwardly from the inner guiding face of the head, and is inserted in the end of the main body portion of the tube where it is rigidly secured by glue or other suitable adhesive indicated at 13. By reason of the inexpandibility of the head 9 the distance between the inner or guiding face of the flange and the abutment or end of the hub is always maintained constant so that when the abutment is positioned against a longitudinally fixed driving shoulder the guiding face will always deliver the note-sheet in the required alinement with the tracker-board. The head 14, disposed at the other end of the tubular portion of the spool and of similar composition to the head 9, is equipped with a pintle 15 adapted to turn in the usual bearing block which may be secured upon the spring-pressed spindle 4, and is likewise provided with an inwardly projecting cylindrical extension 16. This head, however, instead of being rigidly secured to the tubular portion of the spool, is slidingly and telescopically engaged therewith so that the cylindrical extension may partially withdraw from the tubular portion 8 to increase the length of the spool. Since the paper note-sheets usually employed are subject to expansion and contraction under the influence of atmospheric changes, the extensibility of the spool provided by the movability of the head 14 is very desirable, in that it permits lateral expansion of the note-sheet to take place without binding or distorting the edges of

the sheet between the inner faces of the spool-heads. The comparative freedom of movement between the cylindrical portion 16 and the main body portion of the spool permits the expansion spring 5 to yieldingly thrust the head 14 against the edge of a rolled up note-sheet so as to hold the opposite edge in contact with the inner guiding face of the head. Furthermore, if the rolled up sheet should be disarranged on the spool the head 14 may be manually reciprocated to bring the opposite edge of the sheet in contact with the driving head 9 before the spool is positioned in the instrument. The modification disclosed in Fig. 4 also comprises a tubular main body portion 8, but in this instance the heads of the spools are slightly different from those shown in Fig. 3. The head 17 in this modification is also composed of electrose or other impervious and inexpandible material and is provided with an integral cylindrical portion 18 adapted to fit within the main body portion 8. In lieu of the feathered key with which the head 9 is equipped, the hub 17' of the head 17 is provided with a shoulder or end abutment 19' and a key-slot 19 adapted to receive a driving key provided on the end of the spindle 3. This head is glued or otherwise rigidly secured by adhesive 13 to the tubular body 8. The distance between the abutment 19' and the guiding face of the flange is always constant because of the inexpandibility of the material from which the head is composed, as previously described in connection with the other embodiment of the invention. The opposite head 20 of this modification is similar to the head 17 except that in place of the key-slot there is provided a tapered socket 21 adapted to fit over the end of the conventional stub-bearing or spindle 4, shown in Fig. 1. The integral cylindrical portion 22 telescopes within the main tubular portion 8 to permit longitudinal movement of the head 20 similar to the movement of the head 14. This movability of the head 20 permits lateral expansion of the note-sheet and also serves to hold the opposite edge of the sheet continuously against the guiding face of the head 17.

The heads 9 and 17 in the modifications described, known as the driving heads, are glued or otherwise rigidly secured to the tubular body portion of the spools so that the spools may be rotated from the usual

driving mechanism to rewind the note-sheets in the customary manner. The opposite heads 14 and 20, which do not assist in the driving operation, are carried by the spindle 4 which constantly urges these heads toward the body of the spool under the influence of the expansion spring 5. It will be obvious that these heads may move longitudinally of the main body portion of the spools without in any way disturbing or affecting the driving operation.

My improved note-sheet spool embodying the cast or molded impervious and inexpandible heads can be made much more cheaply and accurately than the wooden head spools heretofore employed, and the positive and invariable position of the guiding face of the head when the spool is in operative position, insures the accurate delivery of the note-sheet across the tracker-board without lateral deviation from its proper alinement irrespective of the temperature or humidity of the atmosphere. Furthermore, a spool head formed as shown with a portion of the outer face of the flange surrounding the driving hub removed, presents a very distinctive and pleasing appearance.

What I desire to claim is:

1. A note-sheet spool end comprising an end abutment and a guiding flange provided with a smooth guiding face constructed integrally of relatively inexpandible material to maintain a fixed predetermined relation between said abutment and the guiding face of said flange.

2. A note-sheet spool end comprising an end abutment and a guiding portion provided with a smooth guiding face, said spool end being constructed integrally of impervious relatively inexpandible material whereby a predetermined invariable distance is maintained between said guiding face and the face of said abutment.

3. A note-sheet spool comprising a body portion and a pair of heads, one of said heads being formed from relatively inexpandible material such as electrose shaped to provide a guiding face and a driving abutment spaced a fixed predetermined distance from said guiding face.

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