

No. 822,111.

PATENTED MAY 29, 1906.

R. A. GALLY.

MUSIC SHEET AND SPOOL FOR SELF PLAYING MUSICAL APPARATUS.

APPLICATION FILED JULY 9, 1903.

2 SHEETS—SHEET 1.

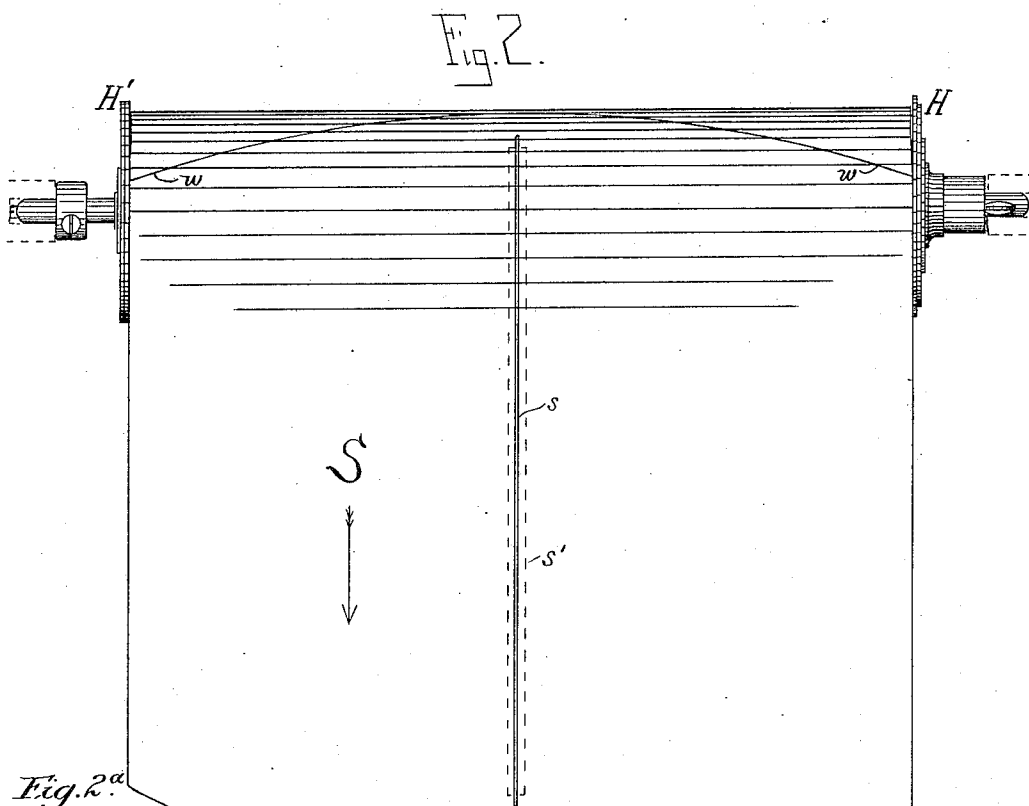
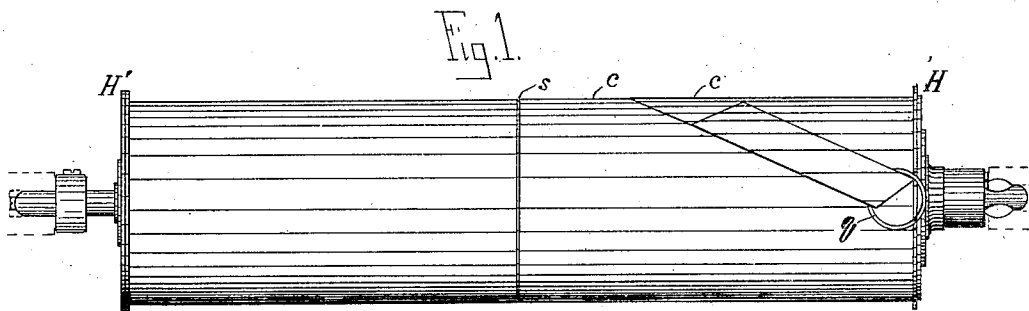


Fig. 2<sup>a</sup>.

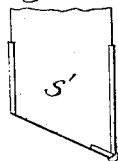
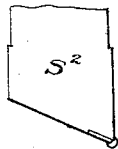


Fig. 2<sup>b</sup>.



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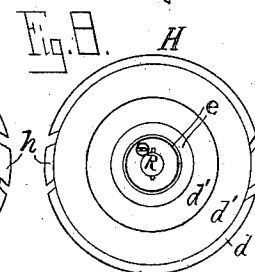
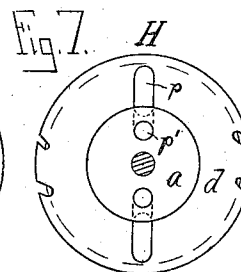
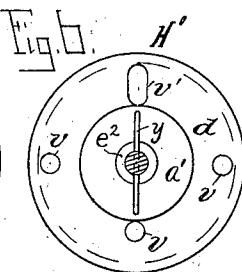
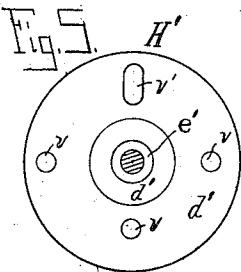
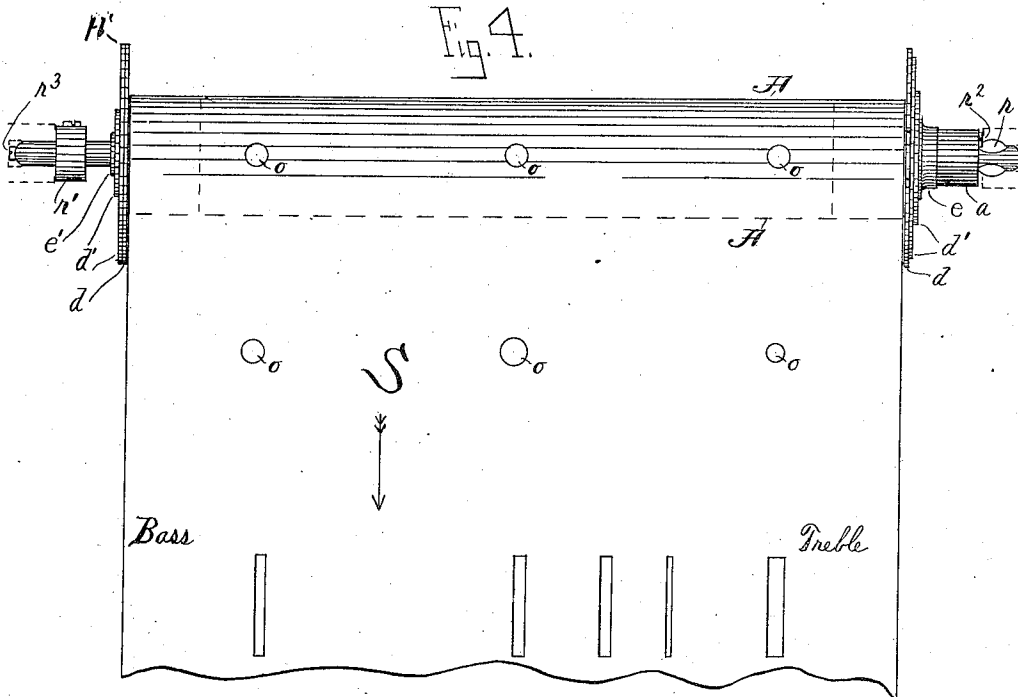
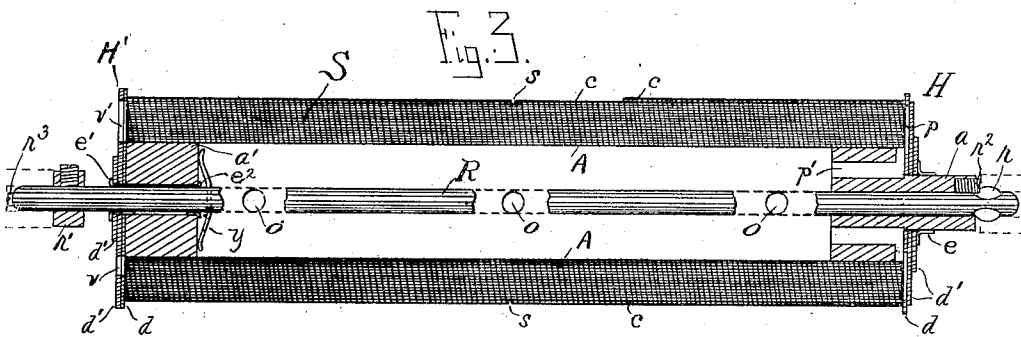
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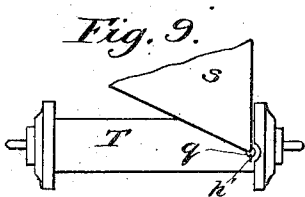
MUSIC SHEET AND SPOOL FOR SELF PLAYING MUSICAL APPARATUS.

APPLICATION FILED JULY 9, 1903.

2 SHEETS—SHEET 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

ROBERT A. GALLY, OF BROOKLYN, NEW YORK.

MUSIC-SHEET AND SPOOL FOR SELF-PLAYING MUSICAL APPARATUS.

No. 822,111.

Specification of Letters Patent.

Patented May 29, 1906.

Application filed July 9, 1903. Serial No. 164,910.

*To all whom it may concern:*

Be it known that I, ROBERT A. GALLY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Music-Sheets and Spools for Self-Playing Musical Apparatus, of which the following is a specification.

My invention has for its object the simpler and more perfect construction of a music-sheet and spool which will avoid error in their properly fitting together and with any self-playing musical apparatus for which they are intended no matter what the condition or variation of hygrometric atmospheric conditions and which spool and sheet shall also have minimum weight and be protected from deterioration or damage from natural, operative, or manual causes.

In the accompanying drawings, Figure 1 is a front view of the music-sheet wound in roll form on its spool and caught to place by its end ring. Fig. 2 is a similar view of the same rolled sheet and spool with the front end of the sheet unwound about one coil's extent and pulled out to show the protective front part of sheet, Figs. 2<sup>a</sup>, 2<sup>b</sup> being modified forms of end of sheet. Fig. 3 is a longitudinal section of the same roll and spool taken on its axis. Fig. 4 is a front view of same spool with the sheet unwound to its end where connected to the spool, the concluding musical chord of perforations of the selection on said music-sheet being shown in this figure. Fig. 5 is an outside view of the left head of spool, and Fig. 6 is an inside view of same head. Fig. 7 is an inside view of right head of spool. Fig. 8 is an outside view of same head, and Fig. 9 shows the take-up cylinder form of spool and catch.

All the views in the drawings as filed are the full working size of ordinary use except that length of spool is reduced to accommodate the width of drawing. Figs. 2<sup>a</sup> and 2<sup>b</sup> are one-eighth scale and Fig. 9 one-quarter scale.

In my patent on compensating music-spool issued March 5, 1901, No. 669,342, is set forth a spool whose flanges are automatically adjusted to the changes of width of the paper sheet by control from hygrometric movements of paper and ventilation to the center of the roll is provided for; but no decrease of variation of the sheet is accomplished. The strip sheet or web now set forth when rolled upon its spool is greatly protected from atmospheric influences, and

whatever hygrometric changes do affect the roll are equalized to all its parts and coils by the special ventilating devices, insuring a uniform width and fit of every part of the sheet at any one time and a very close approximation to one standard at all times.

A paper music-sheet should be protected from atmospheric changes when not in use in order to avoid any changes of dimensions laterally or longitudinally to prevent deterioration of its substance, to obviate "puffing" or "cockling," to guard it against damage or soiling by handling, and to keep all parts of the sheet of equal hygrometric condition at one time. Therefore one or more of the outer coils *c c* of the sheet are now shown herein as of a waterproof or strongly moisture-resistant nature, so that when rolled up and out of use the outer part of the roll acts as a protector and air-seal to the main part of the sheet within. This outer protective part of the roll may be made by treating the front end part of the music-sheet with any suitable compound, as paraffin; but I find shellac as desirable as anything, and it is especially good in results when applied to the outer surface only of the paper and of course does not need to extend far enough in on the sheet to affect the perforated or indicated part. Instead of treating the front end of the sheet as just stated a piece of special-quality waterproof material may be attached to the paper sheet as a front extension or as an overlying coil, all being equivalents for the purpose stated. When the protection part is formed by treatment of the sheet itself, it is best to make the inner end of the treated part of gradually-diminishing width from edges to center, preferably a curve line, as *w*, as by this means tearing of the sheet is avoided. It is also desirable to have the outer coil or coils of the roll a trifle wider than the main part of sheet, so that when the roll is wound up the outer part will fit tightly against the flanges of the spool and so completely protect the coils underneath. This wide part may be made by adding a strip to the edge of the sheet, as *S'* of Fig. 2<sup>a</sup>, or cutting the material accordingly, as *S'* of Fig. 2<sup>b</sup>; but as this is often inconvenient when the sheet itself is used for the outer protective part of roll it is economical and efficient to split the sheet *S* longitudinally for a short distance at or near the front end and after spreading it sufficiently apart at the split *s* make any suitable joint, as by a lapped strip *s'*, fastened on the inner face of

the sheet across and along the split, thus causing the front end of sheet to abut both spool-flanges, while the ensuing main part of sheet has a slightly-free fit, as shown in Fig. 2 near *w w*.

To insure the roll being kept closely wound when not in use and without risk of loosening from breaking of the rubber band heretofore commonly used for claspings the roll, a catch or hook *h* (one or more) or equivalent is formed in or affixed at or near the rim of the flange or head of the spool and adjacent to the edge of the outer end of the sheet when the latter is completely wound on the spool. The sheet has a ring or hook *q* or equivalent formed in or affixed to the edge of the outer end of the sheet *S*, and this ring *q* is caught over the hook *h* of the spool-flange to secure the sheet when wound on its spool. The same ring *q* can be conveniently and economically employed to connect the sheet to the take-up cylinder *T* or equivalent part of the self-playing apparatus when such cylinder or part has its engaging means *h'* correspondingly placed as shown in my application, Serial No. 156,623; filed May 11, 1903, Fig. 9 hereof, and covered in present claim 44. In this way one ring on the sheet can answer the two purposes stated, and its attachment to the edge of the sheet forms a guard thereto at its edge and insures the edge of sheet being aligned to the flange of the take-up cylinder. It is also preferable to slant away the sheet from the edge end where the ring is attached back to the other edge at a rearward point, thus aiding the starting of the sheet in the apparatus and also its smooth finish of winding on and fastening to its own spool when rolled up and out of use.

That the music-sheet may always be exactly fitted to its spool-flanges and any variation there may be in the width of the sheet be compensated by the spool, it is best to use the compensating-spool principle of my Patent No. 669,342, March 5, 1901; but certain modifications and improvements thereof are desirable and will now be described.

To equalize the hygrometric condition of all the coils of roll when it is wound on its spool, intercommunicating ventilation is secured between all the coils by one or more passages *p* in the inner face of the flange or head *H*; but these are entirely within the outer circumference of the rolled-up sheet, so as to exclude external air when the roll is out of use. The passage *p* may be easily made by punching out of the inner disk only of the composite disk head or flange *H* and covering the punched hole with the outer disk. These passages *p* may also communicate by duct *p'* to the interior of the inner coil or tube which connects and automatically adjusts the two heads, and thus equalize the condition of all the interior coils of the roll. As the sheet unwinds, the passages *p* and *p'* are opened to

the outer air to equalize all the roll to the atmosphere, which is then having access to the entire sheet as it unwinds. As the sheet reaches the conclusion of unwinding it uncovers openings *o* into the interior of the inner coil or tube which connects the compensating heads, so that the air within may be fully brought to the same condition which has affected the sheet while unwinding. As the sheet rewinds onto the spool these openings are closed by the sheet, and all parts of the roll are left to equalize. This construction avoids the tendency of sheets of many coils to change unequally in width between the innermost or outermost coils and the others when constant air access is allowed to either the outer or inner coils, or both, and they thus have more rapid change than the others. As the coils of the sheet have a slight play between the heads of spool to avoid friction in winding, many of the coils will be slightly away from the head *H* and the passage *p* thus communicate around the entire circle of such coils.

To permit the equal drying out of all the coils of the roll when wound up, ventilating-holes *v* are provided in the flange or head *H'* of the spool, these holes passing through the flange from its outer to inner surface opposite the end of the coils of the sheet. A hole *v'* may be large enough to include all the coil ends or may be enlarged on the inner face of flange or several small holes *v* may be placed at various radial distances of the flange, and thus collectively connect to all the coils. Space between ends of coil and head aids distribution of the ventilation. By the ventilating and equalizing of the ends of all the coils while protecting the large surfaces of the inside and outside coils from the air when the roll is not in use sudden changes and inequalities of condition are avoided, yet the entire roll is capable of compensating to the average atmospheric condition summer or winter and when used will compensate equally in all its parts to any special condition of the moment.

To have a light weight and compact roll and avoid danger of warping or breaking of the heads or flanges and consequent damage to the sheet, it is best to make the heads or flanges *H H'* of thin composite disks of "press-board," aluminium, or such material, each head composed of two or more disks *d d'*, the inner one, *d*, the full size to guide and guard the sheet and one or more outer disks *d'* built on to reinforce the rigidity, which outer disks can be of the same size as the inner, but preferably of lesser diameter. These disks are held together by adhesive material or riveting, if desired, but are best clamped at their centers by upset thimbles or eyelets *e e'*, as shown, which clamping may also fasten them to suitable hubs or spindles *a a'* to support the axial tube or wound sheet,

which hubs or spindles may be of wood, papier-mâché, &c. To secure good ventilation to the inner coil or axial tube A, it is desirable to have no large core within it. Therefore hubs  $a$   $a'$  are made only sufficient in length to engage the coil or tube A near each flange or head and hold the heads true, thus leaving the inner surface of coil or tube A accessible to the air contained within it, and lightness of spool is also secured. To add rigidity to the spool, an axial rod or shaft R extends from end to end through the spool and even beyond each head. This rod is affixed to one part of the spool and roll as the hub  $a$  of head H, the other parts of the spool being free to slide upon the shaft. Thus the one head H will always have a fixed position on the shaft, while the head H' can slide thereon to suit the changes of width of sheet. To insure easy movement of head H' and accurate true right angle of the same to the axial line, the hub  $a'$  has a hole larger than the shaft, and at each end of this hole are set eyelets or bushes  $e$   $e'$ , preferably of substance antifrictional to the shaft and made to accurately fit and slide thereon.

The shaft R has a clutch or engagement of any suitable form, as  $r$ , to enable the roll to be turned by the mechanism of a self-playing apparatus to which it may be connected for use. A fixed collar or equivalent stop  $r'$  on the shaft R outside of and free from head H' takes the thrust of the bearing of apparatus at that end and so relieves the compensating head H', tube A, and coils of sheet S from undue pressure. Adjusting-screws  $r^2$   $r^3$  serve to regulate the lengthwise position of the spool to any apparatus. A spring presses outwardly against hub  $a'$  and prevents pressure on head H' from damaging coil A or other coils of roll.

It is evident that the hygrometrically compensating spacing means or core A between the two sheet-guiding parts or heads of the spool may be formed of one or more coils of the sheet itself or of similar paper wound into a tube and to which the sheet is attached; also, that several such layers or coils may be pasted into such a tube or a self-tube of single mass be used and the sheet attached to either, so long as the coefficient of expansion of A is exactly or approximately equal to that of the sheet, as any such details are but mere modifications or equivalents of and tributary to my Patent No. 669,342, of March 5, 1901, if the heads or flanges be adjustable relatively to each other and are connected to and automatically adjusted by the said hygrometrically-variable means, although many of the claims herein are not limited to the sheet-guides, flanges, or heads being attached to the spacing means.

The term "core" is used above and in the claims for lack of any precisely-correct word to cover scope intended, said term to be un-

derstood as covering any manner of hygrometrically variable or compensating support, carrier, spindle, tube, core, or spacer, so that it serves the function or purpose of the present invention.

Numerous modifications may be effected and substitutions of equivalents may be made without departing from the spirit of my invention, and I do not limit myself to the particular details shown.

What I claim as my invention is—

1. A spindle or core, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed coils in roll form on said spindle or core, one or more of the outer coils being more resistant to absorption of moisture than the main part of the sheet.

2. A hollow tube or core, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed coils in roll form on said tube or core, one or more of the outer coils being more resistant to absorption of moisture than the main part of the sheet.

3. A core variable in its length from hygrometric causes, end pieces or hubs at each end of said core, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed coils in roll form on said core, one or more of the outer coils being more resistant to absorption of moisture than the main part of the sheet.

4. A music-spool, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed coils in roll form on said spool, one or more of the outer coils being more resistant to absorption of moisture than the main part of the sheet.

5. A music-spool, a perforated or indicated paper music-sheet for a self-playing musical apparatus disposed in several superimposed coils in roll form on said spool, the outer end of the sheet preceding the note perforations or indications being more resistant to absorption of moisture than the main part of the sheet.

6. A music-spool, a perforated or indicated paper music-sheet for a self-playing musical apparatus disposed in several superimposed coils in roll form on said spool, the outermost coil being more resistant to absorption of moisture than the main part of the sheet.

7. A music-spool, a perforated or indicated music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, the outermost coil being moisture-protected on its outer surface to a greater degree of resistance to moisture absorption than the main part of sheet.

8. A music-spool, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed

layers in roll form on said spool, one or more of the outer coils being more resistant to moisture absorption and wider than the main part of the sheet and abutting the flanges or heads of said spool.

9. A music-spool, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, one or more of the outer coils being wider than the main part of the sheet and abutting the flanges or heads of said spool.

10. A music-spool, a perforated or indicated paper music-sheet coiled upon said spool and having its forward end portion longitudinally split and rejoined in spread position of said split, said split-and-spread portion of the sheet being wider than its main part and abutting the flanges or heads of said spool.

11. A music-spool, a perforated or indicated music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, a single ring or catch at the forward end of one side only of said sheet, and a coacting catch or engaging means on only the one corresponding head or flange of the spool, said head or flange being fixedly revoluble with the spindle of said spool.

12. A music-sheet spool having a flange fixedly revoluble with the spool-spindle and a permanent sheet-engaging means on said one flange only.

13. A music-roll core variable in its length from hygrometric causes, a music-sheet wound thereon, flanges or heads to said core, and one or more vents from the outer air to the ends of the coils of said sheet and the end of said core but not opened to any other part of the structure.

14. A music-spool, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, the spool-heads and the outer coils of the roll adapted to close passage of air between them, the inner coils being slightly less in width than the distance between said spool-heads.

15. A music-roll core, hollow, and variable in its length from hygrometric causes, a head or flange thereto having a vent connecting the end of said core to the outer air, and means normally closing the interior of said core from the outer air.

16. A music-roll core variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus having its web disposed in several superimposed layers in roll form on said core, and a head or flange to said core having one or more vents through the flange portion to said core arranged in position to be opened and closed by the respective unwinding and winding of the sheet on said core.

17. A core, hollow, and variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus having its web disposed in several superimposed layers in roll form on said hollow core, vent-holes in the wall of said hollow core and perforations in the music-sheet between the core and any note perforations or indications of said sheet and in position to correspond with the vents of the core as the sheet is wound thereon.

18. A music-roll spool having a core variable in its length from hygrometric causes, an end piece to said core having one or more vents to said core and means arranged in position to open said vents when the roll is operated in the apparatus and close them when it is not in operation.

19. A core, hollow, and variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus having its web disposed in several superimposed layers in roll form on said hollow core, and an end piece to said core having one or more vents to the interior of said core arranged in position to be opened and closed by the respective unwinding and winding of the sheet on said core.

20. A core, hollow, and variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus having its web disposed in several superimposed layers in roll form on said hollow core and vents through the wall of said hollow core arranged in position to be opened and closed by the respective unwinding and winding of the sheet on said core.

21. A music-spool, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, and one or more ventilating-spaces in the inner face of the spool-head and opposite to several coils of the sheet when it is wound but entirely within the circumference of the outermost coil.

22. A music-spool having a core variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, and one or more ventilating-spaces in the inner face of the spool-head and opposite to several coils of the sheet when it is wound but entirely within the circumference of the outermost coil, and air-passages from said ventilating-spaces to the surface of the said variable core of the spool.

23. A music-spool having a core, hollow, and variable in its length from hygrometric causes, a perforated or indicated paper music-sheet for self-playing musical apparatus disposed in several superimposed layers in roll form on said spool, and one or more venti-

lating-spaces in the inner face of the spool-head and opposite to several coils of the sheet when it is wound but entirely within the circumference of the outermost coil, and one or more air-passages from said ventilating-spaces to the interior of the said hollow variable core of the spool.

24. A music-sheet spool and a music-sheet wound thereon, said spool having one or more vents from the outer air to the ends of the coils of said music-sheet and to no other part of the structure.

25. A music-sheet spool and a music-sheet wound thereon, said spool having one or more perforations through a flange or head of the spool opposite to the ends of the coils of said music-sheet and not connected to any other part of the structure.

26. A music-sheet spool and a music-sheet wound thereon, said spool having one or more perforations through a flange or head of the spool from one face to the other of said flange opposite to the ends of the coils of said music-sheet.

27. A music-sheet spool having a composite head consisting of two or more disks with joined faces, one or more perforations in the inner disk, and an imperforate part of the outer disk completely covering the perforations of the inner disk.

28. A music-sheet spool having two flanges or heads and an end check means adapted to abut against the outer end of the bearing or journal of the apparatus with which the spool is to engage, the flange or head adjacent to said end check means being automatically variable in its adjustment relatively to said end check means.

29. A music-sheet spool having an axial shaft, a flange or head movable longitudinally thereof, a core variable in its length from hygrometric causes and connected to said flange or head, and a check or abutment on said shaft adapted to abut against a part of the apparatus with which the spool is to engage, the abutting part of said check or abutment being outside of the said movable head but inside of the extreme end of the shaft or journal-pin of said spool.

30. A music-sheet spool having a composite head consisting of two or more disks faced together and held by axial eyelets or upset thimbles extending through the several disks of a head.

31. A music-sheet spool having a composite head consisting of two or more disks faced together, a sleeve, hub or spindle supporting said head, and an axial eyelet or thimble clamping said composite head to its said sleeve, hub or spindle.

32. A music-sheet spool having a head consisting of a disk; a sleeve, hub or spindle supporting said head; and an axial eyelet or thimble clamping said head to its said sleeve, hub or spindle.

33. A music-sheet spool having a head consisting of a disk; a shouldered hub or spindle supporting said head against its shoulder; and an eyelet, thimble or sleeve on the smaller part of the hub or spindle and fixed firmly against the head and clamping it to the shoulder.

34. A music-sheet spool having two end pieces and a core variable in its length from hygrometric causes, and connected to said two end pieces, one said end piece having an axial extension rigid therewith and extending through the other end piece in a free manner, the said second end piece being guided upon but free to move longitudinally of said axial extension.

35. A music-sheet spool having two end pieces and a core variable in its length from hygrometric causes, and connected to said two end pieces, one said end piece having an axial extension rigid therewith and extending into the axis of the other end piece in a free manner, the said second end piece being guided upon but free to move longitudinally of said axial extension.

36. A music-sheet spool having an end piece thereof longitudinally movable on an axis, and bearing upon said axis at substantially each extremity only of said end piece and free for longitudinal movement of said end piece upon said axis.

37. A music-sheet spool having an end piece thereof longitudinally movable on an axis, the bore of said end piece being larger than said axis, and an eyelet, sleeve or bush fitted in said end piece and of less length than the bore of said end piece and centering upon said axis but free for longitudinal movement of the end piece upon the axis.

38. A music-sheet spool having a core variable in its length from hygrometric causes, two end-pieces connected by said core, and spring means tending to extend the two said end pieces relatively to each other.

39. A music-sheet spool having a core variable in its length from hygrometric causes, two end pieces connected by said core, and spring means intermediate the said two end pieces and tending to extend them relatively to each other.

40. A music-sheet spool having an axial shaft or journal-pin, two flanges automatically adjustable to and from each other longitudinally of the spool, and an end check means adjustable longitudinally of the spool relatively to its flanges and axial shaft or journal-pin, and adapted to abut against the endwise-guiding part of the apparatus with which the spool is to engage and guide.

41. A music-sheet spool having a music-sheet mounted thereon which is variable in its width from hygrometric causes, two end pieces automatically adjustable to and from each other longitudinally of the spool and correspondingly to the width of said sheet,

and an end check means adjustable longitudinally of the spool to various distances from the music-sheet position thereon and the said end pieces and adapted to abut 5 against the outer end of the endwise-guiding bearing or journal of the apparatus with which the spool is to engage.

42. A music-sheet spool having a shaft, a flange or head movable longitudinally thereof, a core variable in its length from hygro- 10 metric causes and connected to said flange or head for effecting its said movement, and a check on the shaft of said spool outside of and clear of the said movable head but inside of 15 and clear of the extreme end of said shaft and adapted to abut against a part of the apparatus with which the spool is to engage.

43. A music-sheet spool having a shaft, a flange or head movable longitudinally of the 20 spool, a core variable in its length from hygro-metric causes and connected to said flange or head and a longitudinally - adjustable check on the shaft of said spool outside of and clear of the said movable head but inside of 25 and clear of the extreme end of said spool and adapted to abut against a part of the apparatus with which the spool is to engage.

44. A music-sheet spool or cylinder having a permanent sheet-engaging means at 30 only one of the two ends thereof and adapted to engage a coacting catch of a music-sheet.

45. A core variable in its length from hygro-metric causes, a perforated or indicated paper music-sheet for self-playing musical 35 apparatus having its web disposed in several superimposed layers in roll form on said core, and an end piece to said core having one or more vents to said core arranged in position to be opened and closed by the respective un- 40 winding and winding of the sheet on said core.

46. A music-spool, a perforated or indicated music-sheet for self-playing musical apparatus disposed in several superimposed 45 layers in roll form on said spool and having its forward end of slanted or diagonal form, a ring or catch at the forward part of the long side of said slanted or diagonal end of the sheet, and a coacting catch or engaging means on the corresponding head or flange of 50 the spool, said head or flange being fixedly revoluble with said spool.

47. A music-spool, a perforated or indicated music-sheet for self-playing musical apparatus disposed in several superimposed 55 layers in roll form on said spool and having its forward end of slanted or diagonal form, and a ring or catch at the forward part of the long side of said slanted or diagonal end of the sheet, and a coacting catch on the corre- 60 sponding end of said spool.

48. A music-sheet spool having a spindle, core or carrier for supporting such sheet, a head or flange, and an axial eyelet or thimble holding said head or flange to the said spin- 65 dle, core or carrier.

49. In combination; an automatic music-sheet having a single ring or catch at the forward end of one side only of said sheet, and a spool or cylinder having a permanent sheet-engaging means at the end thereof corre- 70 sponding with the said side of the sheet having said catch.

50. A music-sheet spool having two flanges or heads, a driving-clutch at one end of the spool, and an end check means adjustable 75 longitudinally of the spool relatively to its adjacent flange or head and the clutch and adapted to abut a part of the apparatus with which the spool and its clutch are to engage.

51. A music-sheet spool having two flanges 80 or heads, a driving-clutch at one end of the spool, and an end check means adjustable longitudinally of the spool relatively to its adjacent flange or head and the clutch and adapted to abut the endwise-guiding means 85 of the apparatus with which the spool and its clutch are to engage.

52. A music-sheet spool having two flanges or heads, a driving-clutch at one end of the spool, and an end check means adjustable lon- 90 gitudinally of the spool relatively to its adjacent flange or head and adapted to abut against the clutch-engaging and driving means of the apparatus with which the spool and its clutch are to engage and operate, the 95 abutting part of said end check means being outside of its adjacent flange or head but inside of the extreme end of the driving-clutch of the spool.

53. A music-sheet spool having two flanges 100 or heads, a driving-clutch at one end of the spool, and an end check means adjustable longitudinally of the spool relatively to its adjacent flange or head and adapted to abut 105 against the clutch engaging and driving means of the apparatus with which the spool and its clutch are to engage and operate, the abutting part of said end check means being inside of the extreme end of the driving- 110 clutch of the spool.

54. A music-sheet spool having two flanges or heads, a driving-clutch at one end of the spool, and an end check means adjustable lon- 115 gitudinally of the spool relatively to its adjacent flange or head and the clutch and adapted to abut against the clutch engaging and driving means of the apparatus with which the spool and its clutch are to engage and op- 120 erate, the abutting part of said end check means being outside of its adjacent flange or head but inside of the extreme end of the driving-clutch of the spool.

55. A music-sheet spool having two flanges or heads, a driving-clutch at one end of the spool, and an end check means adjustable lon- 125 gitudinally of the spool relatively to its adjacent flange or head and adapted to abut against the endwise-guiding and clutch engaging and driving means of the apparatus with which the spool and its clutch are to 130



guide, engage and operate, the abutting part of said end check means being outside of its adjacent flange or head but inside of the extreme end of the driving-clutch of the spool.

56. A music-sheet spool having two flanges or heads automatically adjustable to and from each other longitudinally of the spool, a core variable in its length from hygrometric causes and connected with said flanges or heads for effecting their said adjustment, a driving-clutch at one end of the spool, and an end check means adjustable longitudinally of the spool relatively to its adjacent flange or head and adapted to abut against the clutch engaging and driving means of the apparatus with which the spool and its clutch are to engage and operate, the abutting part of said end check means being inside of the extreme end of the driving-clutch of the spool.

57. A music-sheet spool having two flanges or heads automatically adjustable to and from each other longitudinally of the spool, a core variable in its length from hygrometric causes and connected with said flanges or heads for effecting their said adjustment, and an end check means adapted to abut against the outer end of the bearing or journal of the apparatus with which the spool is to engage, the flange or head adjacent to said end check means being automatically variable in its adjustment relatively to said end check means.

58. A music-sheet spool having an axial shaft, two flanges or heads automatically adjustable to and from each other longitudinally of the spool, a core variable in its length from hygrometric causes and connected with said flanges or heads for effecting their said adjustment, and an end check means adjustable longitudinally of the spool relatively to its flanges and axial shaft or journal-pin, and

adapted to abut against a part of the apparatus with which the spool is to engage.

59. A music-sheet spool having an axial shaft, two flanges or heads automatically adjustable to and from each other longitudinally of the spool, a core variable in its length from hygrometric causes and connected with said flanges or heads for effecting their said adjustment, and an end check means adjustable longitudinally of the spool to various distances from the sheet-guiding faces of said flanges or heads and adapted to abut against the outer end of the bearing or journal of the apparatus with which the spool is to engage.

60. A music-sheet spool having a shaft, a flange or head movable longitudinally thereof, a core variable in its length from hygrometric causes and coacting with said flange or head to regulate its said movement, and a check on the shaft of said spool outside and clear of the said movable head, but inside of and clear of the extreme end of said shaft and adapted to abut against a part of the apparatus with which the spool is to engage.

61. A music-sheet spool having a shaft, a flange or head movable longitudinally thereof, a core variable in its length from hygrometric causes and coacting with said flange or head to regulate its said movement, and a longitudinally-adjustable check on said spool outside of and clear of the said movable head but inside of and clear of the extreme end of the shaft of said spool and adapted to abut against a part of the apparatus with which the spool is to engage.

Signed and witnessed this 8th day of July, 1903.

ROBT. A. GALLY.

Witnesses:

IRENE CRAWFORD,  
JOSEPH A. FARLEY.