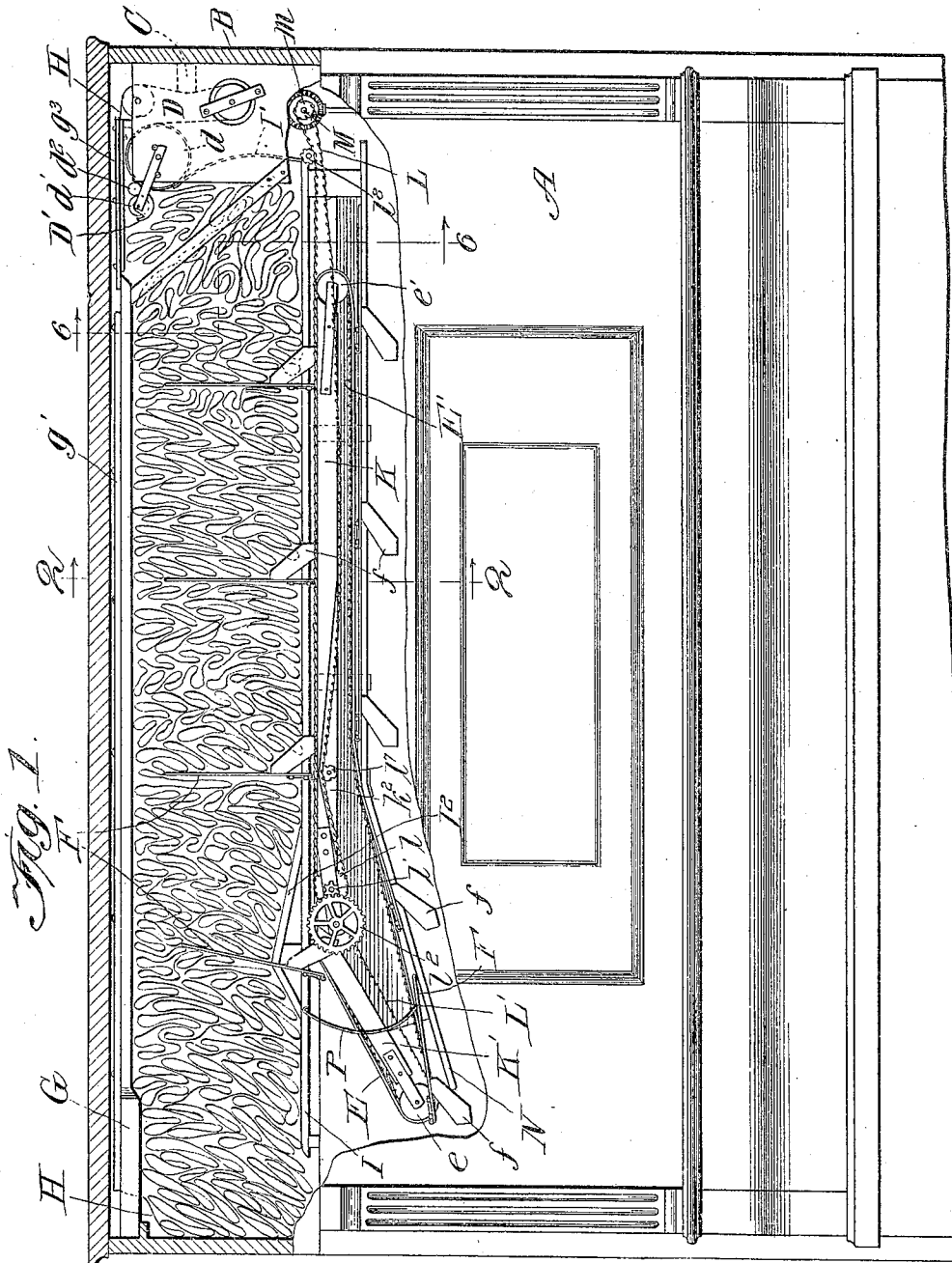


C. H. HAMILTON & G. R. THAYER.
 WEB CONTROLLING MECHANISM FOR SELF PLAYING INSTRUMENTS.
 APPLICATION FILED MAY 18, 1908.

937,933.

Patented Oct. 26, 1909.
 4 SHEETS—SHEET 1.



Witnesses:
 Harry S. Gaither
 Ruby V. Nash

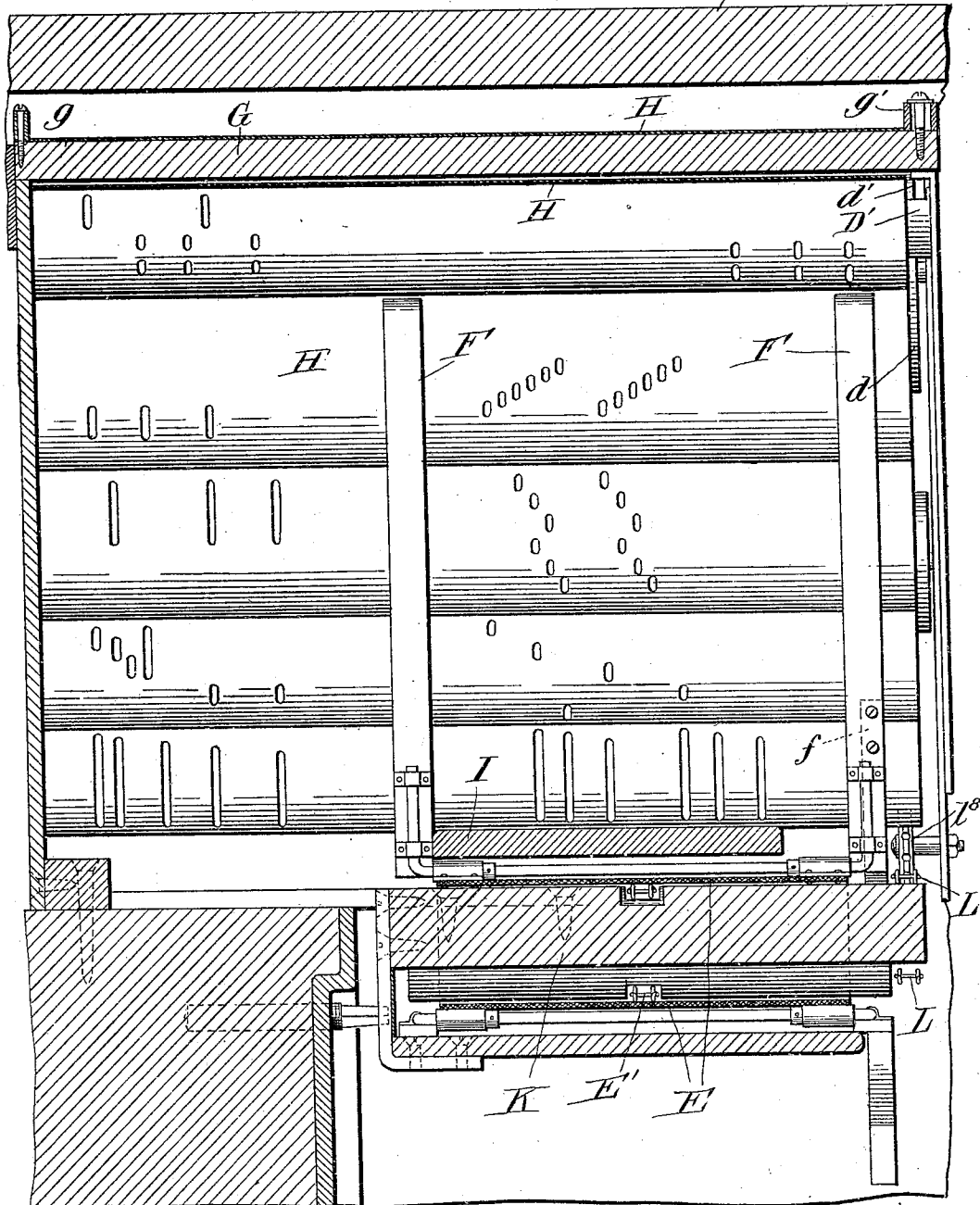
Inventors:
 Charles H. Hamilton
 and George R. Thayer
 by *Walter H. Chamberlin*
 their atty

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Fig. 2.



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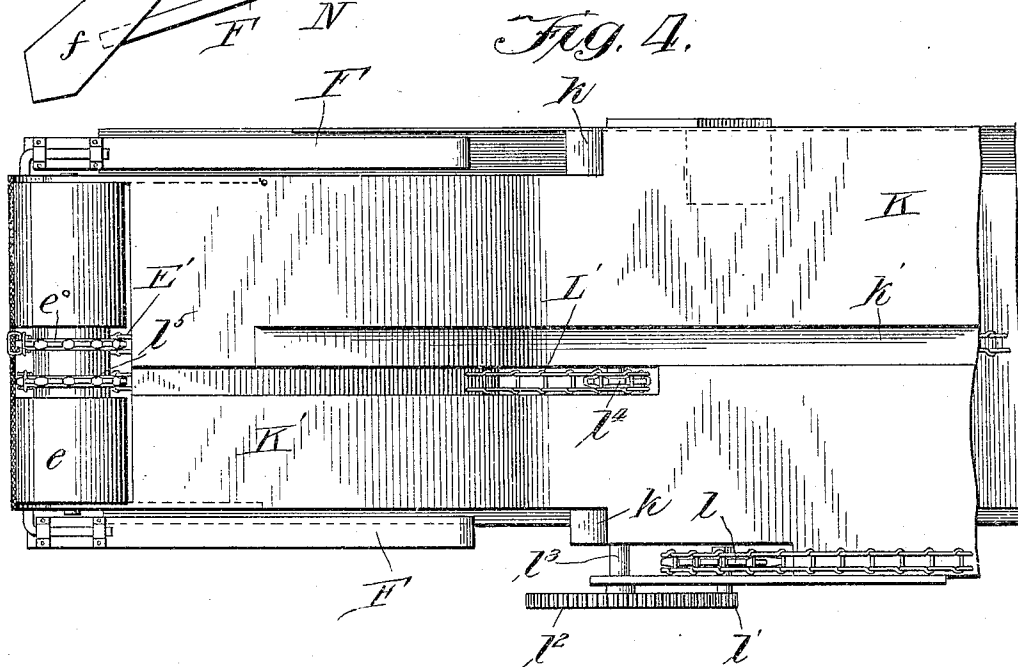
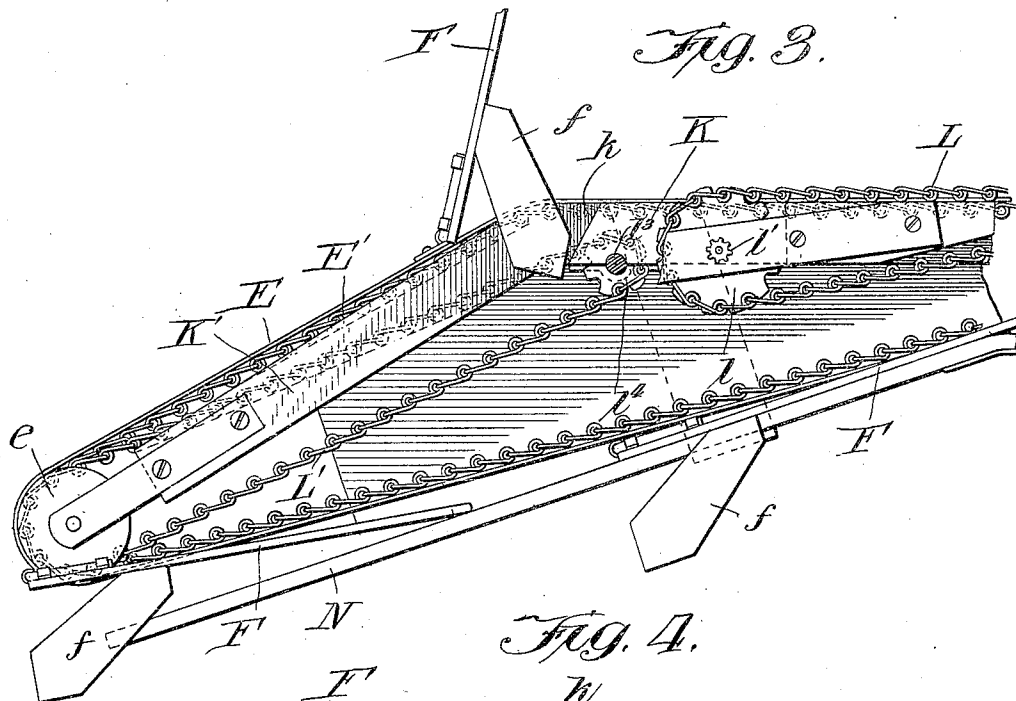
by *Walter H. Mansfield*
their Atty.

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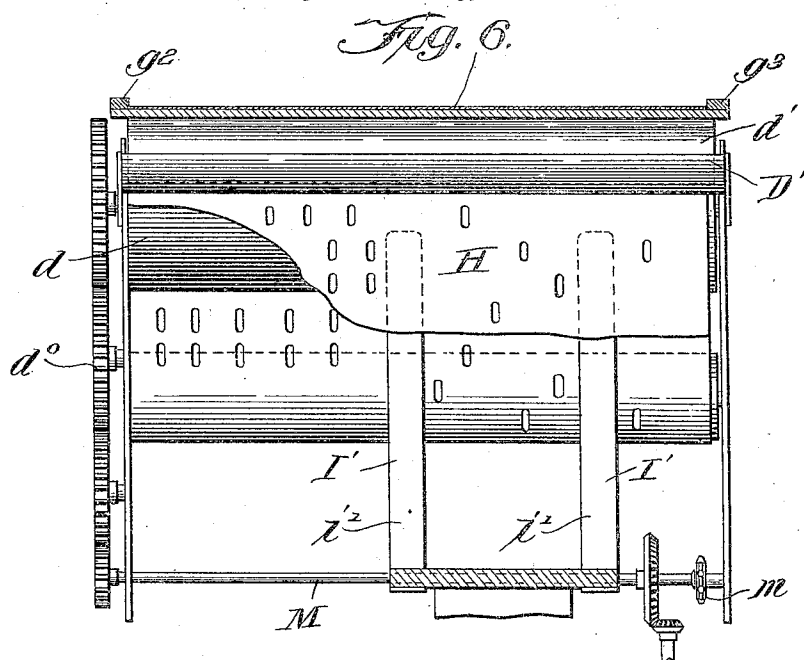
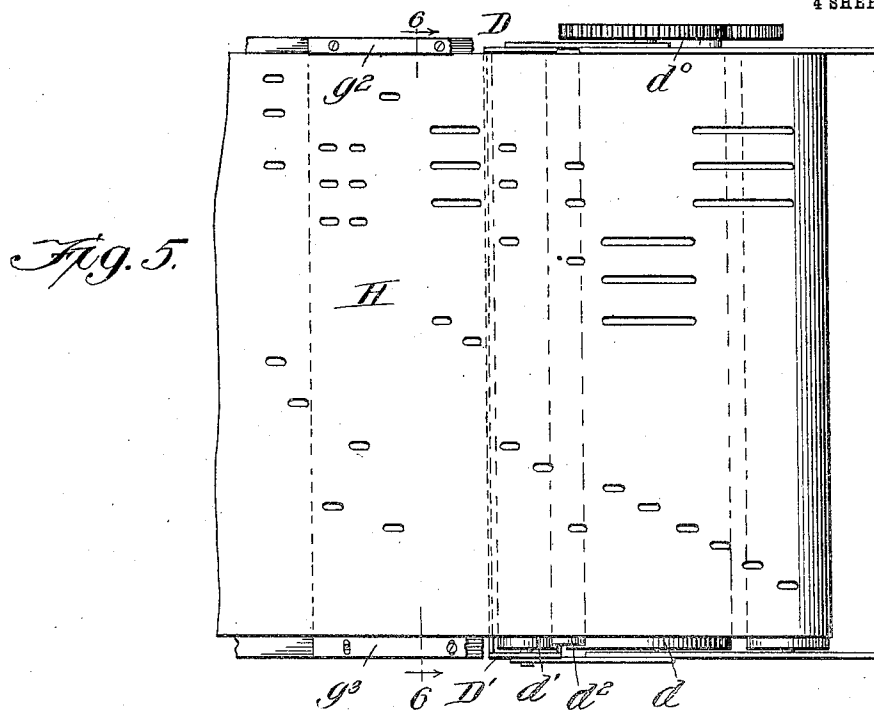


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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CHARLES H. HAMILTON AND GEORGE R. THAYER, OF CHICAGO, ILLINOIS, ASSIGNORS
TO AUTOMATIC MUSICAL COMPANY, OF BINGHAMTON, NEW YORK, A CORPORATION
OF NEW YORK.

WEB-CONTROLLING MECHANISM FOR SELF-PLAYING INSTRUMENTS.

937,933.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed May 18, 1908. Serial No. 433,352.

To all whom it may concern:

Be it known that we, CHARLES H. HAMILTON and GEORGE R. THAYER, both citizens of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Web-Controlling Mechanism for Self-Playing Musical Instruments, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to self-playing musical instruments and more particularly to mechanism for supporting and feeding the web or roll which governs the instrument.

There is a large field for musical instruments in which a number of musical selections may be played in succession without requiring replacement of a web or roll. In order to make instruments of this kind agreeable it is desirable that the number of different pieces which may be played before repeating be as great as possible. It is also desirable that the instrument, after the entire series of pieces has been played through, be in proper condition for beginning over again with the first piece.

Heretofore it has been found impossible, on account of the long length of web required, to provide means for playing a large number of musical pieces one after the other particularly where it has been desired to have the web in the form of an endless belt so as to avoid the necessity of rewinding. Thus four or five pieces have heretofore been the maximum without having to resort to a rewinding operation; and double this number of pieces has been employed where, after the entire number of selections has been played, the entire web has had to be rewound or turned backward so as to bring it to its initial position.

The principal object of the present invention is to provide a novel form of controlling mechanism for the web in musical instruments whereby a large number of musical pieces may be played in succession and the operation repeated as often as desired without making it necessary to run the web backward at any time.

Heretofore the casing for containing the web and the mechanism which controls it and which is controlled by it, has taken the form of an attachment which has been placed at any convenient point, often presenting an unsightly appearance and often being in such position that it is likely to be marred by passersby and to admit moisture to its interior because of proximity to a floor which has to be scrubbed or washed.

A further object of our invention is to provide a mechanism of the character described which may conveniently be inclosed within a housing which forms a continuation of the casing of the instrument to which it is attached so that the casing of the instrument and the casing of the attachment form a harmonious whole, the attachment being preferably arranged upon the top of the main instrument so that it will always remain dry and is no more apt to become marred or broken than any other part of the main instrument.

Heretofore it has usually been necessary, for various structural reasons, to provide abrupt guides for the web so as to bring it into proper relation to the tracker board. This of course is objectionable since the web is apt to become torn or otherwise damaged when it is caused to shift its position within a short space.

A further object of our invention is to provide an arrangement wherein a long guideway is provided for the web before it reaches the tracker board so that it may be gradually and gently brought into proper alinement.

The various features of novelty which characterize our invention will be pointed out with particularity in the appended claims, but for a full understanding of our invention and of its various objects, some of which have already been pointed out, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a front elevation of a self-playing instrument having attached thereto a preferred embodiment of our invention, parts of the casing being broken away to more clearly show the interior mechanism; Fig. 2 is a section taken on line 2—2 of Fig. 1, but on a larger scale than Fig. 1; Fig. 3 is a reproduction on an enlarged

scale of a portion of Fig. 1; Fig. 4 is a plan view of the parts shown in Fig. 3, the top length of the conveying belt being removed; Fig. 5 is a plan view on an enlarged scale of the parts shown at the right hand of Fig. 1, the top cover being removed; and Fig. 6 is a section taken on line 6—6 of Figs. 1 and 5, the scale being the same as that of Fig. 5.

In the drawings we have illustrated our invention as applied to an ordinary automatic piano, wherein the control is by the usual perforated type of web. While, for the sake of brevity, we shall hereafter refer to our invention as embodied in this particular form, it will of course be understood that broadly considered the type of musical instrument and the type of controlling web are immaterial.

Referring to the drawings, A indicates the casing of a self-playing piano and B an auxiliary casing which extends entirely across the top thereof, preferably forming a continuation of the lines of the main casing. At one end of the auxiliary casing is a tracker board C of usual construction and D indicates a series of rolls for feeding the controlling web past the tracker-board.

The length of the web which may be employed is limited only by the space within the auxiliary casing and the density to which the web may be packed. In accordance with our invention the web after it passes the feeding mechanism D is doubled up into a series of short folds, thereby making it possible to pack the folds together quite firmly without interfering with the ready withdrawal of the web and without danger of tearing or otherwise damaging it. Since the chamber for containing the web is quite long we provide means for carrying the folded portions of the web from the tracker end of the casing toward the other in such a manner that the folds are removed fast enough to permit the ready formation of new folds as the web leaves the tracker end.

Arranged within the free space within the main casing immediately below the auxiliary casing is a conveyer apparatus comprising an endless belt E having hinged thereon a series of U-shaped arms F which are adapted to fold toward the belt when they are on the underside and to stand at right angles to the belt when upon the upper side. The belt is driven in any suitable manner so as to take away the web as fast as it is folded into the right hand end of the casing and carry it toward the opposite end.

Extending across the top of the web chamber is a flat table G and the web H passes onto this table at the extreme left hand end thereof and is drawn across the top thereof by the feeding mechanism D. Cleats g and g' , the latter preferably being adjustable from and toward the other cleat,

extend along the edges of the table at opposite sides thereof, these cleats forming guides for the web. Near the end at which the web leaves the table we prefer to provide short additional guide sections g^2 and g^3 the latter of which is also adjustable toward and from the former. These latter guides serve to give the final adjustment to the web so as to position it accurately with respect to the tracker board. The guides g and g' need not be and preferably are not adjusted with extreme accuracy, so as to give the advantage of a considerable length of web between the point at which the web enters upon the table and the point at which it leaves the table in a delicately adjusted position.

The conveyer mechanism may taken various forms. In the arrangement shown, the web does not rest directly upon the traveling belt but lies upon a platform I directly beneath which the conveyer belt travels. Furthermore the conveyer belt is illustrated as being much narrower than the web itself; this being for the purpose of utilizing the idle space within the piano casing and thus make it unnecessary to unduly heighten the auxiliary casing; for, as will appear from an inspection of Figs. 1 and 2, the lower half of the conveyer belt as well as portions of the supporting devices may extend downwardly into the hollow space usually found in the top of a piano casing. The platform I preferably extends practically from one end of the casing to the other, there being provided at the tracker-end a shield I' which extends upwardly to the roller d over which the web passes as it leaves the feeding mechanism D. This shield may conveniently be made up of a pair of spring fingers i' although it may take any other desired form. A shield D' is preferably placed in front of the roller d' between which and the roller d is carried the heavy idler roller d^2 .

Directly beneath the platform I is a frame K which may conveniently be formed of a thick board or plank. The member K is shorter than the platform above it and has a downwardly inclined portion K' at the left hand end thereof. Mounted directly upon the ends of the member K and its continuation K' are a pair of rollers e and e' over which the conveyer belt passes. The top length of the belt preferably rests upon the frame and is prevented from sagging thereby. In order to drive the conveyer belt there may be employed a sprocket chain L which passes over a sprocket wheel m on a suitable driven shaft M, a sprocket wheel n having attached thereto a small pinion n' , a gear wheel n^2 meshing with the pinion n' and mounted on a shaft n^3 which carries the sprocket wheel n^4 , a second sprocket chain L' which passes over the sprocket wheel n^4 and

a sprocket wheel l^5 on the roller e . It will be seen that the roller e is driven at a much lower speed than the shaft M. The shaft M is also geared to the feeding mechanism D by means of a train of gearing d^o . The driving mechanism is so proportioned that the conveyer travels just fast enough to take away the web as it is received in folded form from the feeding mechanism and carry it toward the other end of the chamber at such a rate that there is always a supply of webbing directly beneath the receiving end of the table G, this supply being packed together quite firmly but not sufficiently to interfere with the ready withdrawal and unfolding of the web. The frame K also serves to maintain the arms extending upwardly into the web chamber while they are on the upper side of the frame. This may conveniently be accomplished by providing each arm with a finger f projecting rearwardly therefrom. These fingers are so arranged that as the belt travels upwardly over the roller e' the fingers strike the end of the frame and prevent the arms from dropping downwardly as they would otherwise do. Then as the points of connection between the arms and the conveyer belt leave the roller the fingers ride upon the upper surfaces of the frame and act as struts for bracing the arms from the rear. In passing around the roller e' the arms are therefore gradually elevated and enter into the web chamber at a point near the shield or guard I' . The web folds which have been loosely deposited within the chamber in rear of the preceding set of arms are gathered up and moved forwardly, and initially at a somewhat more rapid rate than the folds in advance are traveling. This serves to compress one section of folds and to provide a clear space into which a new set of folds is deposited. As the operation continues each set of arms carries a portion of the web toward the left and finally, when the end of the horizontal portion of the frame is reached, the fingers f are left unsupported for the reason that the downwardly inclined extension K' is narrower than the main portion of the frame, thereby providing shoulders k from which the fingers drop.

It will be seen that the arm-supporting fingers are released just as the points of connection between the arms and the conveyer begin to descend and therefore the arms may be gradually drawn downward while at the same time the upper ends do not have to follow any fixed path. It is therefore possible for the arms to be withdrawn from the folds of the web without injuring the web. In order to assist in the retraction of the arms from the web chamber a double incline I^2 may be provided upon the platform I at the point where the arms begin to withdraw. The folds of the web are therefore

lifted and are freed from the arms before the arms are completely retracted from the chamber. Furthermore, by this arrangement, there is less danger that the arms will catch in the web than would be the case if the inclines were omitted. We have found that by properly proportioning the parts and by using a sufficient length of web, that portion of the web on the left hand side of a set of arms which is being retracted will be compressed sufficiently to act as a stop to force the arms downwardly.

When the arms are freed from the web they drop downwardly upon a shelf N which is arranged beneath the frame K and they continue to ride on this shelf until the opposite end of the apparatus is reached and they are carried upward in the manner previously described.

If desired the conveyer belt may be provided with a sprocket chain E' on its inner surface, this chain traveling in a groove k' in the upper surface of the member K and passing over a sprocket wheel e^o on the roller e . The belt is therefore positively driven and there is no danger of disturbance through slipping.

The sprocket chain L may conveniently pass around the frame K near one edge thereof and be supported near the sprocket wheel l upon an idler sprocket wheel l' supported in an under cut portion k^2 in the front edge of the frame. If desired other idlers, as for example as at l^3 , may be provided for controlling the direction of the main sprocket chain.

We have found that by using a web chamber extending entirely across the top of an ordinary piano, a continuous web may be employed which will contain from fifteen to twenty or more different pieces of music. With a longer web chamber a longer web could of course be employed. Furthermore, if it is not desired to use a web of maximum length it is possible to change the relative speed of the conveyer so that satisfactory results may be obtained with a shorter web.

It will now be seen that we have provided a simple and positive apparatus whereby almost any desired number of pieces of music may be played in succession, the first piece of the series being always ready to be played over again as soon as the last is finished. It will also be seen that the web is manipulated gently though positively and that all long folds are avoided, thereby insuring long life to the web. Furthermore the use of our improved mechanism does not detract from the appearance of the instrument to which it is attached; the attachment does not take up any room which would ordinarily be of value for other purposes; and the web and working parts are effectively shielded from moisture or injury.

In order to make our invention clearly

understood we have illustrated and described in detail a single embodiment of our invention which has been found to operate satisfactorily in practice. It will of course be understood, however, that we do not desire to be limited to the structural details thus illustrated and described, since the broad features of our invention may be carried out in various ways. For example we have shown only one type of conveying apparatus; but it is evident that all of the advantages of the particular conveyer illustrated and described may be obtained in other ways.

The various modifications which we intend to cover will be evident from the terms employed in the definitions which constitute the appended claims.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the character described, a web-receiving chamber, an endless web within said chamber, a web-feeding device through which said web passes, and means independent of the web-feeding device for carrying said web away from said device after it has passed therethrough.

2. In an apparatus of the character described, a web-receiving chamber, an endless web within said chamber, a web-feeding device through which said web passes, and means for progressively conveying said web from said device after it has passed there-through.

3. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in said chamber in a series of folds, a feeding device through which said web passes, and means for carrying away from said device the folds of the web as the web emerges from said device.

4. In a device of the character described, a web-receiving chamber, an elongated web arranged within said chamber, a device located at one end of the chamber for feeding said web, and means for carrying the web to the opposite end of the chamber after it leaves said device.

5. In a device of the character described, a web-receiving chamber, a long endless web arranged within said chamber in a series of folds, a device arranged at one end of said chamber for feeding said web and laying it in folds in the chamber, and means for conveying the folds that are formed at the feeding device toward the opposite end of the chamber.

6. In a device of the character described, a web-receiving chamber, a table extending longitudinally of the chamber, an endless web having a portion thereof lying upon said table and the remainder arranged in folds within the chamber on the other side of the table, a device arranged at one end

of the chamber for receiving the web from the table and feeding it in the folded condition into said chamber, and means for carrying the folds of the web to the opposite end of the chamber.

7. In a device of the character described, a web-receiving chamber, a table extending from one end of the chamber to the other, an endless web having a portion lying upon said table and the remainder arranged in folds within the chamber on the other side of the table, a device arranged at one end of the table for drawing the web out of the chamber at the opposite end of the table and across the table and feeding it into the chamber, and means for carrying said web toward the opposite end of the chamber as it leaves said device.

8. In a device of the character described, an elongated horizontal web-receiving chamber, a table extending across the top of said chamber, an elongated web a portion of which lies upon said table and the remainder of which is arranged in folds beneath the table, a device arranged at one end of the table for drawing the web across the table from the opposite end thereof and feeding it into the chamber in the form of folds, and means for gradually carrying the folds of the web from said device toward the opposite end of the chamber.

9. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in a series of folds within said chamber, a device at one end of the chamber for drawing the web from the opposite end of the chamber and feeding it back into the chamber at the end thereof at which said device is located, and a conveyer for gradually carrying said web from the point at which it leaves said device toward the opposite end of the chamber.

10. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in a series of folds within said chamber, a device at one end of the chamber for drawing the web from the opposite end of the chamber and feeding it back into the chamber at the end thereof at which said device is located, and a conveyer for gradually carrying said web toward the opposite end of the chamber, said conveyer having a series of arms projecting across said chamber to divide it into a series of compartments.

11. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in a series of folds within said chamber, a device at one end of the chamber for drawing the web from the opposite end of the chamber and feeding it back into the chamber at the end thereof at which said device is located, and a conveyer for gradually carrying said web

from the point at which it leaves said device toward the opposite end of the chamber, said conveyer consisting of an endless belt having thereon a series of arms arranged to
5 extend across the chamber so as to divide it into a series of compartments.

12. In combination, a self-playing musical instrument, a web-receiving chamber extending across the top of said instrument, a web
10 within said chamber, means for feeding said web, and a conveyer for the web arranged in said chamber and projecting downwardly into said instrument.

13. In combination, a self-playing musical
15 instrument, a web-receiving chamber extending across the top of the instrument, a table extending across the top of said chamber, an endless web having a portion thereof lying upon said table and the remainder arranged in folds beneath the table, and means
20 at one end of said table for drawing the web out of the opposite end of the chamber and across said table.

14. In combination, a self-playing musical
25 instrument, a web-receiving chamber extending across the top thereof, a table extending across said chamber at the top of the chamber, a continuous web having a portion thereof lying upon said table and with the
30 remainder arranged in folds beneath the table, a device at one end of the chamber for drawing said web across the table from the opposite end of the chamber and feeding it into the chamber at the end at which
35 said device is located, and means for gradually feeding the folds of the web from said device toward the opposite end of the chamber.

15. In an apparatus of the character described, a web-receiving chamber, an elongated table within said chamber, an endless web having a portion thereof stretched across one side of the table and the remainder lying in folds on the opposite side of the
40 table, and a device at one end of the table for drawing said web across the table and feeding it back into the chamber in a folded state.

16. In an apparatus of the character described, a web-receiving chamber, an elongated table of a length considerably greater than the width thereof arranged within said chamber, an endless web having a portion thereof stretched across one side of the table,
50 guides on said table for positioning the web, means for drawing the web across the table, and means for maintaining that portion of the web on the table under tension.

17. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in a series of folds within said chamber, means at one end

of the chamber for drawing said web from the opposite end of the chamber and feeding it back into the chamber in the form of
65 folds, and a conveyer having a series of arms adapted to extend across said chamber and divide it into compartments, means for actuating said conveyer to move said arms across the chamber toward the end from
70 which the web is drawn, and means for rigidly supporting said arms as they are traveling through said chamber and for permitting them to yield so as to drop out of the chamber when they approach the end thereof.
75

18. In a device of the character described, a web-receiving chamber, a long endless web having the major portion thereof arranged within said chamber in a series of short folds and the remainder extending from one end
80 of the chamber to the other in an unfolded condition, a device arranged at one end of the chamber for drawing upon the unfolded portion of the web and laying it in folds in the chamber, and means for conveying the
85 folds that are formed by said device toward the opposite end of the chamber.

19. In a device of the character described, a web-receiving chamber, a table extending across said chamber near the top thereof, a
90 long endless web having a portion lying upon the table and the remainder arranged in a series of short folds beneath the table, a device for feeding said web across the table and laying it in folds beneath the table, and
95 means for conveying the folds that are formed at the feeding device toward the opposite end of the chamber.

20. In an apparatus of the character described, a web-receiving chamber, an elongated endless web arranged in a series of short folds within said chamber, a device at one end of the chamber for drawing the web toward the opposite end of the chamber and feeding it back into the chamber at the end
105 thereof at which said device is located, an endless conveyer extending lengthwise of said chamber, said conveyer having a series of arms which are adapted to project into the chamber and form a series of fold-receiving compartments, and means for slowly actuating said conveyer at a rate which will permit each of said compartments to be filled with folds before the next compartment is brought into fold-receiving relation with respect to said device.
110

In testimony whereof, we sign this specification in the presence of two witnesses.

CHARLES H. HAMILTON.
GEORGE R. THAYER.

Witnesses:

WM. F. FRENDENREICH,
HARRY S. GAITHER.