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What to Look for when

Repairing Musical Boxes

By GLENN P. HECKERT

WHEN music boxes were purchased new their owners might have thought that no repairs would ever be necessary. Imagination can easily picture the purchasing of a music box at any one of several establishments in the cities. It would be quite a pleasure to hear the various types and sizes playing when new. In 1908 I looked in the window of the Jacot establishment on Union Square, New York, but I saw victrolas there. I had mild curiosity but was not particularly interested in music boxes then.

In the intervening years the music boxes had faded out until an occasional person began to look them up. But how about cleaning them up and restoring them to the condition they were in when purchased way long ago? The music box looked innocent enough for anybody to fix it. That is not so—the music box was of slow development and required unfailing attention to detail to produce the pleasing music that one would expect from such a finely-finished instrument in an artistic case and with a pretty card having the titles written with neat penmanship.

In order to bring a music box back to a satisfactory standard of performance the mechanism must operate steadily and silently and the musical part must function smoothly without clicking or rasping and be in tune. In other words, the playing tells the story. The cleaning and polishing of the works and case certainly contribute to the pleasure of owning a music box.

The Swiss plan of manufacture has always been to develop a model expertly engineered then to parcel out the parts manufactured to specialists. These are finished down to near size. The final trimming down, fitting and polishing is done by the finisher.

POOR FITTING

The music box maker bought his parts and made up his boxes according to the specifications of his customer. If there was to be any competition on the matter of price he had to cut the rates to the finisher, the tuner and adjuster. The short cuts which resulted show up in the restoring and necessitate the doing over of some of the most elementary operations; all of which takes much time. We also find the same condition in Swiss watches. For illustration: a Geneva box is usually fastened into the case with long screws which go in through the front and back of the case and are tapped into the edge of the base plate of the works.

These holes in the base are not often tapped with a full thread and the screws are shortened by the finisher until they bind, just as the heads begin to tighten against the case, which is not right. Since all music box threads were metric, no modern hard steel tap to match the threads and retap the hole can be bought. In this case I have drilled the holes in the iron deeper, run a tap of about 10-24 size in the hole and used an ordinary screw with fillister head, turning the head down to fit the washer.

Nearly all music boxes have greatly overpowered mainsprings. This was probably the easiest way to overcome additional friction caused by the faulty fitting all the way from the barrel to the fan. The result of this was excessive wear in vital points and an unpleasantly fast tempo to the music.

In that day the tools were crude and probably the manufacturer could not afford the expensive automatics of to-day such as the turret lathe and its equipment. The drills were flat drills and the taps were also hand-made and not fluted. The brass of the barrels and bridges was soft, causing the holes to wear. The steel of the barrel arbors and screws often contained seams and cracks, and was not nearly as good as our common machine steel. The depthing of the gearing was often shallow, necessitating the moving by the restorer of parts never intended to be moved. The governor wheels were seldom truly parallel in the frame, causing excessive friction in the meshing of the wheels. The fan was seldom planted exactly in front of the escape wheel. The worm staff was sometimes warped in hardening. This must be straightened with great care. The cylinder bearings were frequently too close together causing the cylinder to bind and turn hard. This extra force required in the mainspring to drive the box would cause the oil in the worm and its pivots to dry. The worm would cut and the jewel would pit, causing the governor to slow up and stop.

BAD WORKMANSHIP

This, of course, is where the "shoemaker" work would come in. The inexperienced watchmaker would file the escape wheel teeth and point the upper pivot of the worm, instead of recutting and polishing the worm. Sometimes he would put in a still stronger mainspring. Some would move the escape wheel over on the pinion. Then it would run on a new place on the worm long enough for him to get his money. Often the stop work would be broken or removed in desperate effort to get

more force. Then the next step would be to wind the mainspring off the barrel hook. The result of this was the loud bang of the mainspring which would loosen the barrel hook and raise a place like a carbuncle on the outside of the barrel. Sometimes one or more teeth were broken out of the barrel. Sometimes the noses of the clicks were worn round, the click screws often bent or pulled out—the holes in the lever and bridge becoming elongated. This necessitates oversize tapping and new screws made with the threads fitting friction tight.

Now for the musical part. The cylinders often do not contain sufficient cement and the cement is often loose or run to one side preventing the cylinder from sliding on its shaft. The steps on the star wheel are often of irregular height or worn and will not centre the cylinder pins properly on the teeth. That is, some tunes may play all right and others will not.

Then the cylinder pins are nearly always worn rounded on the ends from lack of the slight lubrication they need. Also they are often worn in spots causing the cylinder to be untrue. Often the original "shaving" of the cylinder, after pinning, was done on an untrue or worn shaving tool or lathe. To-day this can be truly corrected on an accurate lathe with a grinding attachment which is tested for parallelism before starting.

To be successful, this grinding is a slow process requiring about 1½ hours to grind the pins on a 16 in. cylinder. There are nearly always bent and broken cylinder pins. This requires much care and time for correction.

Sometimes the cylinder gear has teeth damaged. This is quite a difficult matter to repair or replace —absolute trueness being essential for the gear to work at all in its engagement with the governor.

Then the comb. Sometimes the lead weights have been attacked by moisture and are eaten away to such an extent that many must be replaced and extra lead added to others to bring the pitch down to the true tone. The points are sometimes worn round and some sideways. This requires most careful lapping to grind down to a proper sharp point. If only a few points are worn off at an angle, repointing is the correct procedure. This often happens in the last few bass teeth where the wear is greatest.

The replacement of broken teeth is about the most difficult and time-consuming job in a music box. But one does see a new tooth that is admirably done. The fitting must be perfect to give a clear, resonant tone. More often the new teeth are poorly fitted and not tuned at all.

TUNING THE COMB

The proper tuning of the comb is indeed an art. But like any other instrument, a properly-tuned music box is a pleasure to hear.

Of course, before the tuning is done the dampers must be gone over because if any new damper pins must be put in it may cause the tone of the tooth to be higher or lower according to the weight of the pin. Frequently some of the pins must be drilled out. On many boxes some of the higher teeth have the dampers soldered on. This weight of the new solder must be carefully pared down until the tooth comes to its true pitch.

You will frequently find many dampers of improper strength, some not pinned in straight or poorly shaped. Break off all that are beyond straightening or in any way defective before redampering. After the dampers are repaired and the comb tuned then it is put on, played awhile and then the dampers readjusted. Many combs are adjusted too deep causing the music to be harsh, wearing the dampers and shaking them off. The comb must be carefully set so both ends release together.

To clean the works thoroughly after 60 or 70 years of standing and then to polish and lacquer everything is quite a business. The cylinders in particular should be lacquered. The screw heads are usually burred from the use of a poor screwdriver and should be faced off smooth or polished for the sake of pride and good appearance. There are numerous extraordinary repairs such as cracked bed plates and cabinet work on the cases that I do not think necessary to cover in this article.

The tricky short cuts of the finisher, the wear from the lack of lubrication, the sabotage of incompetent repair men and the accumulated dirt of generations must be dealt with to make a good, lasting job. The repair man must be equipped to make almost anything and everything and have the experience—even of the worm and cylinder pins—to do it. Indeed, he must be a mechanical engineer and a metallurgist as well as willing to give a lot of time to the job, to restore a music box successfully. For these reasons definite estimates of repair cost can seldom be given in advance and the cost of the completed transaction is a matter of confidence. I have never known a capable workman to overcharge. I have seen incompleted jobs that did not sound satisfactory and were well charged for.

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