

# **Service Manual**

==== for the ====

# **Violano-Virtuoso**

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## **MILLS NOVELTY COMPANY**

**CHICAGO  
NEW YORK  
BOSTON**

**DETROIT  
PITTSBURGH  
CINCINNATI**

**DENVER  
ST. LOUIS  
DALLAS**

**KANSAS CITY, MO.  
SAN FRANCISCO**

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**Note:** These instructions are written in as simple and complete a form as possible, covering all details from the removing of the Violano from the wagon until the time that it is

playing. If you follow these instructions carefully, just as they are written, you will have no difficulty in making the installation properly.

### To Take Off Wagon

To take the Violano off of the wagon, three good men are necessary. The truck driver, the proprietor of the location, or one of his helpers and yourself will be sufficient.

Have the front of the shipping case facing the side-

walk. (The front is the side that has the door on it). Now, two men stay on the wagon and one man on the sidewalk. Tip the case backward until you can slide the case on its back from the wagon to the sidewalk.

### To Remove the Violano from the Shipping Case

It is best to take the Violano out of the shipping case before moving it into the store. First remove the front door of the shipping case by taking out the three wood screws and several nails from the three cross-piece boards on the front door. Next, take a monkey wrench and remove the four steel bolts from the rear of the shipping case—one in each corner.

Two men grasp the bottom of the Violano in the front. The third man balancing instrument at the top, so as to keep it from tipping either backward or forward. In this way, pull the Violano **half way**

out of the shipping case. When the Violano is half way out of the case, let the front end down so as to let the front casters rest on the sidewalk. Then two men raise the back of the Violano just enough to allow the third man to push the shipping case back away from it. Then let the back end of the Violano down until it rests on the sidewalk. Push the Violano into the store. Place the instrument in that part of the store which your investigation has shown to be the best-paying location. Be sure that a wall socket or electric light socket to connect to is nearby.

### To Install the Violano for Operation

First remove the paper hood which covers the entire Violano. Next cut the shipping cord which holds the keys to the Violano and which are tied at the back of the instrument. Cut the shipping cord

on the front doors and unlock the upper and lower doors. (The long key is for the upper door lock and the short key for the lower door lock.)

### If the Current is Alternating

Ask the proprietor if his store has alternating current or direct current. If it has alternating current, then open the lower doors of the Violano and see what the volts and cycles are that are stamped on the name plate on the converter. (See drawing No. 1 lower.) Then have the proprietor take you to where his electric meter is and see if the meter has the same volts and cycles marked on it as are marked on the converter. (This is generally marked on the

meter just below the dials.) These should be exactly the same. If they are not, notify us at once, as to what the cycles and volts are and do not, under any circumstance, connect the Violano to the wall socket. (This will happen in very few instances, but it is very important.) However, you may install the Violano with the exception of connecting it to the wall socket.

### If the Current is Direct

If the proprietor tells you that the current is direct current, there should be no converter with the Violano, as you would have no need for it. (The converter is used only to change alternating current to direct current.)

If the Violano has a converter, take a monkey wrench and take out the four bolts from the legs of the converter. (See drawing No. 1 lower.) These bolts hold the converter to the floor of the Violano and are used for shipping purposes only. After removing them, tie them together and leave them in the bottom of the Violano in case it may have to

be shipped again. Next, release four thumb screws from the four corners of the feeder frame. (See drawing No. 1 upper.) Simply unscrew these as far as possible. They are not to be taken out entirely, but loosened as far as they will go.

Next, open the supply box which is located beneath the lower shelf of the Violano on the right hand side. (See drawing No. 1 lower.) Take out a bottle of oil marked "Motor Oil," one small oil can, one large steel roller, which is called the "Contact Roller," two pieces of rosin, and an electric-light bulb.

Remove all wrapping paper and cord around the Violano, remove the wrapping cord from the governor (see drawing No. 1 upper). And also from tremolo plate (see drawing No. 1 upper). Remove

the shipping cord from both ends of the piano hammer rail. The hammer rail is the long, wooden rail across the front of the piano and against which the piano hammers rest.

Take the short keys and open the aluminum cash box on the right hand side of the Violano (see drawing No. 1 upper), take out the package which contains the tuning weights. Note: If the Violano is a DeLuxe Model, be sure you do not confuse the weights for the upper violin with those for the lower

violin. They are marked on the package. There will be four weights (eight, if the instrument is a DeLuxe Model)—one marked on the side with the letter "E"—one marked "A"—one marked "D"—one marked "G." These correspond to the "E," "A," "D," and "G" violin strings. The "G" string

is the heaviest and the one closest to you when you stand facing the violin. The "D" is the next heaviest and is next to the "G" string. The "A" string is next and the "E" string is farthest from you.

Take the "E" weight and fasten it onto the "E" tuning arm (see drawing No. 2). Do likewise with the "A," "D" and "G" weights. After the weights have been fastened to the tuning arms, take a screw driver and remove the shipping lug from the shipping bracket which holds down the tuning arms. (See drawing No. 2.) When the shipping lug has been removed, the tuning weights are automatically released, and the strings should be in tune. (If not, see explanation for tuning page 8.)

The tuning arms should be high enough away from the shipping bracket so as to allow the weights to swing freely, but should not be more than one inch above the shipping bracket (see drawing No. 2). The tuning arms are raised or lowered by tightening the small nut on the small threaded arm on top of each tuning arm. (See drawing No. 2.)

Be sure that all violin strings are in the grooves which are cut into the top edge of the violin bridge.

### **Be sure that violin bridge is directly under the two bridge pins above bridge. See drawing No. 4 To Put on Music Roll**

Remove the upper music-roll spool by pulling the left-hand side out first. Place the music roll on the spool according to instructions and illustrations which are pasted on the music roll and then place the spool back into position by pushing the right end (the end without the pin) in first. Then take the music roll end—the end with the metal ring on it—and push behind the contact roller. **(Be sure the paper is behind the contact roller.)** This is very important. Bring the paper down in back of and under the lower spool and fasten the metal ring on the pin in the middle of the lower spool. Then turn the feeder switch to "start."

When the instrument starts, take the small oil can and fill the oil tubes on either side of the converter

(See drawing No. 3.)

Be sure that the feeder switch (see drawing No. 1 upper) is turned to "off."

Open the lower doors of the Violano and unfasten the extension or electric-light cord which is fastened around the upper and lower spools on the feeder. Place one end of this cord into the electric-light socket on the wall of the store and put the other end into the socket on the left hand side and on the back of the Violano.

Take the two small cakes of rosin and place in the small rosin box which is located just above the small disc bows. (See drawing No. 3.)

Make sure that the feeder switch is turned to "off." Then take the contact roller and, pushing the right end in first (see drawing No. 1 upper), fit it so that the roller spins freely when you turn it with your hand. When turning the contact roller with your hands, look to see if the governor (see drawing No. 1 upper) spins with the roller. If it does not, you have not put the roller in so that it fits on the bearings on either end. (It must be taken out and put back so that it fits on the bearings.)

by taking off the cap screws on the tops of these tubes (see drawing No. 1 lower). Put in enough oil to fill up these tubes. Then put oil in the two small oil holes on either side of the feeder motor (see drawing No. 1 upper). Put in enough to fill up these holes.

If you have followed these instructions closely and carefully, the Violano should be playing perfectly.

It is advisable, before leaving the customer, to take your "Instructions for Minor Adjustments on the Violano" and instruct him on minor adjustments that he might make himself.

Small electric-light bulb, which you found in supply box, should now be screwed into its socket in upper compartment of instrument.

## **INSTRUCTIONS FOR MAKING MINOR ADJUSTMENTS ON THE VIOLANO**

### **How to Tune Violin to the Piano**

In order to tune the Violin, you must first turn the feeder switch (see drawing No. 1 upper) to "rewind," and let the music roll rewind for a short distance and then turn the feeder switch to "off." This has to be done in order to disengage the feeder brushes from the contact roller. It will also allow the violin bows to revolve without the music playing.

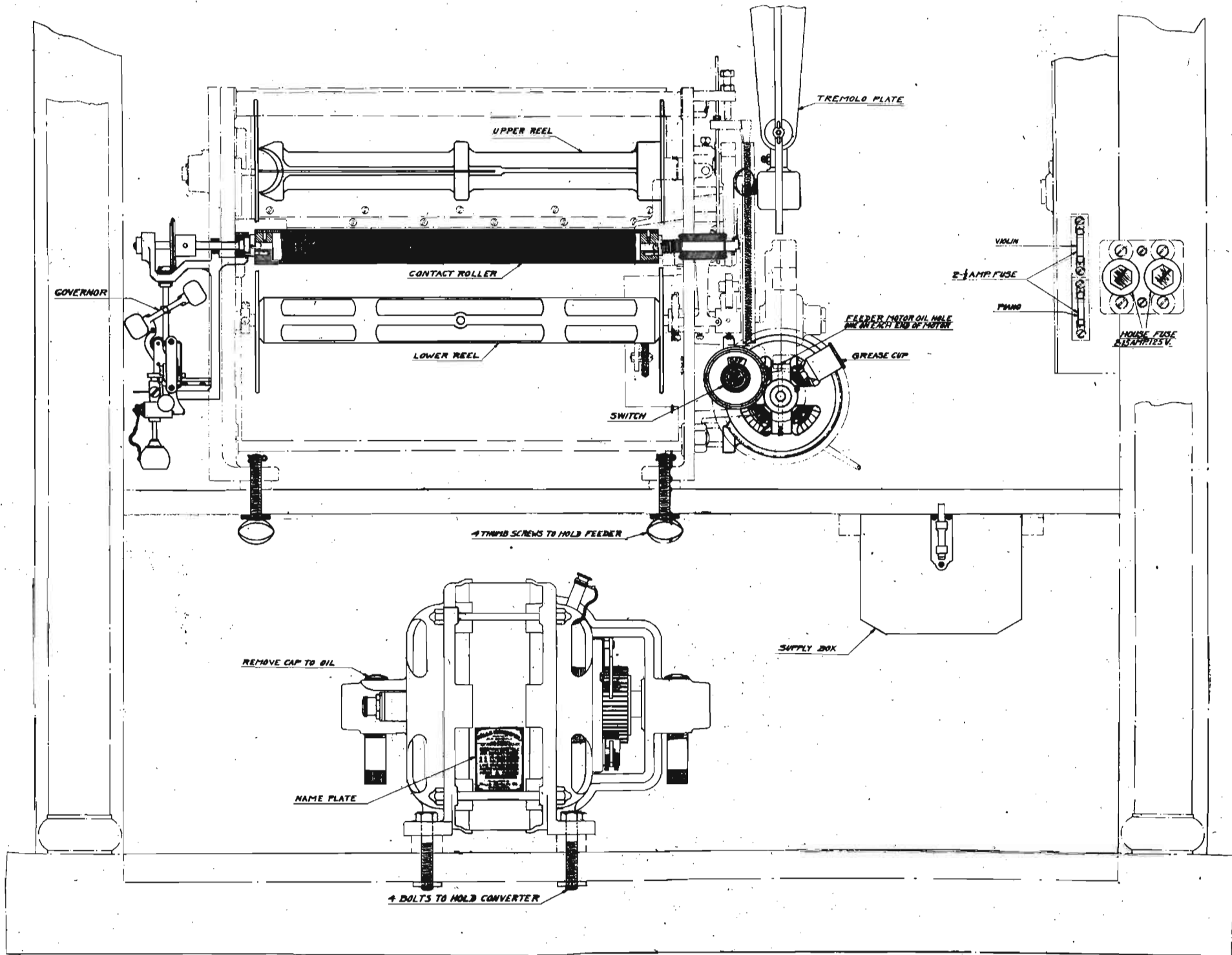
There are four small buttons on the tuning device in front of the violin. These buttons are marked "A," "E," "D," "G"—one for each string on the violin. Press the button marked "A" and, by so doing, you will play the "A" note on the piano and also the "A" string on the violin. If the violin string is higher in tone than the "A" note on the piano, the tension of the "A" tuning weight must be released. This is done by turning the small tuning nut at the top of the "A" tuning weight toward you. If the tone of the violin string is lower than the "A" note on the piano, this screw must be turned away from you, so as to increase the tension of the string and consequently, raising the tone. In this way, get the tone of the "A" string exactly the same as the tone of the "A"

note on the piano.

Now, when the "A" string is in tune, you must tune the "E" string to the "A" string. So push the "E" button. By doing this, you will play the "E" string and also the note "E" on the "A" string. These two notes must have the same tone. (Remember, the "A" string is in tune, so do not move the "A" weight.) Now, by turning the tuning nut at the top of the "E" weight, either backward or forward, you will lower or raise the tone of the "E" string until it has the same tone as the "E" note on the "A" string or until both tones sound like one.

Now the "D" string must be tuned to the "A" string. Do this by pushing the "D" button which plays the "A" string and also the "A" note on the "D" string. By turning the tuning nut on top of the "D" weight you will make these two tones sound like one.

Then by pressing the "G" button, you play the "D" string and also the note "D" on the "G" string. By turning the tuning nut on the top of the "G" tuning weight, make these two tones sound like one.



DRAWING No.1

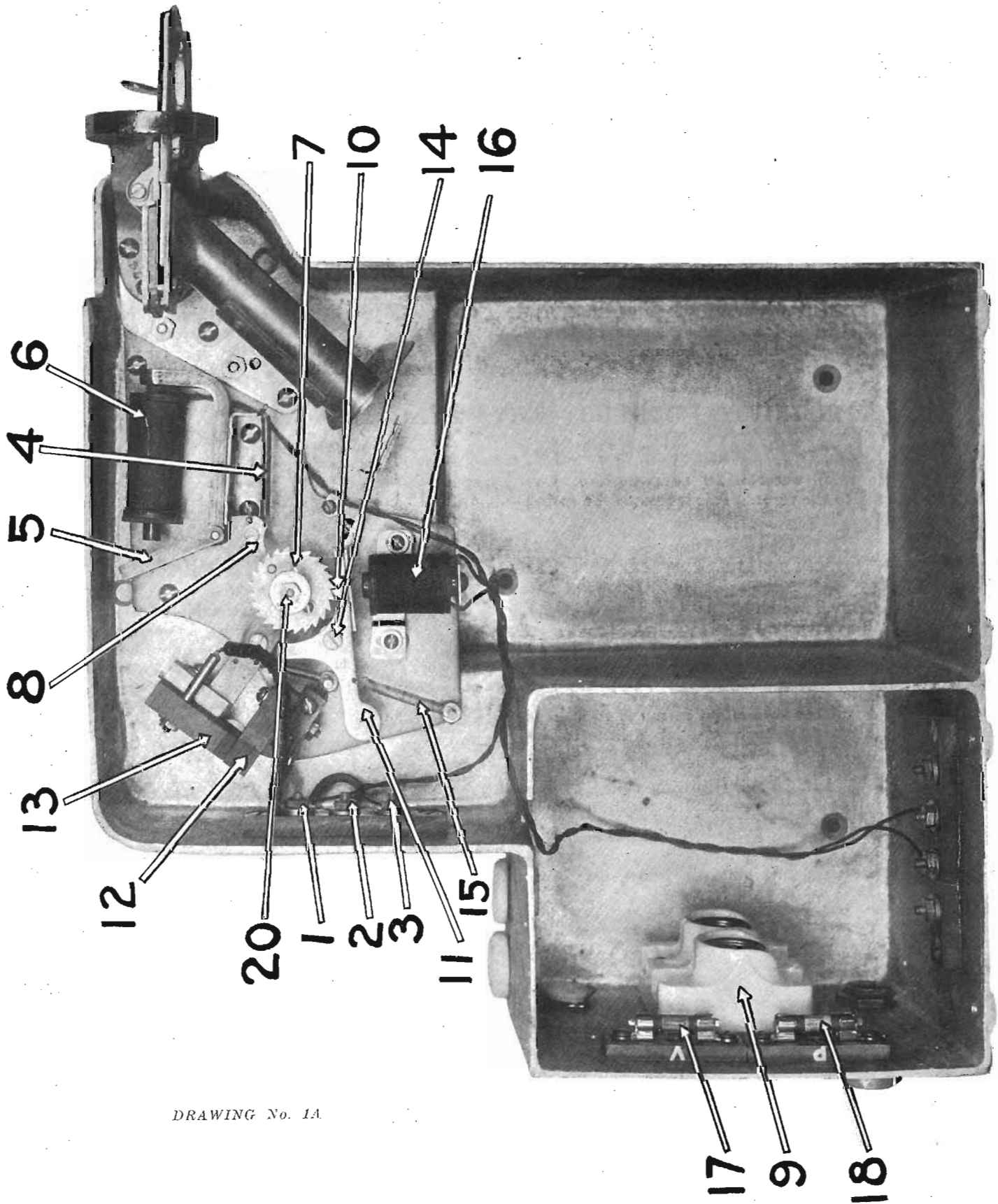
### How To Start Instrument

Turn feeder switch to start, place coin in slide and push slide in.

### How To Remove Roll

Start instrument, turn feeder switch to "Rewind," and when roll runs off bottom spool turn feeder switch

to "Off." Gently pull left end of upper spool upwards and towards you.



DRAWING No. 1A

### If Instrument Does Not Start

(1) See if small lamp in Violin cabinet is lit. If not, inspect main fuses in cash box.

(2) See that socket to which attachment cord is connected is alive by inserting electric light globe.

(3) See that instrument is connected in bottom of cabinet to work on kind of current location is supplied with (AC or DC).

(4) See that carbons No. 12 and No. 13 (Drawing 1A) are together and making good contact after depositing coin.

#### (If piano doesn't play)

(5) If Violin plays and piano doesn't, then fuse No. 18 (drawing 1A) is burnt out.

#### (If violin doesn't play)

(6) If Piano plays and Violin doesn't, then fuse No. 17 (drawing 1A) is burnt out.

#### (To renew fuses)

Renew 1/2-ampere fuse for single Violin and 1-ampere fuse for double Violin. See that fuses are held firmly in clips; if loose, squeeze clips together to make good contact. Use only genuine Mills' fuses

as increasing size of fuse may damage instrument and burn out magnets.

(7) If operating Violano on A. C. and converter does not start after inspecting the foregoing parts, then see that A. C. brushes are making good connection on converter collector rings and that springs have sufficient tension to keep the brushes forward. See that brushes do not stick in holders and are not oil soaked. See cut of converter No. 25.

(8) If music roll has stopped so that cut off hole has not passed clear of contact roller, then every time a coin is deposited cut off magnet No. 6 (drawing No. 1A) would become energized and instrument would not start. Turn lower spool forward and drop another coin.

(9) See that trip lever No. 11 (drawing No. 1A) goes down far enough when coin is inserted to release spur wheel No. 7 (drawing No. 1A) one tooth, thereby letting No. 12 and No. 13 come together and complete the circuit. If trip lever does not go down far enough see that "Bearing Screw" No. 14 is not binding. Drop a little oil on screw and work lever No. 11 up and down until it works freely.

### IF INSTRUMENT DOES NOT PLAY FOR ALL 15 COINS DEPOSITED

The spring tension on spur wheel No. 7 is insufficient. Loosen small nut No. 20 (drawing No. 1A) and turn washer to the right. This increases the spring

tension and spring should be strong enough to turn spur wheel one tooth every time a coin is deposited up to 15 coins.

### IF INSTRUMENT WILL NOT CUT OFF BUT CONTINUES TO PLAY

1. See that small switch No. 19 (drawing No. 1A) is turned to indicate current used A. C. or D. C.

2. Remove contact roller and see that No. 75 brush extends 1/8" from tracker bar. See drawing No. 13.

3. See that cut off hole is cut in music roll. This is a small hole cut after each selection a little to the left of center of paper.

4. See that spring No. 4 (drawing No. 1A) has sufficient tension to bring dog No. 8 in position shown in drawing.

5. See that cut off lever No. 5 works freely. If not drop a little oil on joint pin and work lever forwards and backwards until free.

6. See that cut off magnet No. 6 is alive. Take test cord—attach to test post on violin board and touch end to No. 3 binding post on cash box. If cut-off works from No. 3 post and not from No. 75 feeder contact brush then wire from No. 75 brush to cash box is broken. If cut off does not work from either No. 75 brush or No. 3 post then magnet No. 6 is dead and would have to be removed.

Cut off mechanism should be placed so that small dog No. 8 does not touch teeth of spur wheel in the idle position but on pulling lever No. 5 towards magnet it turns spur wheel back one tooth and by pulling lever over to cut off the current the lower dog No. 10 on trip lever should show a back lash of nearly half a tooth.

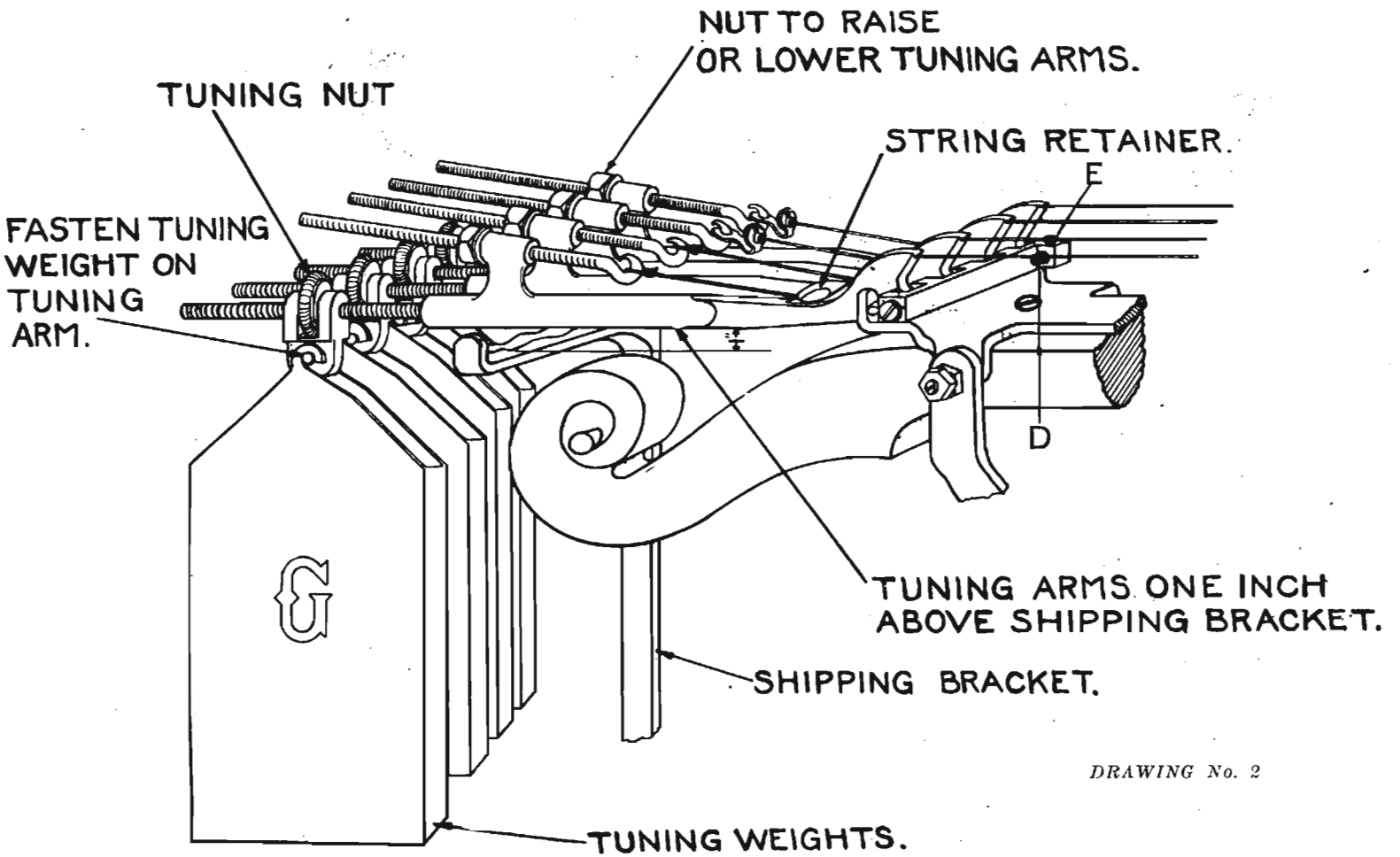
### To Replace a Broken Violin String

Our Violin strings are looped at one end and have a small eyelet at the other end. Put the eyelet in the small slot in the tailpiece at the end of the violin opposite the tuning weights, fasten the loop at the other end over the hook on the tuning lever at the

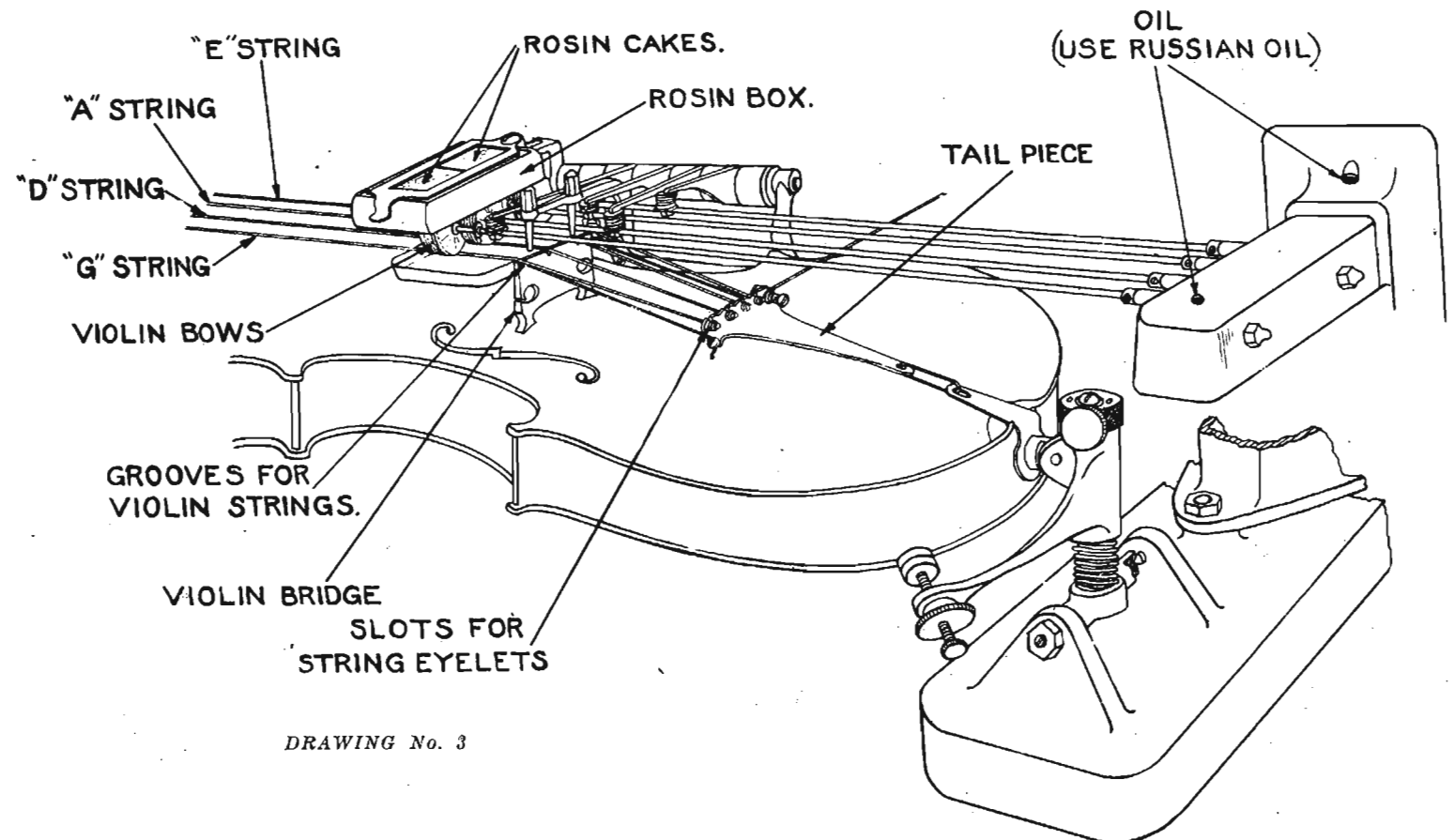
opposite end of the violin. (Be sure string is under the small string retainer near the hook (see drawing No. 2) and be sure string is in the proper groove on top of the violin bridge.) (See drawing No. 3.)

NOTE—Tuning lever must not rest on bracket as they will not keep proper tension on strings if they do so. Be sure you have proper strings in proper place.

Each string comes marked from factory and the tuning weights are stamped "E", "A", "D", "G".



DRAWING No. 2



DRAWING No. 3



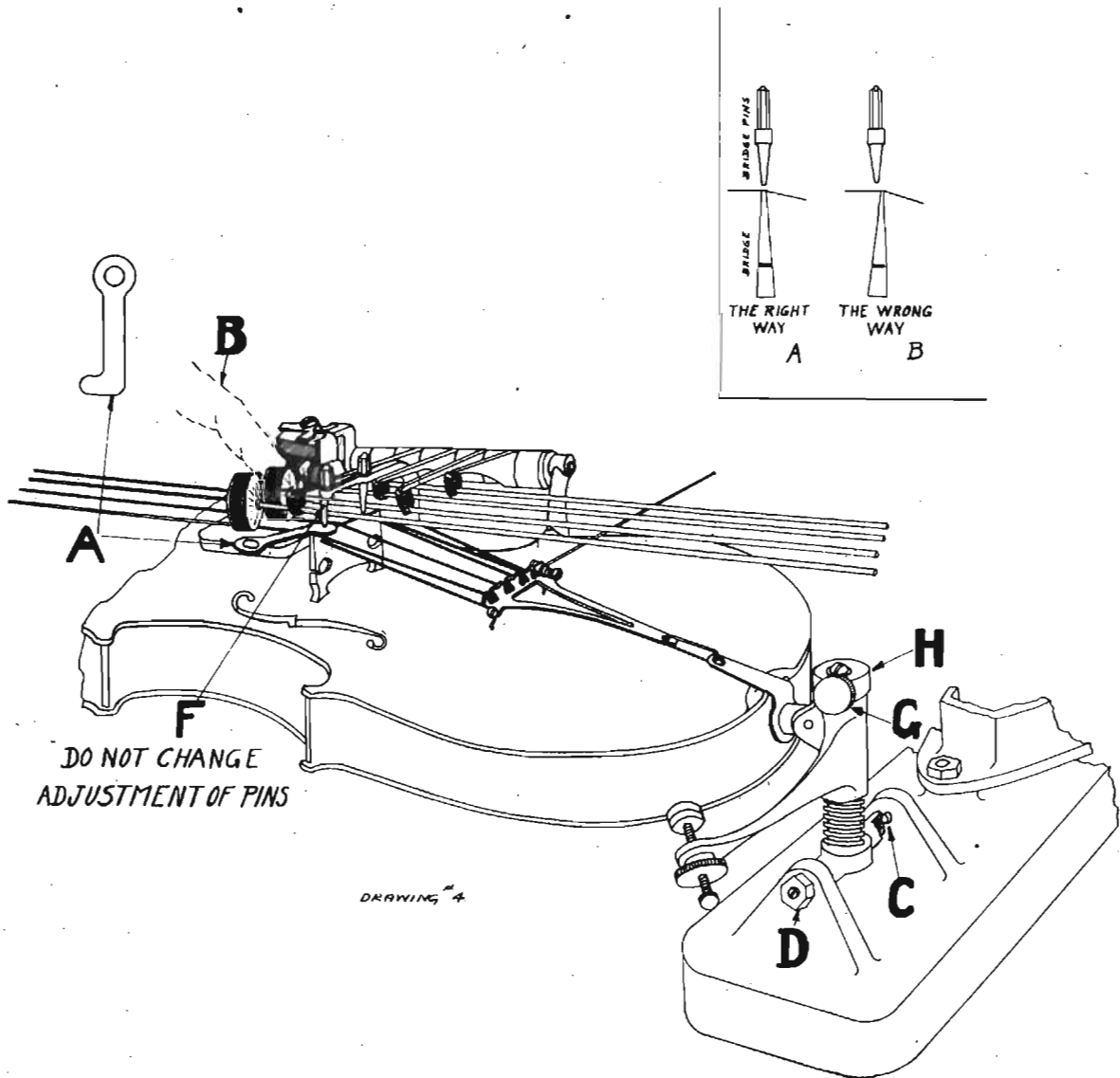
## ADJUSTMENT OF FINGERS TO STRING LINE

Before trying the following adjustments be sure that all strings are in proper notches on bridge.

The violin is in perfect string line when the fingers lift, the string hits in the exact center of the "V." If the fingers on lifting up at the front push string slightly to either side, then violin is out of line.

To align head of violin to fingers loosen screw "E" (drawing No. 2) and turn screw "D" in or out to move violin in the required direction. Tighten screw "E" after adjusting.

To align tail of violin to fingers loosen nuts "D" (drawing No. 4) and turn pivot screws C in or out moving tail of violin in the required direction.



DRAWING No. 4

## ADJUSTMENT OF VIOLIN TO RIGHT HEIGHT

This is important to get good tones. The violin is set to the correct height when violin gauge "A" fits snugly between bridge pins "F" (Drawing No. 4)

and violin bridge. Raise or lower violin by loosening screw "G" (Drawing No. 4) and turning screw "H."

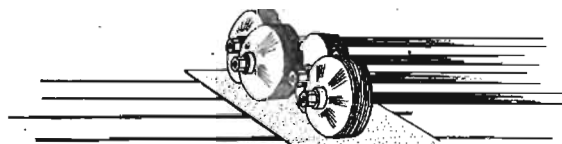
## VIOLIN BRIDGE MUST BE DIRECTLY UNDER BRIDGE PINS

Violin bridge must always be directly underneath and in line with bridge pins. See drawing No. 4. If

not, lift up tuning levers to relieve string tension and tap bridge at top lightly until directly under pins.

## A VIOLIN DOES NOT GIVE A CLEAR TONE CARE OF VIOLIN BOWS

The rosin box above the bows should always be supplied with rosin. If your bows get too much rosin you will get a coarse tone. Clean your bows by means of holding a soft tooth brush against bows when they revolve, Drawing No. 7. Then lay a piece of No. 00 sand paper on strings immediately under the bows, Drawing No. 6. Start instrument, turn feeder switch to "Rewind" until tracker bar falls back. Then turn feeder switch to "Off" and press each tuning button which will bring the bows down lightly against the



DRAWING No. 6



sandpaper for one minute. This will true up the bows. Then turn sandpaper over and clean the rosin that has accumulated on the strings. If there is not enough rosin on the bows they will give a whistling tone. See that your rosin cakes are not worn down too much. If so, turn them over, or renew, so bows have a chance to pick up some rosin. Re-rosin bows after using sandpaper by gently pressing rosin box down for a minute.



DRAWING No. 7

If you have oil on your bow it will get shiny and will give a whistling tone, then you must replace with a new bow. To change "E" and "D" bows you have to remove "A" and "G" bows first. Be careful that

small nut "N" does not roll inside of violin, as it is hard to get out and will cause a buzzing tone. Cover holes in top of violin before removing small nuts.

### If Bows Slow Down

Remove bow motor and gear covers.

See that commutator is clean. Clean same by pushing upwards on commutator cleaner while motor is running.

See that brushes are clean and making good contact on commutator and that spring tension is sufficient to push brush against commutator.

Clean gears by running a little gasoline thru' them while motor is running.

After all old oil and grease has run out, re-oil with Russian Oil.

See that Bow motor governor is adjusted according to drawing B.

### DISCORDS

Violin discords are caused by fingers not operating correctly and may be either fingers sticking, finger

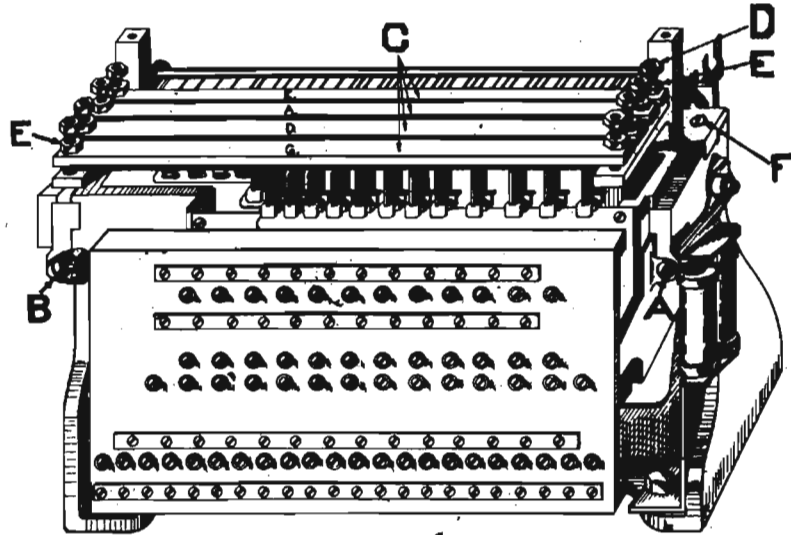
magnets shorted, finger magnets grounded, dead magnets or shorted wires leading to finger magnets.

### STICKY FINGERS

The fingers must be kept very clean. If fingers work sluggish and stick take off cover over finger-head and see if fingers are gummy and dirty and not working free in the slotted guides. If you find this to be the case brush out the front and rear slotted guides with benzole using the soft hair brush in the supply drawer. After cleaning re-oil the fingers at the slots with Russian oil. Do not use oil can but take a tooth pick and put one drop of oil on each finger. Never attempt to adjust the tension of finger spring as this spring is adjusted to the right tension at the factory and if fingers still stick the trouble must be

incorrect setting of fingers to the string i.e., the distance between the violin strings and front of finger.

To decrease the distance between fingers and strings turn screws "E" (drawing No. 8) to the left and be sure to tighten lock nut after adjusting. Turning these screws lower or raise stopper bars "C" which in turn raise or lower the back end of fingers thus shortening and increasing the distance between front of fingers and strings. If fingers are too close to strings then the strings will not vibrate properly and the notes would not be clear.

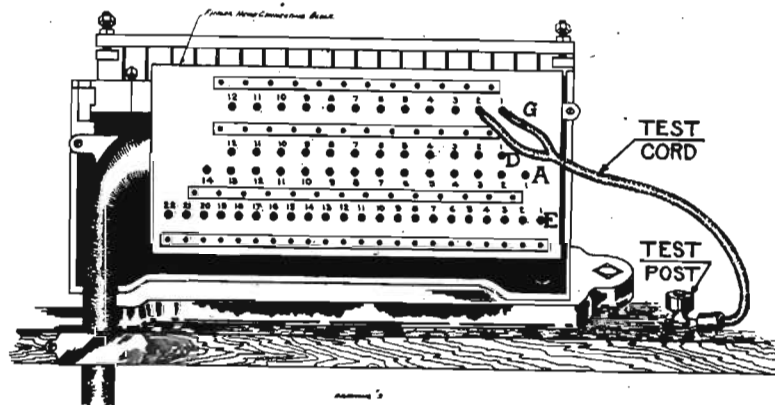


DRAWING No. 8

## TWO OR MORE FINGERS COMING UP AT THE SAME TIME

1. Finger magnet connecting clips may be shorted together on fingerhead connecting block.
  2. Feeder contact brushes bent or brush holders bent and touching each other.
  3. Two or more grounded finger magnets.
- To test for grounded finger magnets, start instru-

ment. Turn feeder switch to rewind and when tracker bar falls back turn feeder switch to "OFF." Connect test cord to test post on violin board and touch metal base of violin with other end of cord. Grounded finger magnets would become energized and violin would play. The fingers coming up would indicate the magnets grounded.

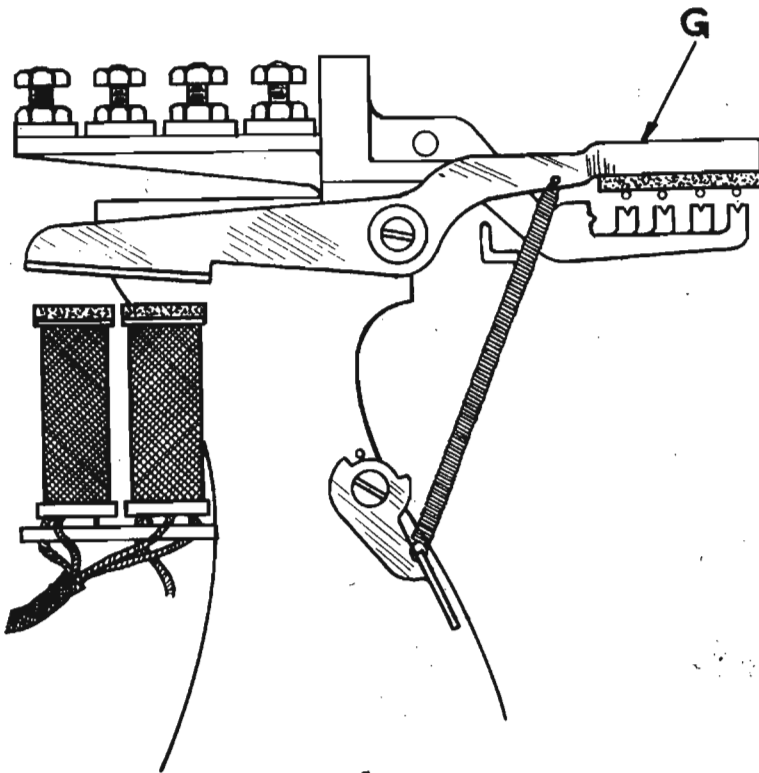


DRAWING No. 9

## SHORTED FINGER MAGNET

If a finger magnet is shorted, the finger would not come up but the open string would play. To test for shorted finger magnet start instrument as in testing for grounded magnet and touch end of test cord to inserts as in drawing No. 9. Touching insert No. 1 on the "G" line the first finger should come up if

by touching the second end of test cord to No. 2 insert (as in drawing No. 9) the second finger did not come up and the first finger also dropped then the second finger magnet is shorted. The most probable place for a short is the magnet connecting clip between insert and brass connecting strip.



DRAWING \*8-A.

## DEAD FINGER MAGNET

To test for a dead finger magnet proceed as in shorted finger magnet but use only one end of test cord. On touching the inserts individually a different note is played on the Violin for each contact made by the test cord. If no note is played on touching any insert then the magnet connected to that insert is dead.

## HOW TO REPLACE DEAD OR GROUNDED FINGER MAGNETS

Disconnect connecting clips of magnets to be removed. Remove fingerhead top by taking out screws "F" drawing No. 8. Take out screws "A" and "B" (drawing 8) and draw out magnet box. Unloosen nut on bottom of magnet with wrench furnished in supply drawer. Take out magnet and replace with new one. Connect both clips on connecting board and be sure connections are tight and clips do not touch any other clips.

## VIOLIN AFTERTONE

The aftertone damper "G" drawing No. 8A should firmly rest on all four strings when spring on side of magnet box stand is in the locked position that is spring extended, and damper should lift clear of strings when one or more open strings is playing.

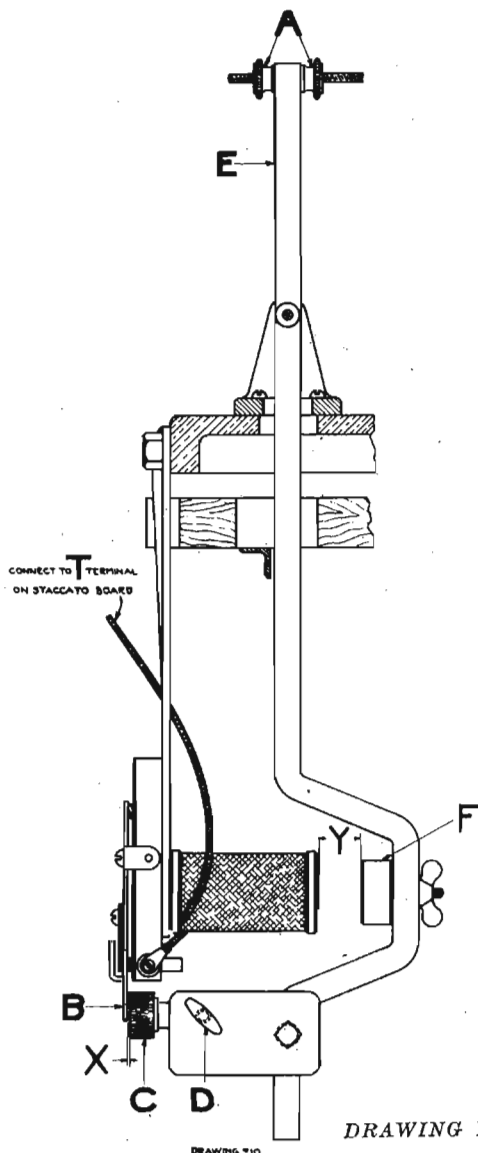
To test aftertone magnets use test cord as in finger magnet tests and on touching the "E", "A", "D", and "G", binding posts left side of staccato block or touching contact brushes Nos. 18, 45, 21 and 72 the aftertone damper should lift and open string should play. If the open string does not play from any of the binding posts mentioned then magnet is dead. If open string plays from binding posts and not from contact brushes the wire is broken between contact brush and staccatto block. If aftertone should lift on touching test cord to metal base of violin then magnet is grounded.

## Tremolo Adjustment

Loosen thumb screw "D" and push plunger "C" back as far as it will go. Then loosen lock nuts "A" so that tremolo shaker rod "E" will hang free and in balance. The weight at the bottom allows this rod to hang "true."

Next, tighten lock nuts "A" to each side of tremolo rod "E." This must be done in a careful manner in order not to move tremolo rod "E" out of balance. Then advance plunger "C" toward vibrator "B" leaving a space between "B" and "C" of about the thickness of an ordinary business card and tighten thumb screw "D." Distance between magnet and armature "F" should be about  $\frac{1}{2}$ ". To reduce tremolo increase air gap "Y," decrease air gap "X." To increase tremolo, decrease "Y" increase "X."

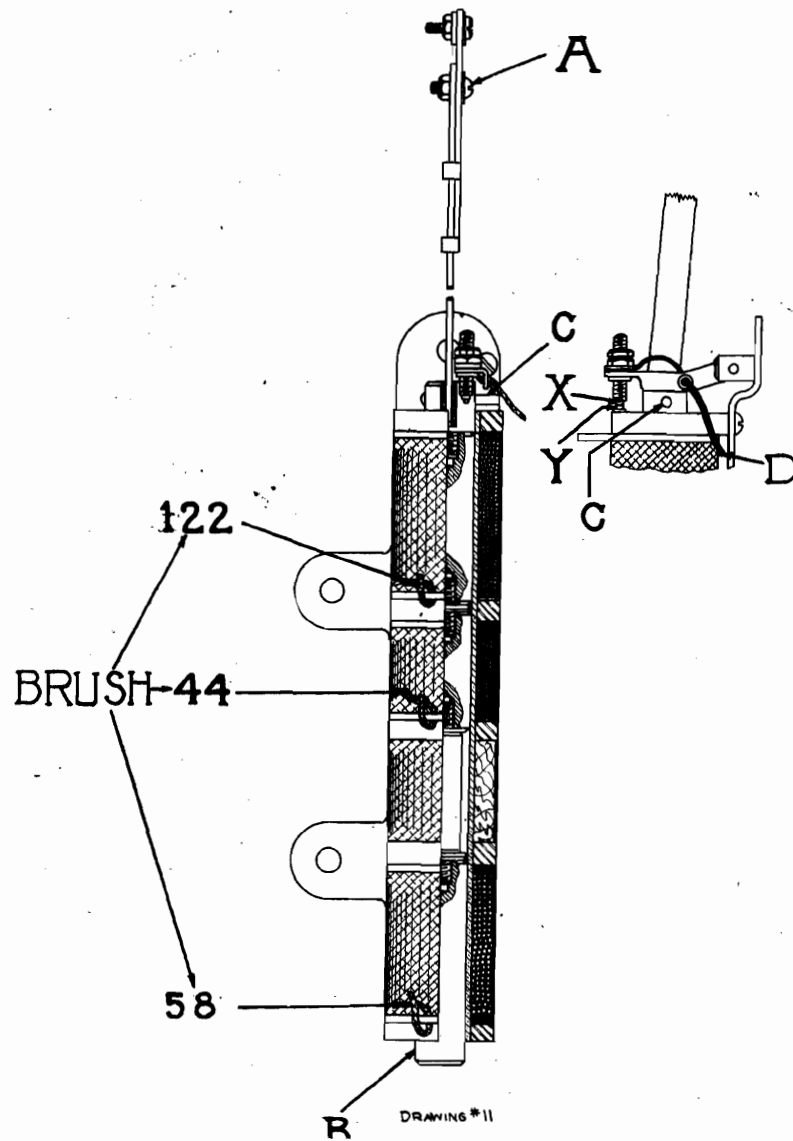
To test tremolo magnet, use test cord as in other magnet tests but be sure that tremolo breaker points are making good electrical contact. Touch test cord to post "T" on staccatto block. If magnet does not become energized then it is open. If magnet is shorted then Violin fuse would blow. If magnet becomes energized on touching cord to base of Violin then magnet is grounded. Repeat the above tests from No. 74 brush and if tests are correct from Post "T" and not from 74 brush then wire between tracker bar and staccatto block is broken.



DRAWING No. 10

DRAWING \*10





DRAWING No. 11

### VIOLIN MUTE DEVICE

The mute device is arranged to operate on the very soft position of piano hammer rail.

When piano hammers are  $\frac{1}{4}$ " from the strings the small switch "X" (drawing No. 11) on piano expression magnet should drop to make contact on plate "Y" and small pin "C" should be  $\frac{1}{16}$ " below switch arm as in drawing 11.

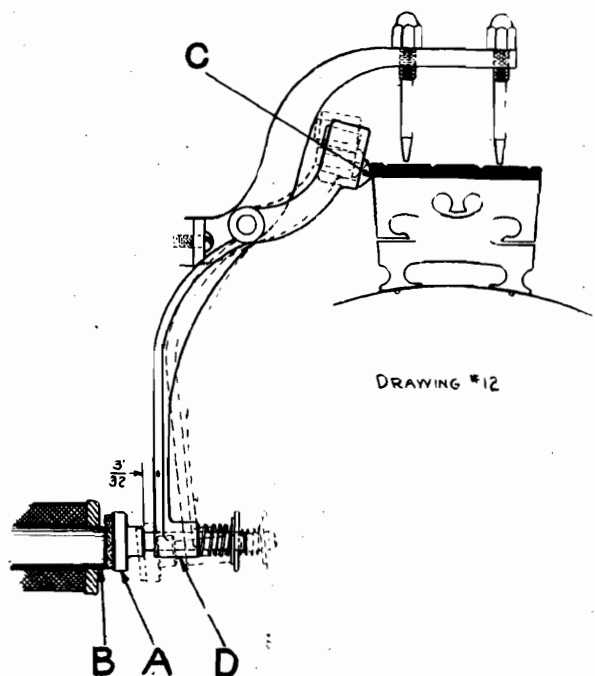
The mute magnet "B" (drawing No. 12) on becoming energized should pull the armature "A" (drawing No. 12) towards it. The mute pin "C" (drawing No. 12) should strike the bridge  $\frac{1}{8}$ " from the top. There should be  $\frac{3}{32}$  of an inch lost motion between armature "A" and mute lever "D" (drawing No. 12). This allows mute to make continuous contact with bridge while tremolo is working.

If mute does not work:

1. See that switch on piano expression makes contact when piano rail is in very soft position.
2. See that wire leading to mute switch is not broken.

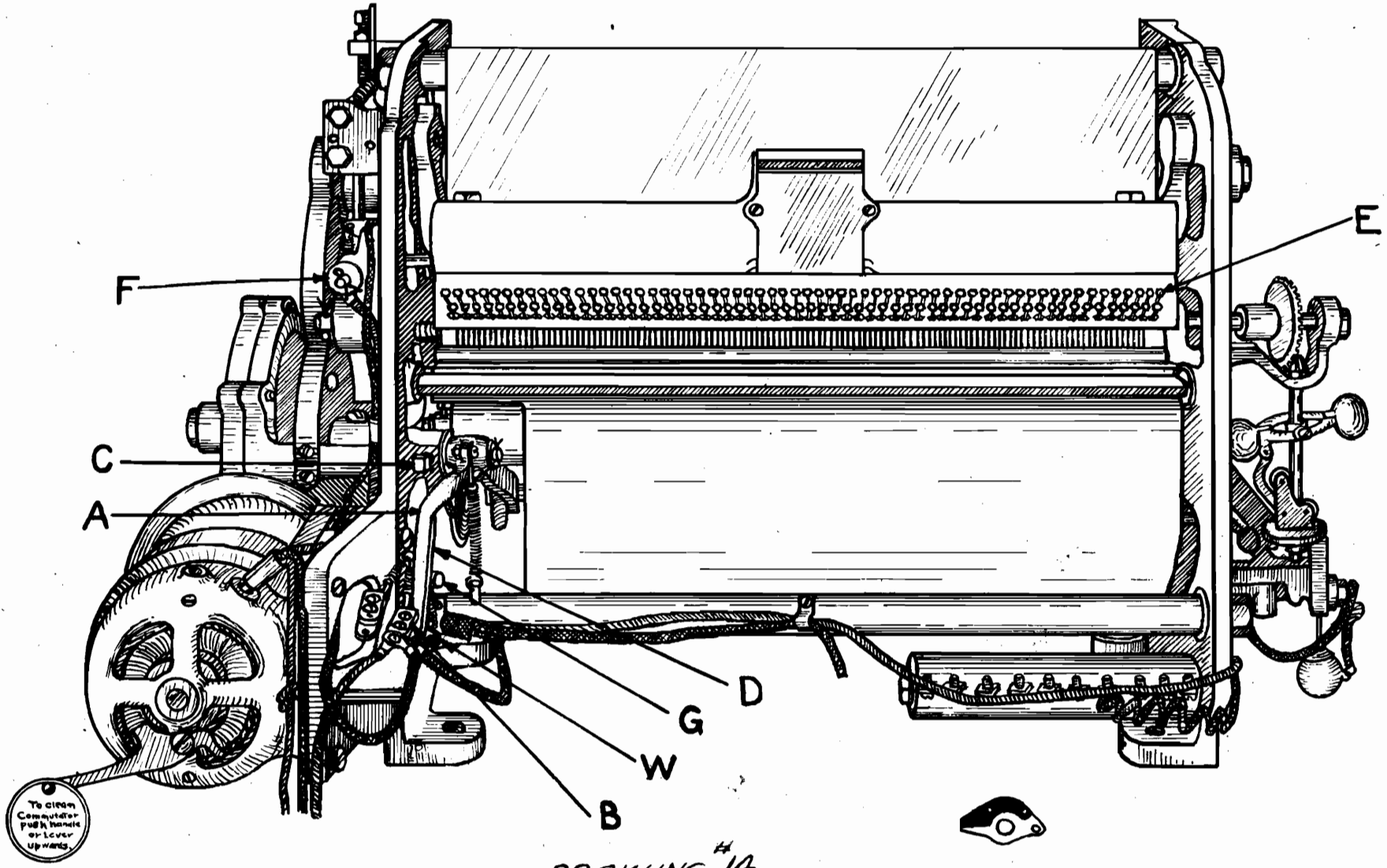
If mute operates all the time:

1. See that hammer rail is not striking in very soft position causing mute switch to make permanent contact.
2. See that mute switch wire is not grounding on any part of piano or expression magnet frame.



DRAWING No. 12

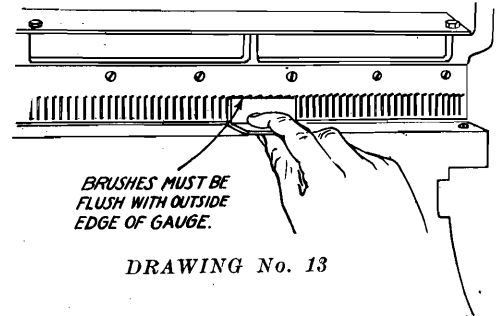
DRAWING No. 14



DRAWING #14

## The Feeder (When Notes are Missing on Violin or Piano) How To Adjust Feeder Contact Brushes

The feeder contact brushes must be kept one eighth ( $\frac{1}{8}$ " ) of an inch from the tracker bar. If one or more brushes get too short, you will experience missing notes for the reason that these short brushes cannot reach contact roller thru' perforation in music roll. In order to adjust these brushes, take out contact roller, which is very easily done by pushing roller to the right and pulling out. See on numbered paper strip right above contact brushes which brush is short and needs adjusting. Then go to back of feeder and brush holder "E" (Drawing No. 14) that has the same number printed over it, and screw short contact brush out to proper length using special wrench in supply drawer and gauge for measuring brushes from front of tracker bar. These brushes must all be even and the correct length in order to play perfectly. Clean your contact roller by means of wire brush supplied by us so that all corroded black matter comes off and leaves contact roller clean.

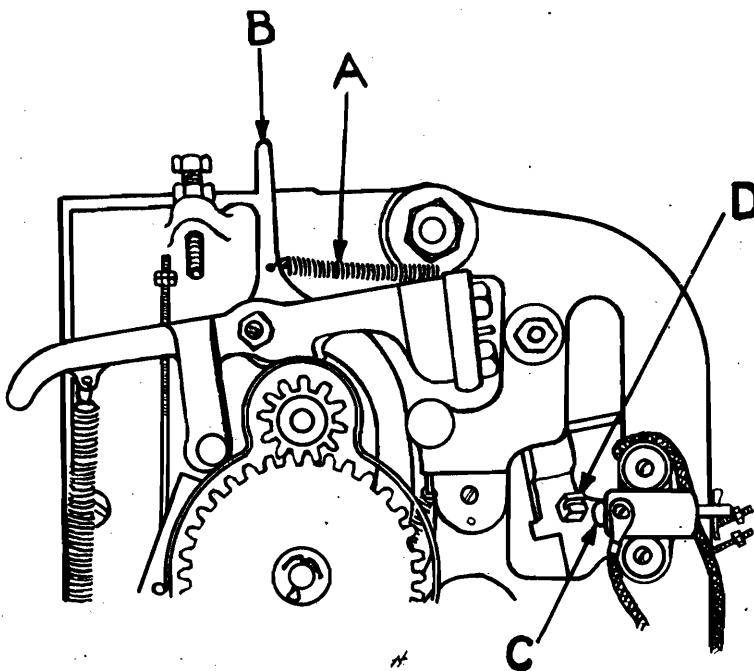


DRAWING No. 13

If feeder reverses and will not run forward.

If the foregoing condition arises and feeder reverses even when switch is turned to "START" and tracker bar is back and runs roll off of lower spool see if reverse lever "A" (Drawing No. 14) is sticking up. Release reverse lever "A" and if feeder continues to reverse, then feeder motor is getting a reverse field current permanently.

- (1) See that reverse wire between feeder switch and contact slide "B" (Drawing No. 14) is not grounding on frame.
- (2) No. 19 brush holder or wire leading to same may be grounded.
- (3) Set screw "C" may be piercing insulation.
- (4) Reverse contact "F" may be grounded.



DRAWING 15

DRAWING No. 15

### IF PAPER RUNS OFF THE TOP SPOOL

1. See that music roll has a perforation after the last piece on roll so that No. 19 brush can make contact on contact roller.
2. See that No. 19 brush extends  $\frac{1}{8}$ " from tracker bar.
3. See that arm "D" makes contact on brass pin "G" in arm "A" (drawing No. 14).
4. See that small flexible wire "W" between slide "B" and lever "D" is not broken (drawing No. 14).

If at the end of music roll the feeder reverses and then runs forward again then arm "D" is not making contact on reverse contact "C" (drawing No. 15) when tracker bar is tripped back. Plunger C is sticking in holder.

(If feeder tracker bar will not lift and lock automatically.)

1. If spring "A" on lock lever "B" (drawing No. 15) is broken then lever "B" would not be pulled back into locking position and tracker bar would lift and fall continuously.

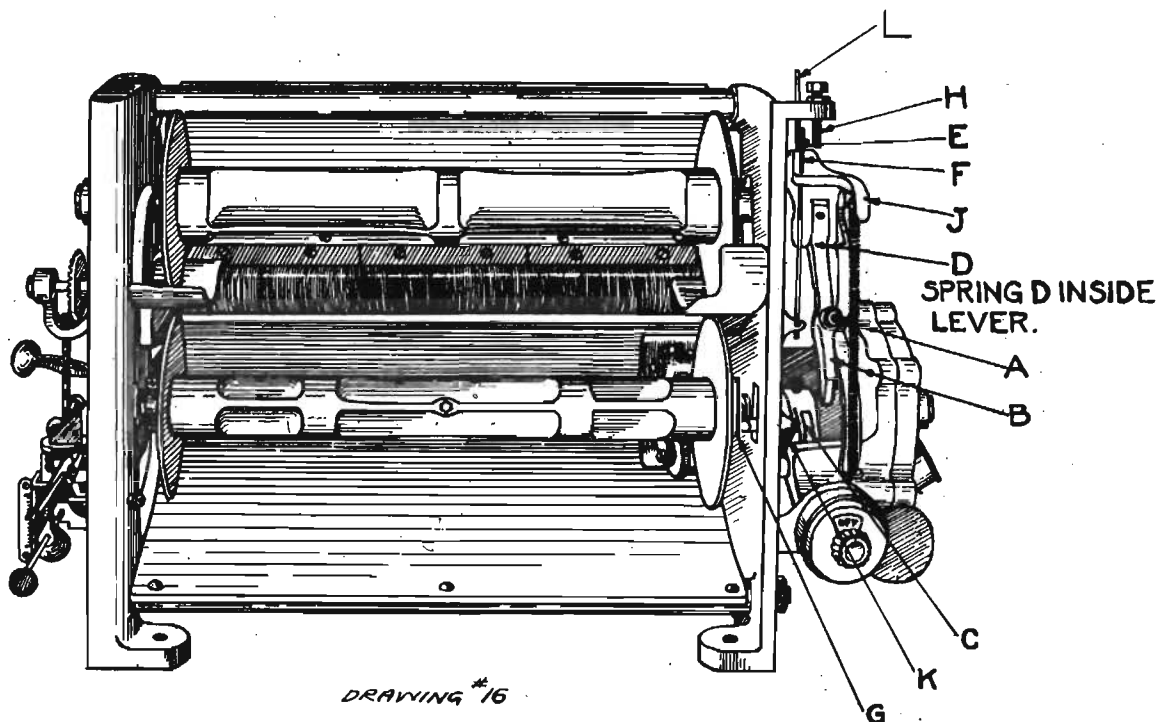
2. If spring "D" (drawing No. 16) inside lift lever "B" is broken or has insufficient tension then the dog "C" on housing will not lift the lever high enough so that back lever "B" (drawing No. 15) would snap into locking position and tracker bar would lift and fall continuously.

3. If lock nuts "E" (drawing No. 16) on brake rod "F" are screwed down too low then lift lever

would not lift high enough so that lock lever could lock. Adjust these nuts "E" so that in playing position, there is no tension on lower right hand spool disc from brake shoe "G." **ADJUSTMENT NO. 3 IS ALSO THE CORRECT LOWER BRAKE SETTING.**

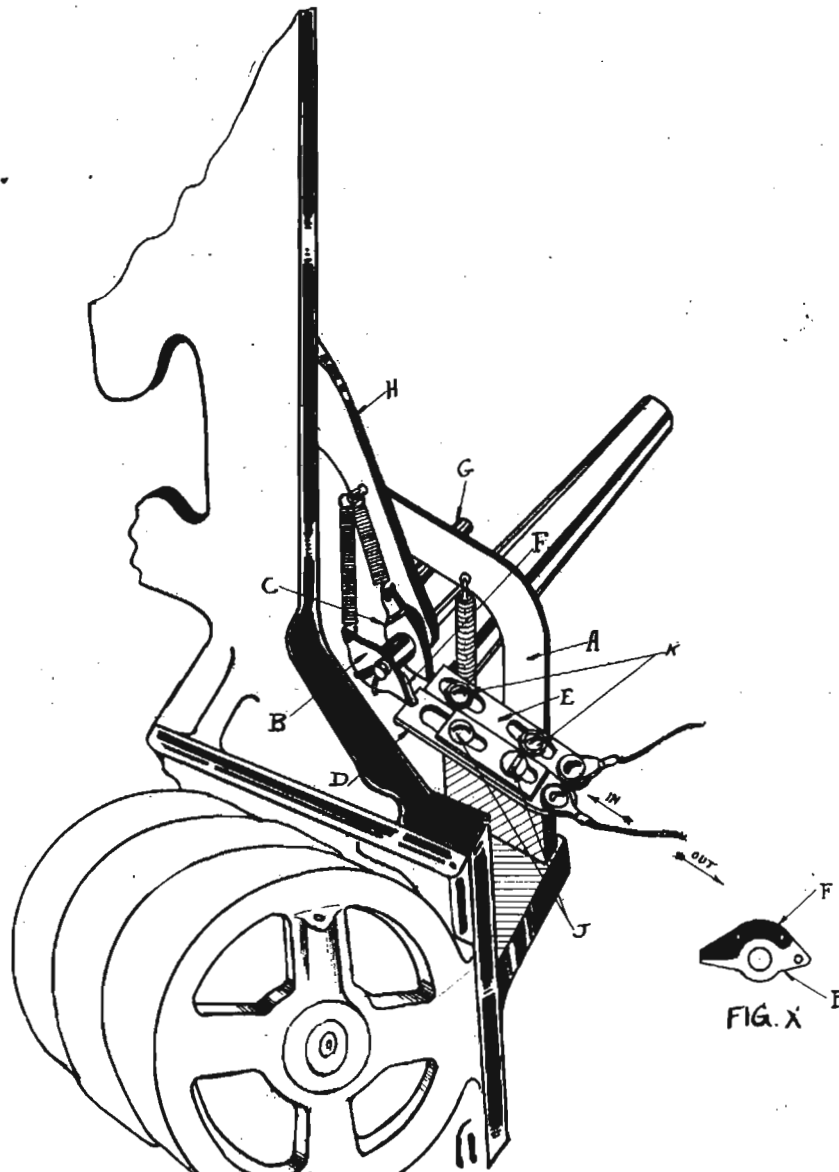
4. If safety screw "H" (Drawing No. 16) is turned down too far then lift lever could not lift high enough. This screw should be adjusted so that distance between the end of screw and arm "J" (drawing No. 16) is  $1/32$  of an inch.

5. Plunger "A" (drawing No. 16) should be adjusted so that lever "B" will fall far enough forward for driving dog "C" to catch it when tracker bar is away from contact roller, but lever must be in a position when instrument is playing so that driving dog "C" does not touch lift lever. Adjust by means of lock nuts on plunger "A" and be sure nuts are tightly locked after adjusting.



DRAWING No. 16





DRAWING

### Adjustment of Reverse Contact Mechanism

(1) The little dog "C" attached to aluminum lever that travels on lower spool must snap off metal sliding piece "E" when there is from five to eight turns of paper on lower spool.

If feeder reverses too soon, loosen screws "K,"

and adjust sliding piece "E" in, if the reversal comes too late move "E" out.

When adjustment is satisfactorily made be sure that screws "K" are firmly fastened.

### Adjustments of Automatic Rosiner Contact

(1) Fibre insulation "F" must be above dog "B" (Fig. X) preventing dog "B" from coming in contact with plate "D" on up stroke of arm "H."

Loosen screws "J" and adjust plate "D" (in or out) so that rosin lays on bows for about twenty

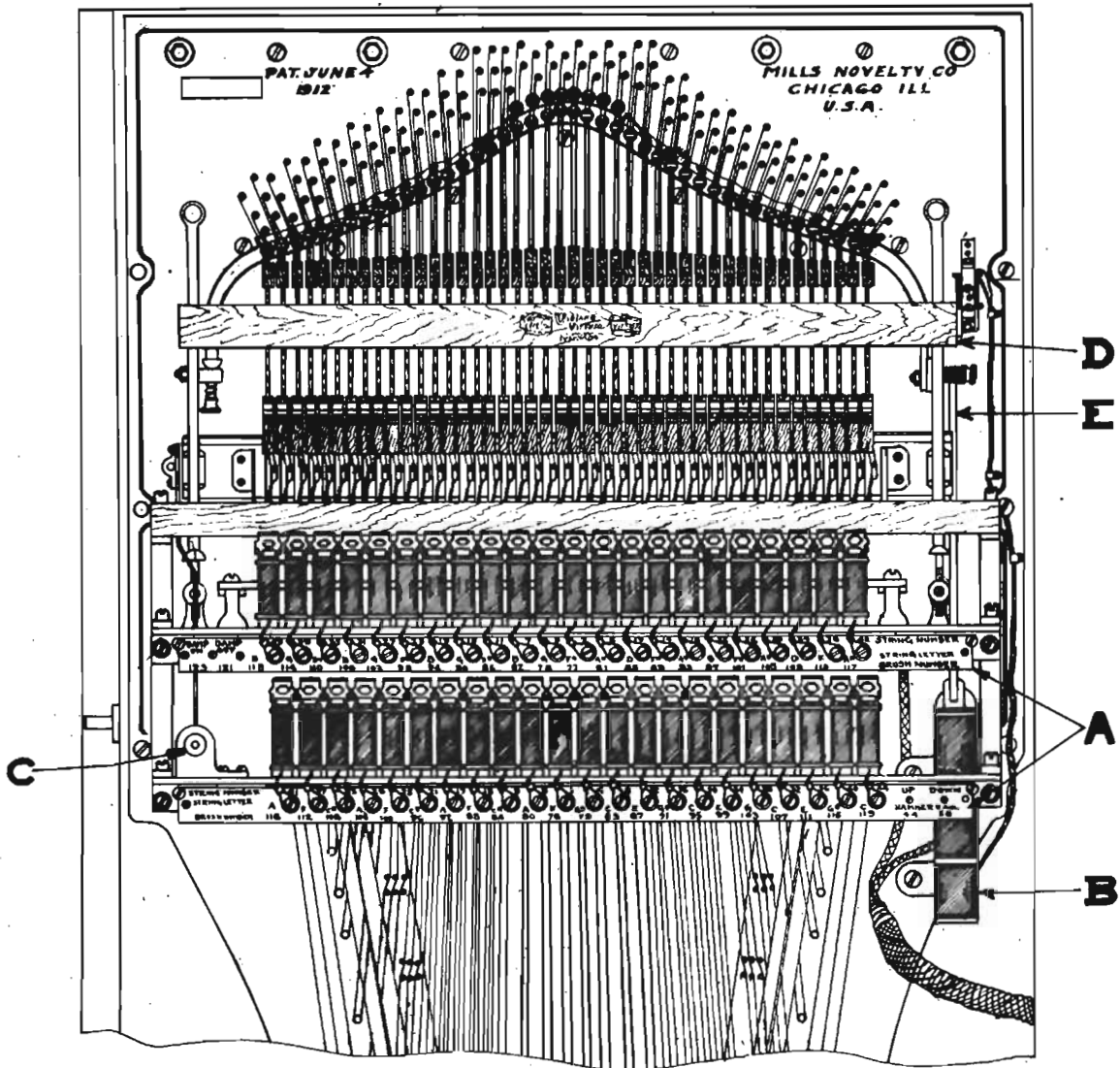
seconds.

Adjust in, for longer time—out, for shorter time.

After adjustment is satisfactorily made be sure that screws "J" are firmly fastened.



## THE PIANO



DRAWING No. 21

DRAWING No. 21

## HOW TO TUNE PIANO

Unlike those of any other piano, the bass strings of this piano are in the centre, the treble being on either side. By this particular harp shape arrangement which on account of the keyboard, would be impossible in any ordinary piano, we are enabled to give each string its proper length and insure that the strings of each tone be stretched at the same tension. When tuning this piano give the tuner, the tuning chart which you find in the supply drawer. With the help of this Tuning Chart any Piano Tuner is able to

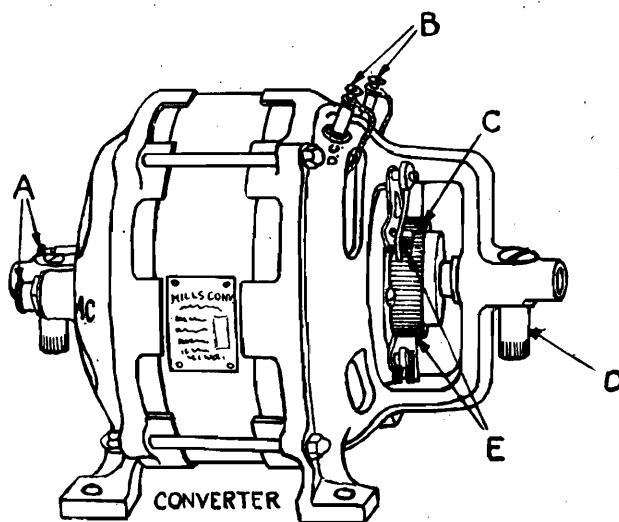
tune this piano. On the Tuning Chart you will see the different numbers and notes of the piano. Lay the Temperament by tuning No. 1 on top line to middle "C" (International Pitch). The first fifth is No. 1 to No. 2, that is C to F. The first fourth is No. 1 to No. 3, that is C to G. Continue thru the Temperament No. 1 to No. 13 top line of Tuning Chart and then tune the Octaves. The piano should be kept up to pitch.

## HOW TO FIND AND REPLACE DEAD PIANO MAGNET

Start instrument, turn feeder switch to "Rewind" until tracker bar falls back and then to "Off." Connect best cord on test post and with the other end touch screws running along the centre of bakerlike strips "A", "A", (drawing No. 21). If you touch one of these screws and no note is struck then the magnet connected to this screw is dead. If the dead magnet is on the top row loosen hexagon screw under the magnet and slide magnet frame out, then unscrew magnet, renew same and replace magnet frame. If the dead magnet is on the bottom row, then you have to remove the leather nut on rod going thru the tail of magnet armature in addition to what was necessary on replacing upper magnet. The intensity of tone on this piano is varied by the shortening or lengthening of the stroke of the hammers. This is controlled by moving hammer rail D, towards or away from piano strings and the hammer rail is operated by magnet "B" (drawing No. 21). To test this magnet proceed as in testing for dead magnet. By touching

screw marked 58 on strip "A" hammer rail should pull down to its lowest position, by touching screw No. 44 on strip A hammer rail should move upwards and hammers should be ( $\frac{1}{2}$ ) half an inch from piano strings. By touching feeder contact brush No. 122 the hammer rail should move up and hammer should be ( $\frac{1}{4}$ ) one quarter of an inch from strings and in this position the mute on the violin should operate. To adjust these distances shorten or lengthen rod E (drawing No. 21) by loosening small screw in rod and sliding the joint in the rod in the required direction to increase distance of hammers from strings lengthen rod, to decrease shorten rod. The piano damper magnet "C" drawing No. 21 is used for sustaining the piano notes. By touching test cord to screw No. 121 on strip "A" the dampers are lifted clear of strings and on striking a note on the piano the tone is sustained until test cord is taken off of screws No. 121.

### Care of Converter and Feeder Motors



**DRAWING # 25**

DRAWING No. 25

"A". Alternating current brushes should work freely in holders. Examine occasionally to see that they aren't worn down so short that coil spring inside is not pressing them firmly against contact plate (Collector rings). The Alternating current wires have large clips and are connected to these brushes A.

"B". Direct current wires with small clips connect to these posts B.

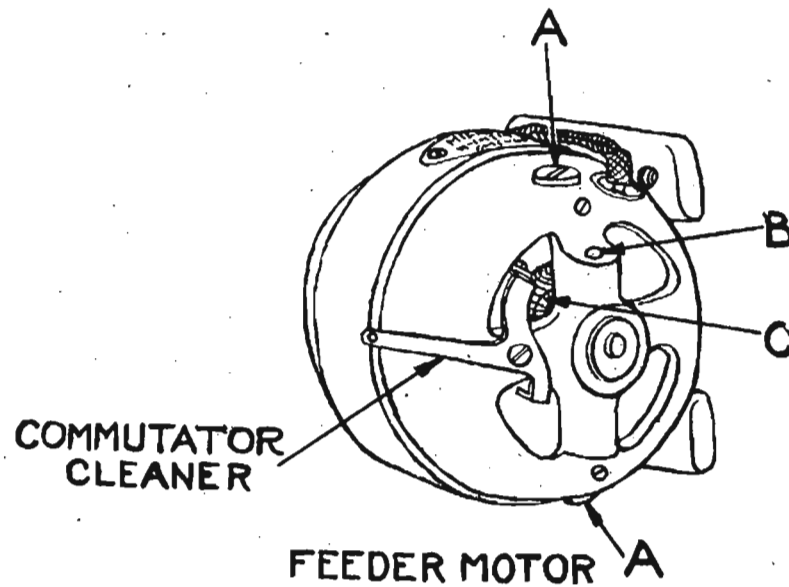
"C". Commutator—Keep it clean—to prevent

sparking. Kerosene oil on a piece of cheesecloth will clean it.

"D". Oil Hole (one on each end of motor): Put only a drop in oil holes once a month, not oftener. Don't get oil on Commutator or Collector Rings.

"E". Direct current brushes—See that they slide easily in their holders. If not take them out and wipe them off. If they stick up so they don't make contact your instrument won't play right.





*DRAWING # 25-A*  
DRAWING No. 25A

"A". Brushes. Replace when they get short. See that they do not stick in holder.

"B". Oil Hole. Drop of oil once a month. There's an oil hole on each end of Motor.

"C". Commutator. Clean with Kerosene Oil.

(Connections for operating wall boxes on Alternating Current).

(Connections for operating wall boxes on Direct Current).

Violano Virtuoso designed to operate on 110 Volt  
Violano Virtuoso designed to operate on Direct  
Current only and this requires no converter. When  
Violano Virtuoso is operated on any kind of alternating  
current from 25 to 133 cycle or any Voltage  
other than 110 Volt Direct Current, a converter  
must be installed. The use of a converter is to change  
any of the various kinds of electricity into standard  
110 Volt Direct Current.

Wall boxes can be operated from dry batteries just  
as well as from a transformer but their life is short  
and require constant renewals. When a transformer  
is installed you have efficient service as long as the  
lighting company furnishes your instruments with electricity.

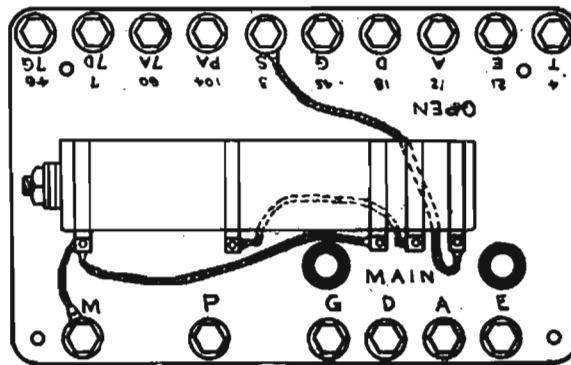
Do not install Violano Virtuoso on a circuit that  
is already loaded, but pick out a circuit that has but  
a few lamps, or better yet, have customer get local  
electrician to install a separate circuit.

## THE STACCATO

The Staccatto coil located under the Violin board is used to cut the current from the bows magnets and cause the bows to leave the string a fraction of a second before the fingers leave the strings.

To test staccatto connect test cord to test post,

start instrument and while violin is playing touch end of test cord to post "S" and staccatto block. The bows should immediately lift clear of strings but fingers should continue to operate. Test also from No. 3 feeder contact brush.



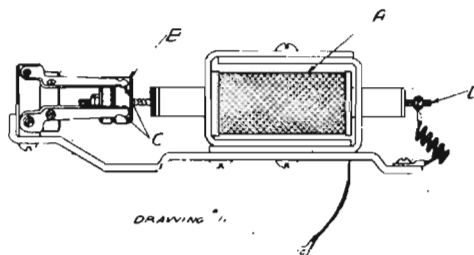
DRAWING

## SPECIAL STACCATO FOR DELUXE GRAND DRAWING NO. 11

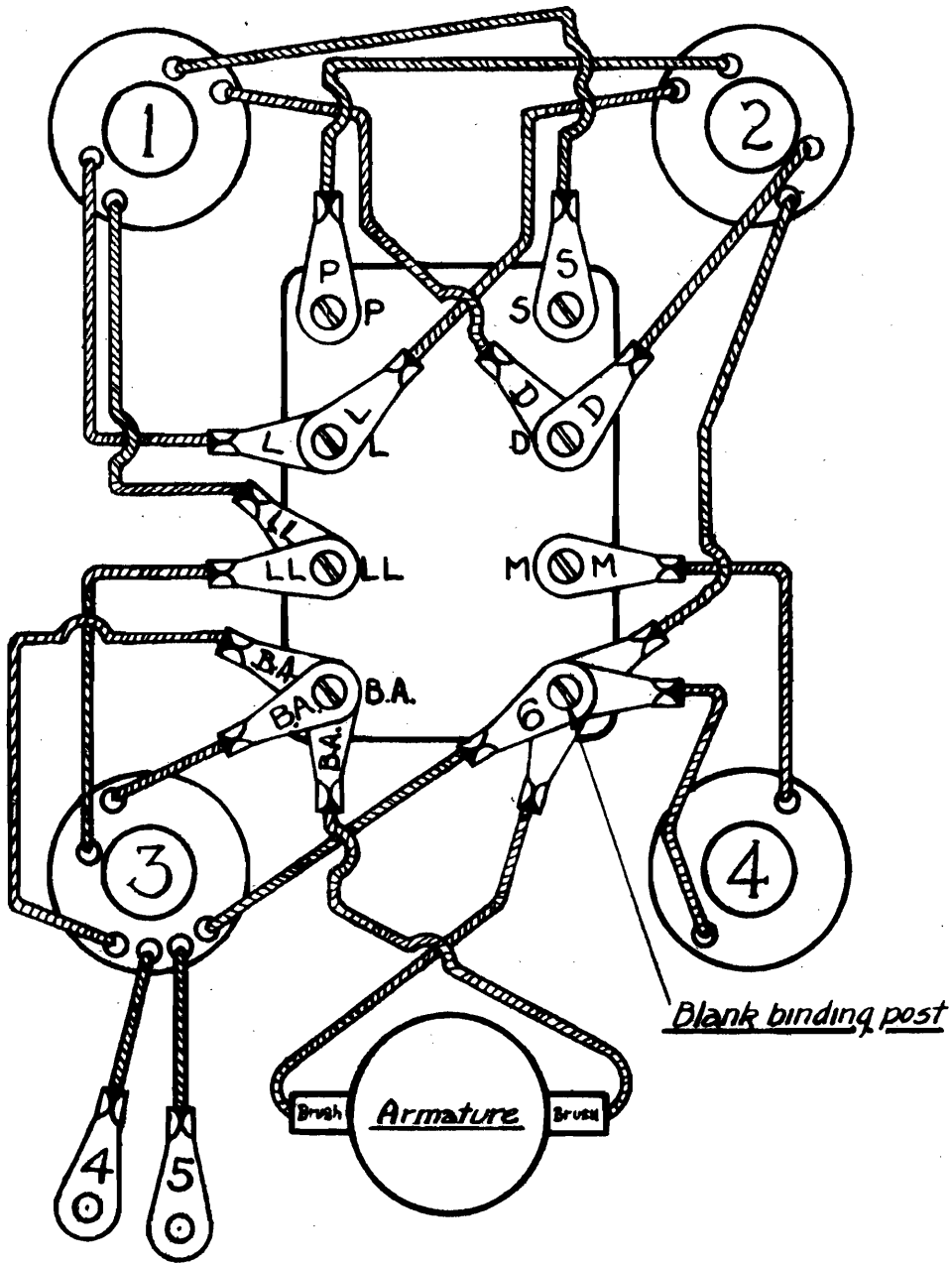
On touching post "S" staccatto block or No. 3 feeder contact brush while instrument is playing. Magnet "A" becomes energized and causes armature to move forward. Round brass plunger "B" will now make contact on four bronze springs "C" and bows should lift clear of strings but fingers continue to operate. As this staccatto makes a separate contact for all four strings be sure to test and play all strings. If

any bow continues to play whilst magnet A is energized it would indicate that plunger B is not making good contact on bronze springs.

After adjusting bronze springs press all tuning buttons and push forward rod "D." Do not give springs "C" too much tension as armature would be liable to stick.



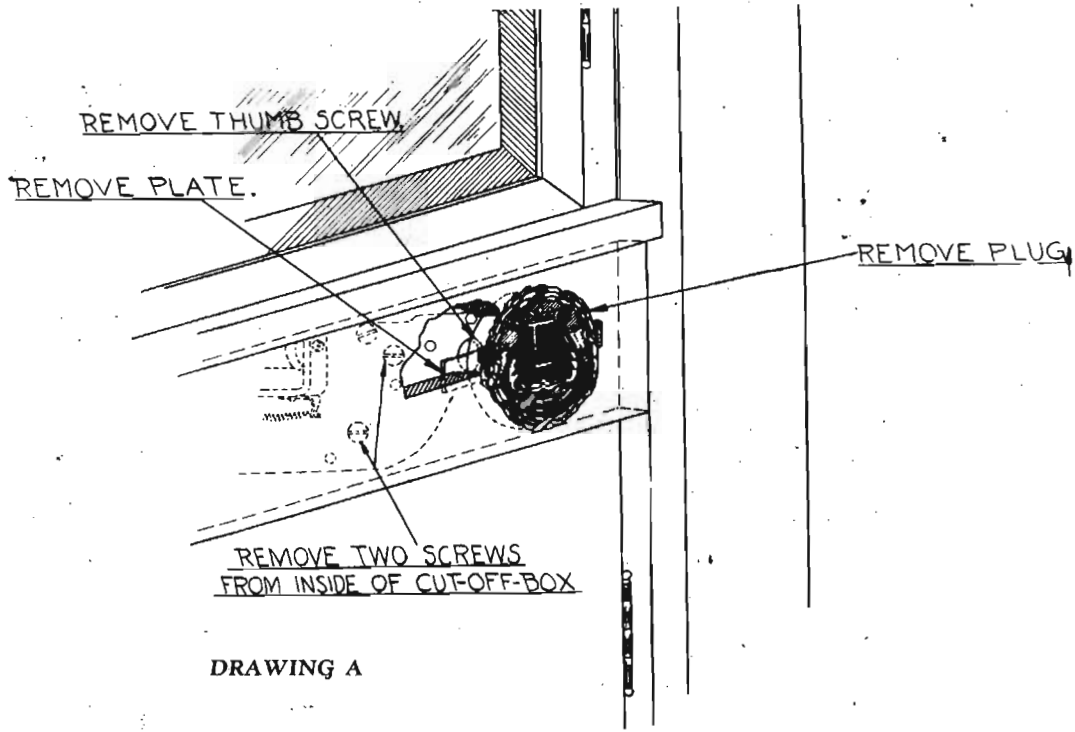
DRAWING No. 26



WIRING FOR BOW MOTOR - 110 VOLTS - D.C.

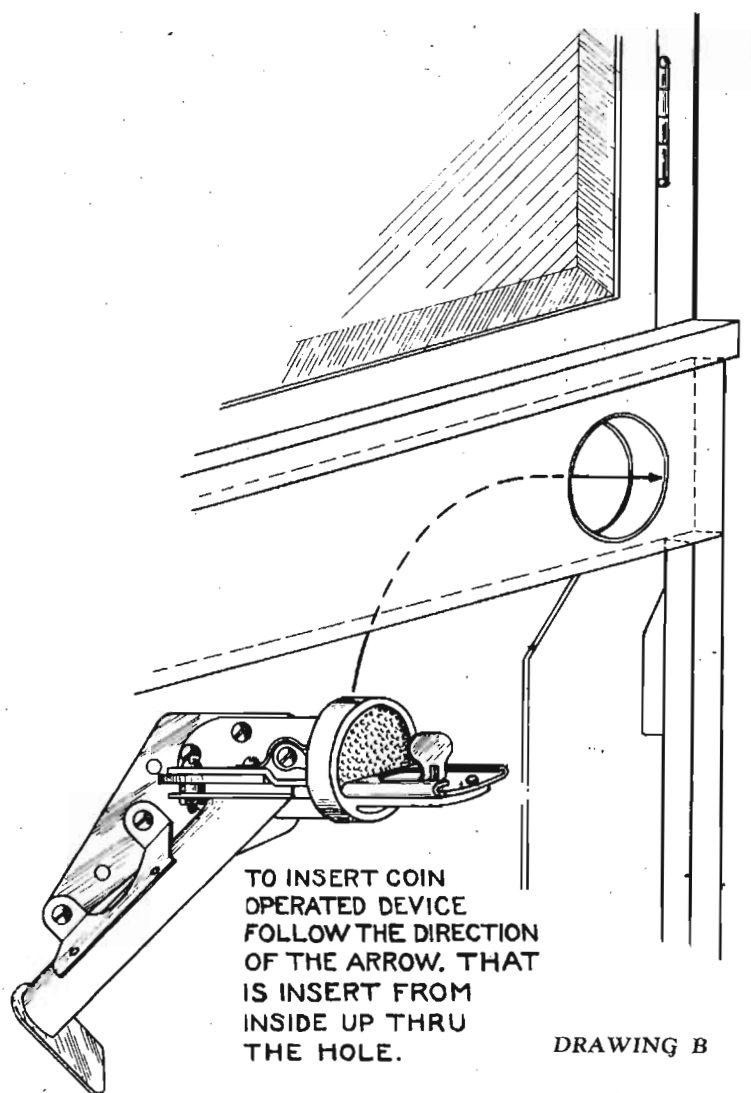
- #6 Clip on blank binding post motor runs fastest
- #5 Clip on blank binding post motor runs slower
- #4 Clip on blank binding post motor runs slowest

Mills Novelty Co.



### Instructions to Install Coin Operated Device

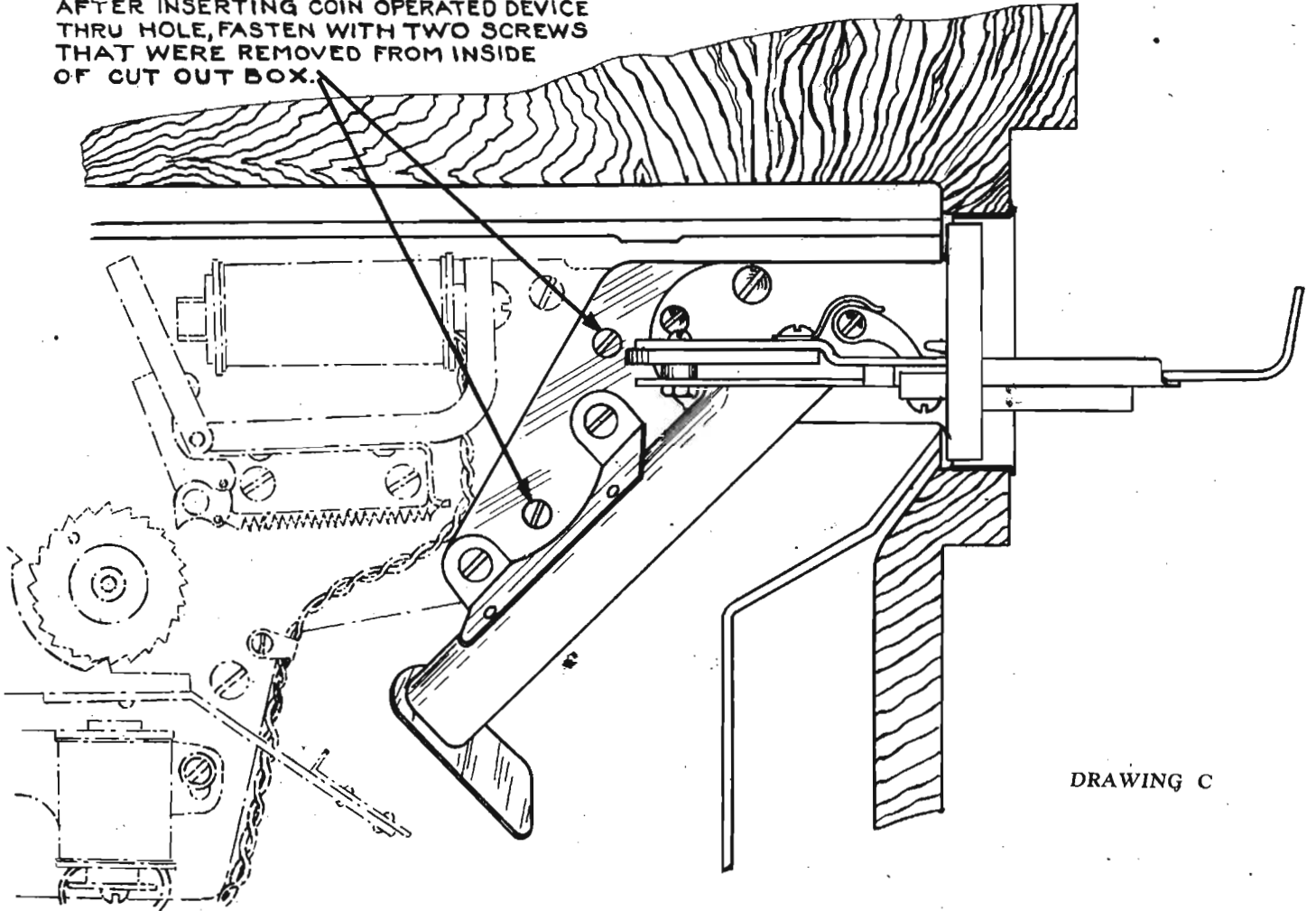
Follow carefully and in detail the instructions on drawings A, B, C and you will experience no difficulty in installing the coin operated device.





**COIN OPERATED DEVICE IN PLACE.**

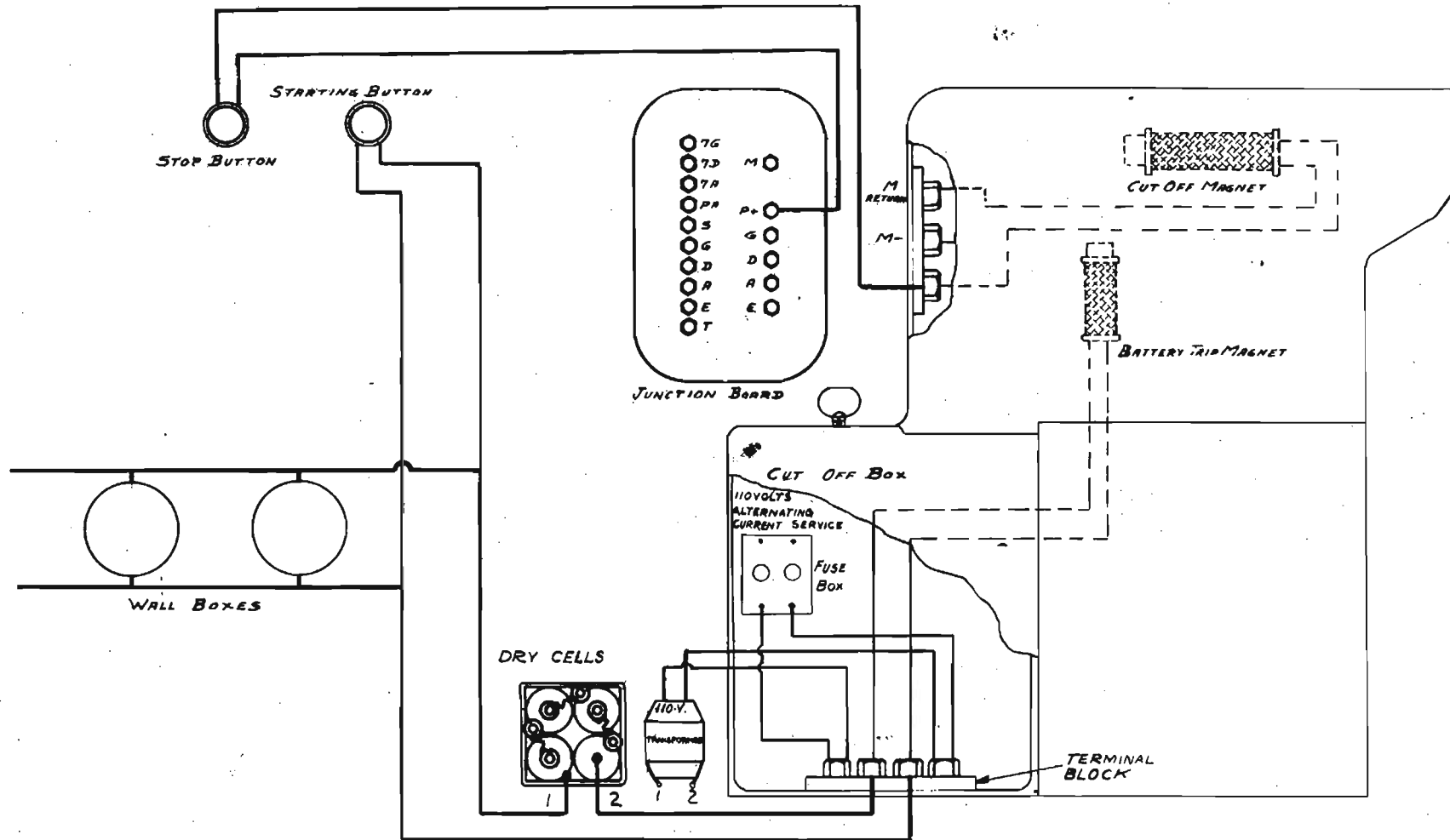
AFTER INSERTING COIN OPERATED DEVICE  
THRU HOLE, FASTEN WITH TWO SCREWS  
THAT WERE REMOVED FROM INSIDE  
OF CUT OUT BOX.

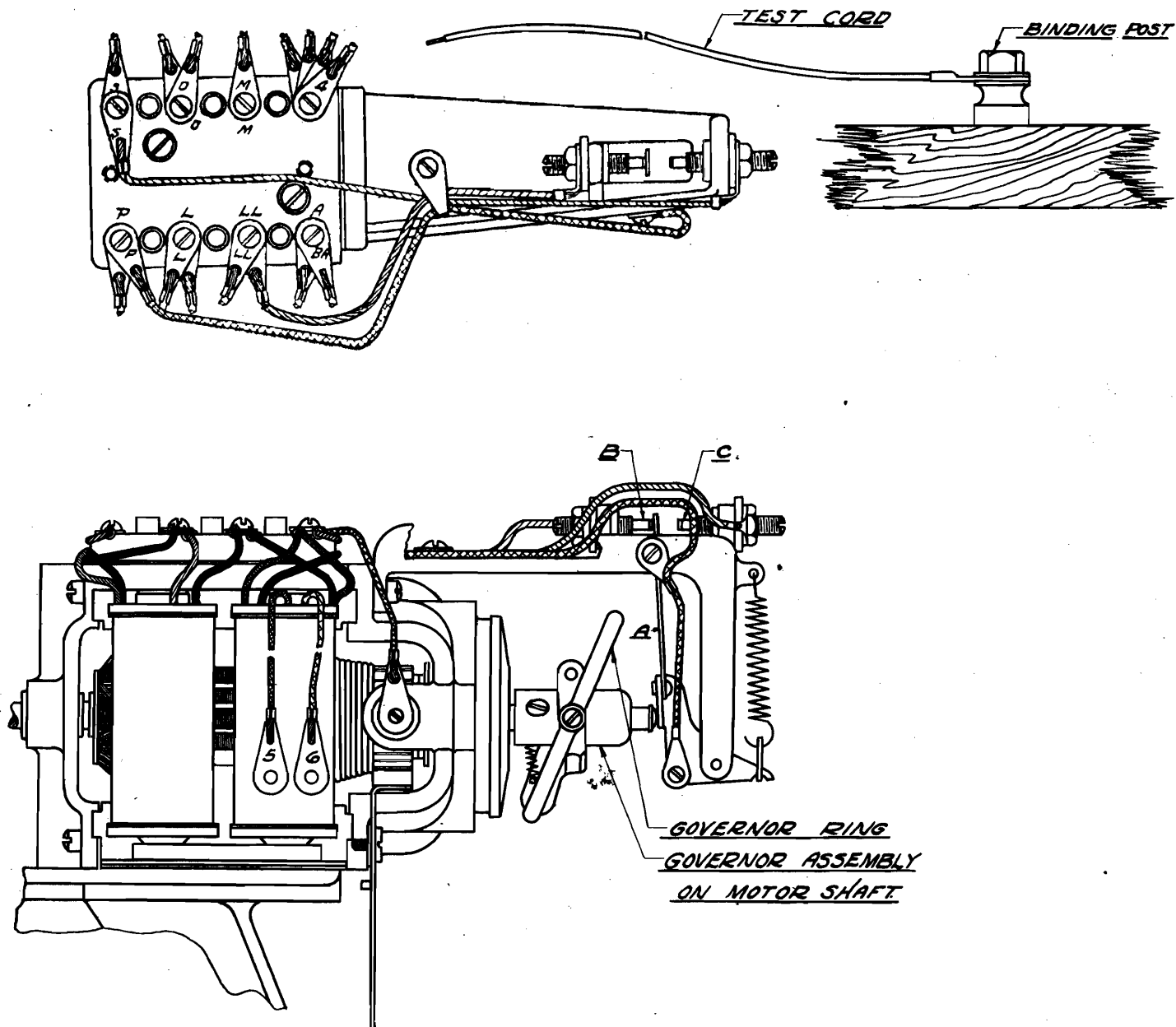


DRAWING C

# WALL BOX WIRING

Operated on Dry Batteries or with Transformer on Alternating Current Circuits





DRAWING B

### DIRECTIONS FOR SETTING BOW MOTOR GOVERNOR

Use test roll, or if test roll is not available connect one end of test cord on binding post at back of Violin. Touch other end to No. 1 Brush (Die Out), then Lever "A" should be in contact with screw "B." This Contact should be intermittent, making and breaking continually, as the motor receives the impulses.

Adjust screw "B" accordingly.

Now make connection with brush No. 2 (Bow action or High speed) then lever "A" should make contact at screw "C." This contact should be intermittent, making and breaking continually, as the motor receives the impulses.

Adjust screw "C" accordingly.

At this position [High Speed] Governor Ring must not straighten out; but must be a few degrees from the straight up and down. This setting may vary for different motors, due to necessity of finding a high speed position in which the bows do not whistle. This can be adjusted by loosening screw "D" and moving Governor assembly on motor shaft. Bows will whistle if they have not sufficient rosin on them (See drawing for setting rosin). See that they have plenty; then if there is a whistle it is due to too much speed.

If this again disturbs the setting of lever "A" re-adjust screws "B" and "C."

## A STITCH IN TIME SAVES NINE

DO NOT allow anyone but an authorized repairman of the Mills Novelty Company to repair, inspect or service your Violano, Magnetic Expression Piano or any Mills musical instrument or attachments.

Above all, do not allow anyone other than one authorized to install or attach any parts to your instrument.

This bit of advice is given because it has been brought to our attention time and again that some person or persons who represented themselves as expert repairmen, but without the proper knowledge on their part, or our authority, have installed certain devices of their own manufacture.

Each integral part in our instruments is patented and anyone installing unauthorized parts is infringing on our patent rights. ---- This is not only an act against us, but endangers your instrument and your pocket-book.

When a man calls on you to repair your instrument make him show his credentials printed on a card as follows:-

<b>CREDENTIALS</b>	
<b>This Certifies that</b> the Bearer	
Mr. _____	
is authorized to act in the capacity of serviceman' during the	
period between _____	and _____
on musical instruments and attachments manufactured by the	
Mills Novelty Company.	
MILLS NOVELTY COMPANY	
CHICAGO, ILL. _____	<i>Service Manager</i>

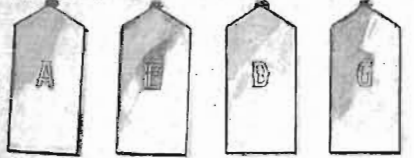
So that you will not confuse Piano tuning with repairing, we suggest that you have the piano part of your instrument tuned at least once a year. This can be done by any certified Piano Tuner whom you may select--a regular tuner, of course, does not understand the stringing of our piano board and if you will write to us we will forward a chart and complete instructions.

### BUT

It should be kept in mind that PIANO TUNERS SHOULD NOT ATTEMPT TO MAKE ANY ADJUSTMENTS ON THE MECHANISM OF THE INSTRUMENTS.

That you may safeguard the perfect operation of your instrument, we advise that you adhere closely to the above suggestions.

P.V. 1483 csp. P.V. 1482 csp. P.V. 1484 csp. P.V. 1485 csp.



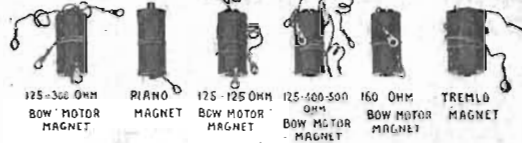
FRONT OF VIOLIN STRING WEIGHT 'A' ASS'LY. FRONT OF VIOLIN STRING WEIGHT 'E' ASS'LY. FRONT OF VIOLIN STRING WEIGHT 'D' ASS'LY. FRONT OF VIOLIN STRING WEIGHT 'G' ASS'LY.

P.V. 2126 csp.



HAMMER BELL STOPPER ASS'LY.

P.V. 546 csp. P.V. 1076 csp. P.V. 545 csp. P.V. 547 csp. P.V. 555 csp. P.V. 1285 csp.



125-300 OHM BOW MOTOR MAGNET. PIANO MAGNET. 125-125 OHM BOW MOTOR MAGNET. 125-400-500 OHM BOW MOTOR MAGNET. 160 OHM BOW MOTOR MAGNET. TREMOLO MAGNET.

P.V. 1000A csp.



PIANO MAGNET WITH HOLLER ASS'LY.

P.V. 1035 csp.



DOWN HAMMER RAIL MAGNET.

P.V. 1034 csp.



HAMMER RAIL CONTROL MAGNET.

P.V. 1060 LEGATE MAGNET PLATE.



P.V. 1060 LEGATE MAGNET PLATE.

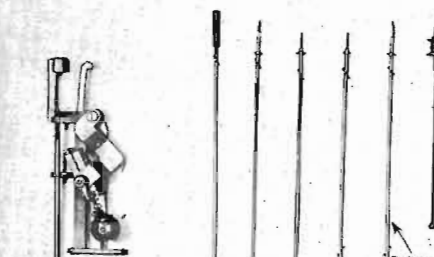
P.V. 1255 csp. TREMOLO WEIGHT ASS'LY.



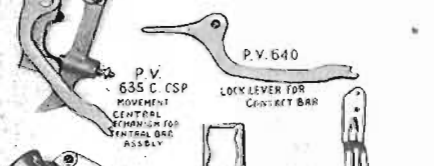
P.V. 1255 csp. TREMOLO WEIGHT ASS'LY.



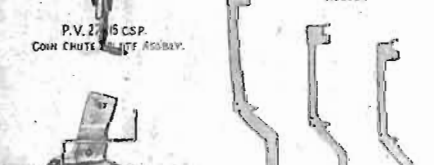
LOST MOTION BRACKET.



P.V. 784 csp. INDICATOR BRACKET ASS'LY FOR FEEDER GOVERNOR. P.V. 842 csp. ROSINER ROD. P.V. 979 csp. BOW SHAFT FOR OLD STYLE E & D STRINGS ASS'LY. P.V. 971 csp. BOW SHAFT FOR OLD STYLE E & D STRINGS ASS'LY. P.V. 1018 csp. BOW SHAFT FOR A & C STRINGS ASS'LY. P.V. 1278 csp. CONNECTING ROD FOR SHAKER.



P.V. 640 LOCK LEVER FOR CONTACT BAR. P.V. 635 csp. CENTRAL THUMB FOR CENTRAL BAR ASS'LY. P.V. 871 BOX FOR ROSIN. P.V. 914 PAN FOR ROSIN HOLDER.



P.V. 2115 csp. COIN CHUTE AND ASS'LY. P.V. 851 csp. BOW BRACKET. P.V. 954 csp. FINGER FOR 'G' STRING ASS'LY. P.V. 953 csp. FINGER 'D' STRING ASS'LY. P.V. 956 csp. FINGER FOR 'D' MAGNET FOR A STRING ASS'LY. P.V. 952 csp. FINGER FOR A STRING ASS'LY. P.V. 957 csp. FINGER FOR A MAGNET TO A STRING ASS'LY. P.V. 955 csp. P.V. 958 csp. FINGER FOR 'E' STRING ASS'LY.

- P.V. 200 csp. WALL BOX
- P.V. 220 GLASS FOR WALL BOX SIGN
- P.V. 525 csp. NEW STYLE UPPER SPOOL
- P.V. 551 csp. BOW MOTOR
- P.V. 609 csp. FEEDER CONTACT ROLLER
- P.V. 612 csp. CONTACT BAR
- P.V. 652 csp. FEEDER MOTOR FLY WHEEL
- P.V. 804 csp. REVERSE SWITCH MAGNET - OLD STYLE
- P.V. 919 csp. COMPLETE SET OF FINGERS
- P.V. 922 csp. FINGER HEAD COMPLETE
- P.V. 964 csp. FINGER HEAD TOP ASSEMBLY
- P.V. 971 csp. BOW FOR E & A STRING
- P.V. 978 csp. BOW FOR D & G STRING
- P.V. 1233 csp. TREMOLO COMPLETE - ( OLD STYLE )
- P.V. 1234 csp. EXPRESSION COMPLETE ( OLD STYLE )
- P.V. 1235 csp. LEGATO COMPLETE ( OLD STYLE )
- P.V. 1388 csp. TUNING BUTTON
- P.V. 1685 csp. 1/2 AMPERE FUSE FOR GRAND PIANO
- P.V. 1689 csp. 1 AMPERE " " DELUXE "
- P.V. 1682 csp. SET OF BOW MAGNETS



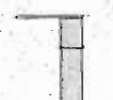
15 AMPERE FUSE PLUG.



P.V. 626 IDLE GEAR FOR REVERSE.



P.V. 794 csp. GOVERNOR CONTACT FOR BOW MOTOR UNPLATE.



P.V. 545 OLD STYLE ROSININ ARM.



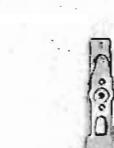
P.V. 947 csp. STRING SUPPORT BRACKET & STRING BLOCK BLOCKS.



P.V. 1263 SHAKER MAGNET BRACKET.



P.V. 202 csp. COVER FOR WALL BOX.



P.V. 1256 csp. TREMOLO INTERRUPTER ASS'LY.



P.V. 1469 csp. MAGNET BRACKET ASSEMBLY FOR AFTERTONE.



P.V. 993 csp. TREMOLO BAR ASS'LY.



P.V. 995 B csp. OLD STYLE TREMOLO BAR.



P.V. 1279 csp. OLD STYLE VIOLIN TAIL HOLDER BRACKET.



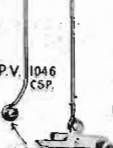
P.V. 837 A BRACKET FOR MUTE & STRING GAUGE.



P.V. 1446 csp. TUNING LEVER FOR STRING ASS'LY.



P.V. 1050A csp. COLLAR & ROD ASS'LY FOR DAMPER.



P.V. 1046 csp. HAMMER RAIL DOWN CONTROL ROD.



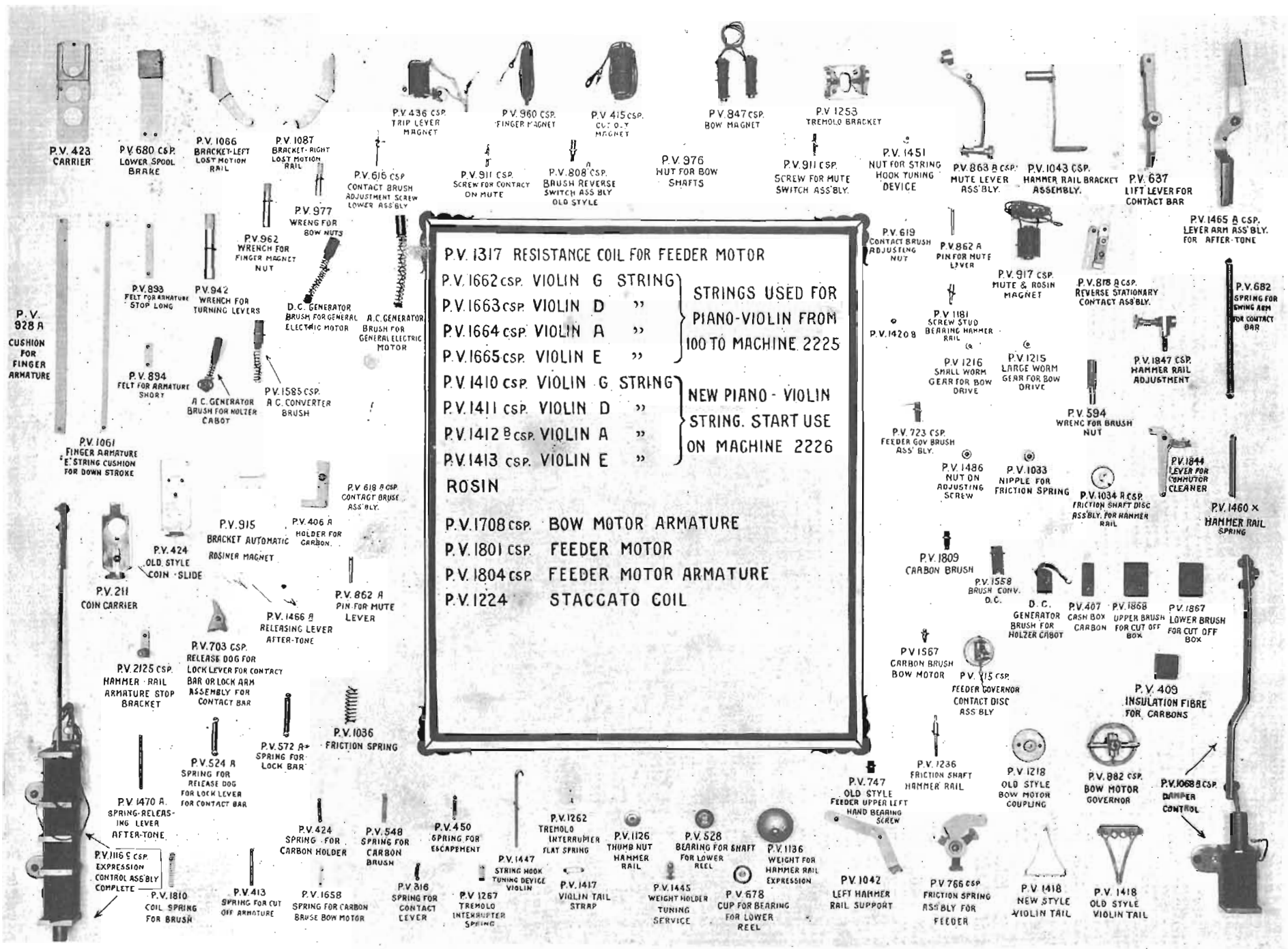
P.V. 707 csp. FEEDER GOVERNOR ASS'LY.



P.V. 1045 csp. HAMMER RAIL UP CONTROL ROD.



P.V. 405A csp. COIN DETECTOR HOLDER ASS'LY.



P.V. 1317 RESISTANCE COIL FOR FEEDER MOTOR  
 P.V. 1662 CSP. VIOLIN G STRING } STRINGS USED FOR  
 P.V. 1663 CSP. VIOLIN D " } PIANO-VIOLIN FROM  
 P.V. 1664 CSP. VIOLIN A " } 100 TO MACHINE 2225  
 P.V. 1665 CSP. VIOLIN E " }  
 P.V. 1410 CSP. VIOLIN G STRING } NEW PIANO-VIOLIN  
 P.V. 1411 CSP. VIOLIN D " } STRING. START USE  
 P.V. 1412 B CSP. VIOLIN A " } ON MACHINE 2226  
 P.V. 1413 CSP. VIOLIN E " }  
 ROSIN  
 P.V. 1708 CSP. BOW MOTOR ARMATURE  
 P.V. 1801 CSP. FEEDER MOTOR  
 P.V. 1804 CSP. FEEDER MOTOR ARMATURE  
 P.V. 1224 STACCATO COIL