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Research Article

Improvements made to the Kamancheh, bowed musical instrument

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Abstract

Musical instruments that are used in the field of national music of Azerbaijan have been handed down from centuries to centuries and have reached our time. Azerbaijani people have been keeping their musical instruments alive, preserving them and not forgetting them since ancient times. The tar, kamancheh, saz and other national musical instruments need improvement and restoration in our modern times. The main point of the scientific article "Improvement made to the kamancheh, bow musical instrument" is based on this issue. The research article includes the classification of Azerbaijani folk musical instruments, coefficient measurements, problems and their elimination, which we have studied for years. The article shows the coefficient modification and improvement of the kamancheh national musical instruments in a new format. The kamancheh musical instrument is classified based on tables and schemes in the article. As we mentioned above in the article, the consistently appropriation of some of our national musical instruments (balaban, qanun) by someone, and the presentation of these instruments by them on a world scale from time to time are still ongoing. So, our purpose is the preservation of our national musical instruments, showing of their uniqueness as a result of their restoration and improvement, and the determination of their place, importance and role in the development of our national musical culture. So, we are trying to achieve our purpose by relying on important evidence and proofs in our presented scientific article. The improvement work carried out on some of instruments is related to the improvement of their tuning system and sound system. Today, one of the problems is the instruments becoming out of tune quickly. These problems are touched upon in the article and the elimination of the problems is pointed out chronologically. The improvement works carried out on the kamancheh are divided into several areas. So, figures, schemes and tables of the individual kamanchehs are presented here. Figures, schemes and table of the improved Bam kamancheh (the bass kamancheh) are explained. Figures, schemes and tables of the Double Bass Kamancheh, the Double Contrabass Kamancheh and other types, which are calculated with coefficients, are presented to the readers.

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Introduction

Azerbaijan the important places in the improving, restoring work of national musical instruments and creating new instruments, their promotion and use, preservation of cultural heritage and its transmission to future generations. "Azerbaijan – 2020. A Vision of the Future" development concept, which was approved by Mr. Ilham Aliyev, the President of Republic of Azerbaijan, on December 29, 2012, presents a conceptual approach to the preservation and

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effective management of cultural heritage. As a result, several of our national musical instruments have been included in the Representative List of the UNESCO in recent years (web1).

National musical instruments of Azerbaijan are closely associated with the historical development of the nation and its culture. These instruments carry great spiritual energy. A new stage in the improvement of our national musical instruments began in the most diverse periods of our history, in the periods when national self-awareness processes were reflected on the cultural level, especially in the 20th century. (web2) Restoration of musical instruments on a scientific-theoretical and scientific-practical basis has become relevant since the 90s of the last century. Ancient musical instruments have been studied and restored based on several sources, archaeological and fine art works. (Badalbeyli, p. 46). For more than 30 years, the scientific laboratory "Restoration and Improvement of Ancient Musical Instruments", which started operating under the leadership of Majnun Karimov (1945–2013) at the Baku Academy of Music named after U. Hajibeyli during 1991-1992, has been doing great work in the direction of returning ancient musical instruments to modern performing arts. The "Improvement of National Musical Instruments" scientific-research laboratory of the Azerbaijan National Conservatory has been operating for twenty years (Abdullazade, 2017:12)

It would not be wrong to say that Azerbaijani national musical instruments, tar (Azerbaijan stringed folk musical instrument), kamancheh (oriental bow instrument), qaval (daf), are the leading attributes of Azerbaijani mugham. (web3) The Ancient musical instruments of Azerbaijan and Eastern countries are relearned, improved and restored at the abovementioned Laboratory. We would like to inform you about the improvement and classification of the kamancheh, one of these ancient musical instruments.

Problem of study

The kamancheh is one of the oldest stringed bow musical instruments of Azerbaijan. It is believed that bowed instruments spread in the territory of Azerbaijan since the 7th-8th centuries. The name of this instrument is mentioned in Nizami's poem "Khosrov and Shirin" and depicted in Tabriz miniature paintings (Aghamirak Isfahani, Mir Sayyid Ali). (Mugham encyclopedia, p.98) is mainly made of walnut wood. It consists of a bowl-shaped resonance box (sound box), a long upper neck, a kelleh (pegbox) where the "ashikhs" (pegs) are placed, and a steel finial called a "shish" (endpin). The resonance box is covered with membrane made from fish skin or lamb skin, and there are no musical notes on the kamancheh's neck. A bow is a made of horsehair covered bow-shaped wooden stick attached to its ends. The kemanchehs had three strings, but modern instrument have four strings. The instrument is used solo, as well as in ensemble and orchestra (Abdullayeva, 2002).

The kamancheh occupies one of the leading places among our national musical instruments. This instrument went through a long evolutionary path, underwent certain changes, improved, had wide performance possibilities and has reached our time.

The genius composer Uzeyir Hajibeyli created an orchestra of folk instruments in 1931, and the orchestra included the tar, balaban, daf and naghara (drum), as well as the kamancheh musical instrument. (Hacıbeyli, 2005: 215).

New reforms have been made to this instrument since from the first days of the establishment of the Azerbaijan National Conservatory. (İsmayılov, 1984:55-58).

It is appropriate to create the kamancheh's family to increase the sound range of the Azerbaijani folk instruments orchestra to 7 octaves. Because this issue has already been solved in many countries. After many studies and investigations, the work was done in the following order to create the kamancheh's family: (web3)

Method

First, its ratio between each other was determined to obtain a proportional increase or decrease of the kamancheh. For this, we have used measurement systems that have been passed down from our ancestors for centuries. In this work, we have determined the dimensions of hundreds of the kamancheh instruments and reduced to a common denominator. As a result of the research, it was found that the diameter of 85% of these kamanchehs is equal to 215 mm; 89% of the kamanchehs' membrane diameter to 120 mm; the neck length of 79% of the kamanchehs was equal to 294 mm. (Karimov, 2003:129).

The scale (the distance from the kherek (bridge) to the kherek) is equal to 314 mm in the majority of kamanchehs. (See Figure 1). The endpin on the knee can vary from 100mm to 50mm. This length is adjusted depending on the performer's height.

1	$\frac{314\ scale}{34\ (diameter\ coefficient\ of\ the\ neck\ in\ the\ resonance\ box\ )}$	= 9.235
2	$\frac{314\ scale}{32\ (diameter\ coefficient\ of\ the\ neck\ in\ the\ kelleh\ (pegbox)}$	=9,81
3	$\frac{314\ scale}{125(the\ length\ of\ pegbox)}$	=2,512
4	$\frac{314\ scale}{125(he\ length\ of\ the\ crown)}$	=5,71
5	$Length\ factor\ of\ the\ neck$	= 1.068
6	$Length\ factor\ of\ the\ pegbox$	= 2.512

Figure 1. Determination of coefficients

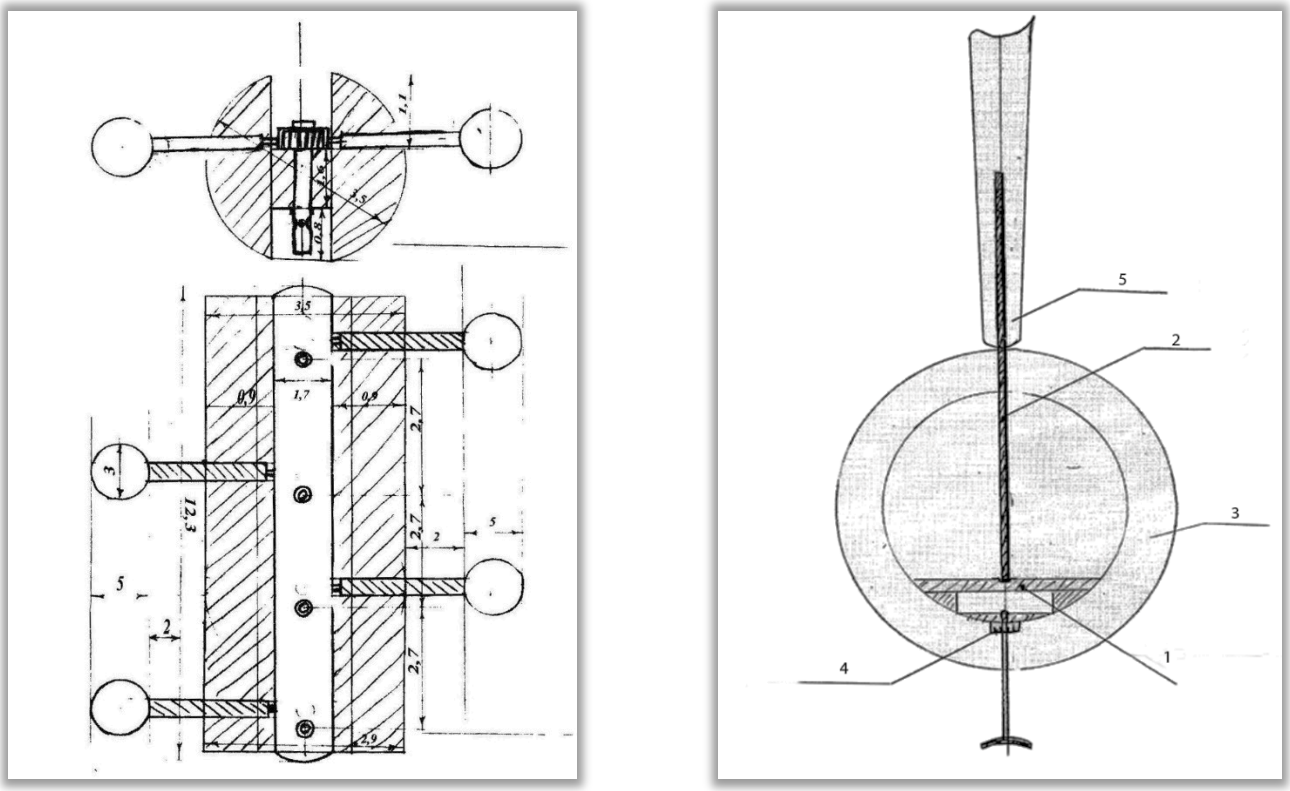

Figure 2 Improvements on the kamancheh

So, I have found the optimal dimensions for the orchestral kamancheh. I determined the coefficients of the parts based on the obtained measurements (Figure 3).

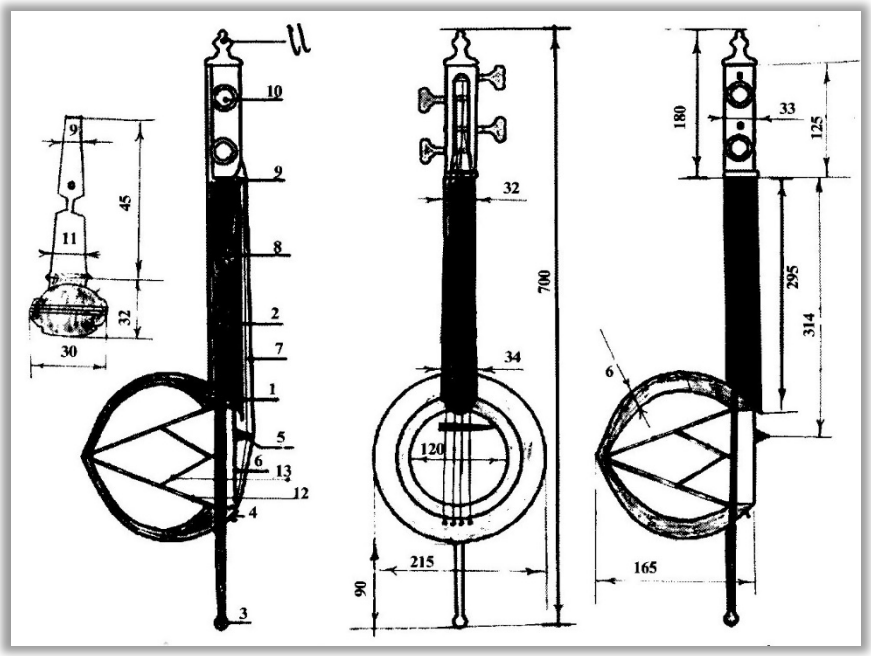

Figure 3. Determination of coefficients

As we know, solving the problems, such as two-sided pinching of the resonance box, becoming out of tune, etc. in the kamancheh musical instrument is one of today's most important issues.

For this reason, the following improvement works were made at the laboratory to eliminate the existing problems of the kamancheh: (Table1)

Table 1. Names of the kamancheh's parts

No	Names of parts
1	I resonance box (sound box)
2	Endpin (inside of the resonance box)
3	I Endpin
4	Tailpiece
5	Kherek (bridge) on the resonance box
6	Skin (membrane) covered the resonance box
7	4 strings
8	Neck
9	Kherek (bridge) on the neck
10	Ashikhs (Pegs)
11	Crown
12	Inner mezrab (plectrum)
13	Resonator
14	Endpin on the knee

- Mechanical adjustment of the strings in the pegbox of the kamancheh national musical instrument (Figure 2)
- Increasing the moisture resistance of the kamancheh's pegs
- Placing a resonator in the resonance box and freeing the resonance box from two-sided pinching. It is registered by the Copyright Agency (registration number 12/C-5432-11, registration date 10.03.2011, exclusive copyright owner is Mammadali Mirali oglu Mammadov).(Figure4)
- Prevention of two-sided pinching of the resonance box and improvement of sound effect. It has been registered and approved by the Copyright Agency (registration number 12/C-8970-17, date of registration 28.04.2017, the owner of the exclusive copyright owner is Mammadali Mirali oglu Mammadov).
- Studying the principle of straight kherek (bridge) and switching to this system.
- Expansion of the diameter of the neck in the direction from the pegbox to the resonance box
- Works against the instrument becoming out of tune.

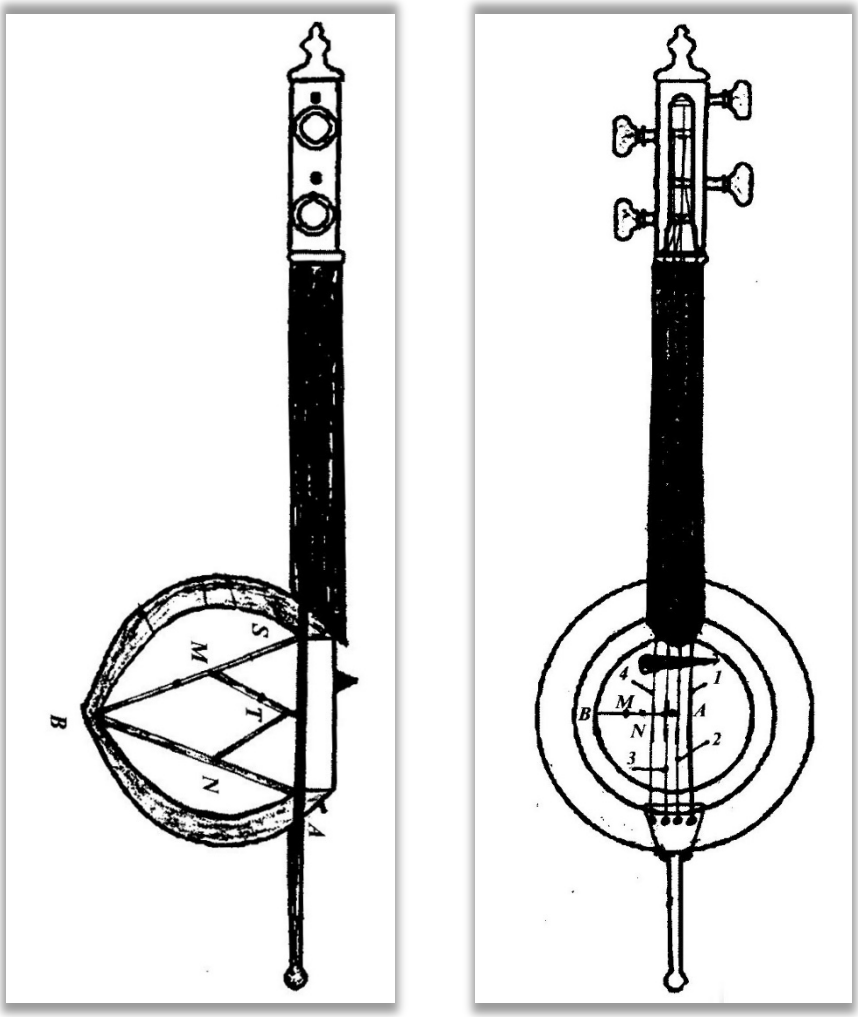

Figure 4. Improvement works on the kamancheh

As a result of the improvement works made to the kamancheh, the dimensions of the Apprentice kamancheh are determined as following:

No	Names of parts	Dimensions of the Apprentice kamancheh
1	I resonance box (sound box)	*The diameter of the resonance box – 195.2 mm*
2	Endpin (inside of the resonance box)	*The diameter of the membrane of the resonance box – 108.8 mm*
3	I Endpin	*Scale – 285 mm*
4	Tailpiece	*Neck length – 260 mm*
5	Kherek (bridge) on the resonance box	*Resonance box height – 150 mm*
6	Skin (membrane) covered the resonance box	*Total length – 620 mm*
7	4 strings	*The length of the pegbox with the crown – 120 mm*
8	Neck	*The diameter of the neck in the resonance box – 32 mm*
9	Kherek (bridge) on the neck	*The diameter of the neck in the pegbox – 30 mm*
10	Ashikhs (Pegs)	*The wall thickness of the resonance box – 5-6 mm*
11	Crown	*The diameter of the pegbox – 30 mm*
12	Inner mezrab (plectrum)	*The diameter of the pegs – 28 mm*
13	Resonator	*The pegs' cone –9-8 mm*
14	Endpin on the knee	*The length of the endpin – 65 mm*

The tunes of the strings in octaves of the orchestral kamancheh are 1-2-3-4. It is registered by the Copyright Agency (registration number 12/C-8983-17, registration date 28.04.2017, exclusive copyright owner is Mammadali Mirali oglu Mammadov) (Picture 1, Figure5).

Picture 1. The improved bam kamancheh

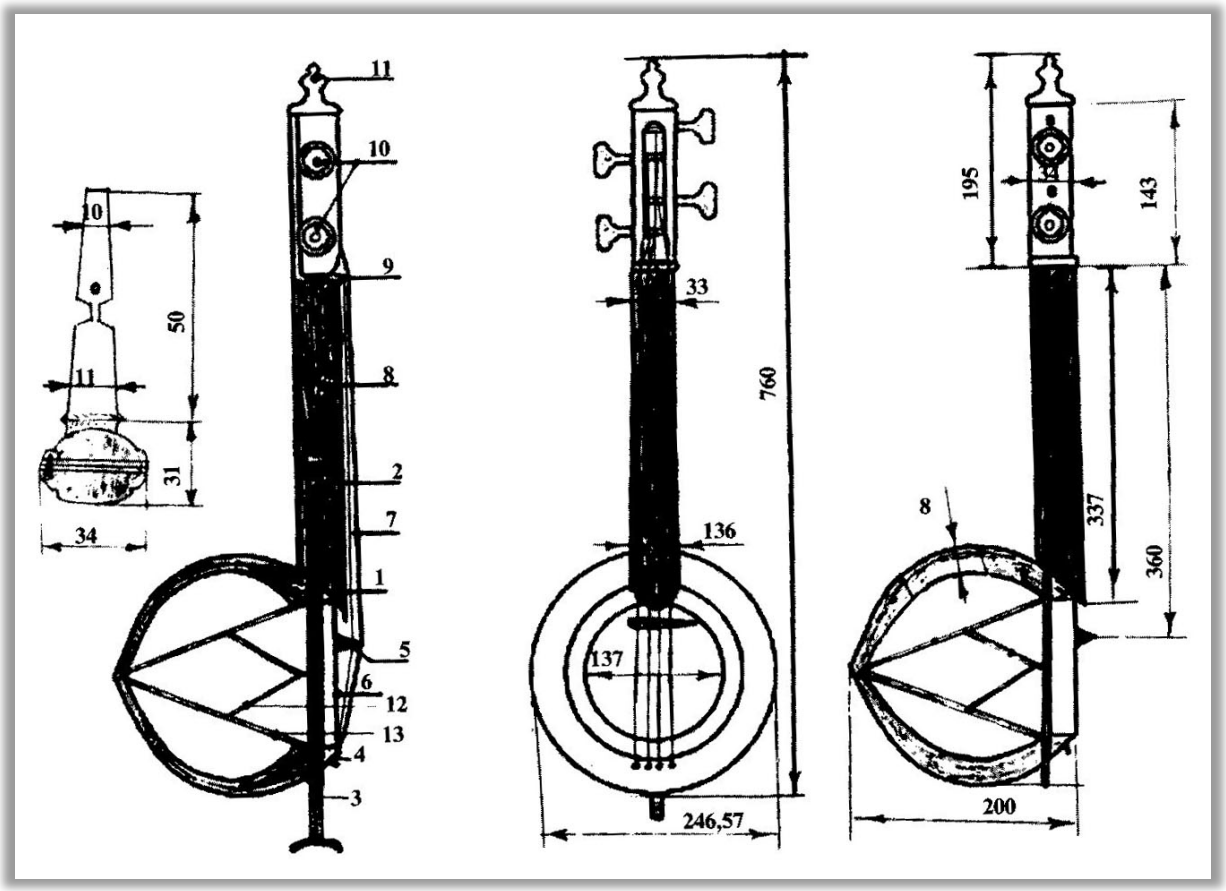

Figure 5 The improved bam kamancheh

Table 2. Dimension table of the improved bam kamancheh

No.	Names of the instrument parts	Dimension of the instrument parts
1	The diameter of the resonance box	246,57 mm
2	The diameter of the resonance box's membrane	137 mm
3	Scale	360 mm
4	Neck length	337 mm
5	Height of the resonance box	200 mm
6	Total length	760 mm
7	Length of the pegbox with the crown	195 mm
8	The diameter of the neck in the resonance box	38 mm
9	The diameter of the neck in the pegbox	33 mm
10	Wall thickness of the resonance box	8 mm
11	Diameter of the pegbox	34 mm
12	Diameter of the pegs	34 mm
13	Pegs' cone	11-10 mm
14	Length of the endpin	30 mm

The Improved Bam (Bass) Kamancheh has been registered and approved by the Copyright Agency (registration number 12/C-8985-17, registration date 04.28.2017, exclusive copyright owner is Mammadali Mirali oglu Mammadov).

The dimensions of the orchestral kamancheh are as following:

No.	Names of the instrument parts	Dimension of orchestral kamancheh
1	The diameter of the resonance box	215 mm
2	The diameter of the resonance box's membrane	120 mm
3	Scale	314 mm
4	Neck length	294 mm
5	Height of the resonance box	165 mm
6	Total length	700 mm
7	Length of the pegbox with the crown	180 mm
8	The diameter of the neck in the resonance box	34 mm
9	The diameter of the neck in the pegbox	32 mm
10	Wall thickness of the resonance box	6 mm
11	Diameter of the pegbox	33 mm
12	Diameter of the pegs	30 mm
13	Pegs' cone	10-9 mm
14	Length of the endpin	90 mm

The tunes of the strings in octaves of the bass kamancheh are 9-10-11-12.

So, we see the mutually participation of the kamancheh's family in all registers. The pitch of the 1st string can rise from the 2nd octave "F" sharp to the 4th octave "F" sharp.

Picture 2. The Double Bass Kamancheh

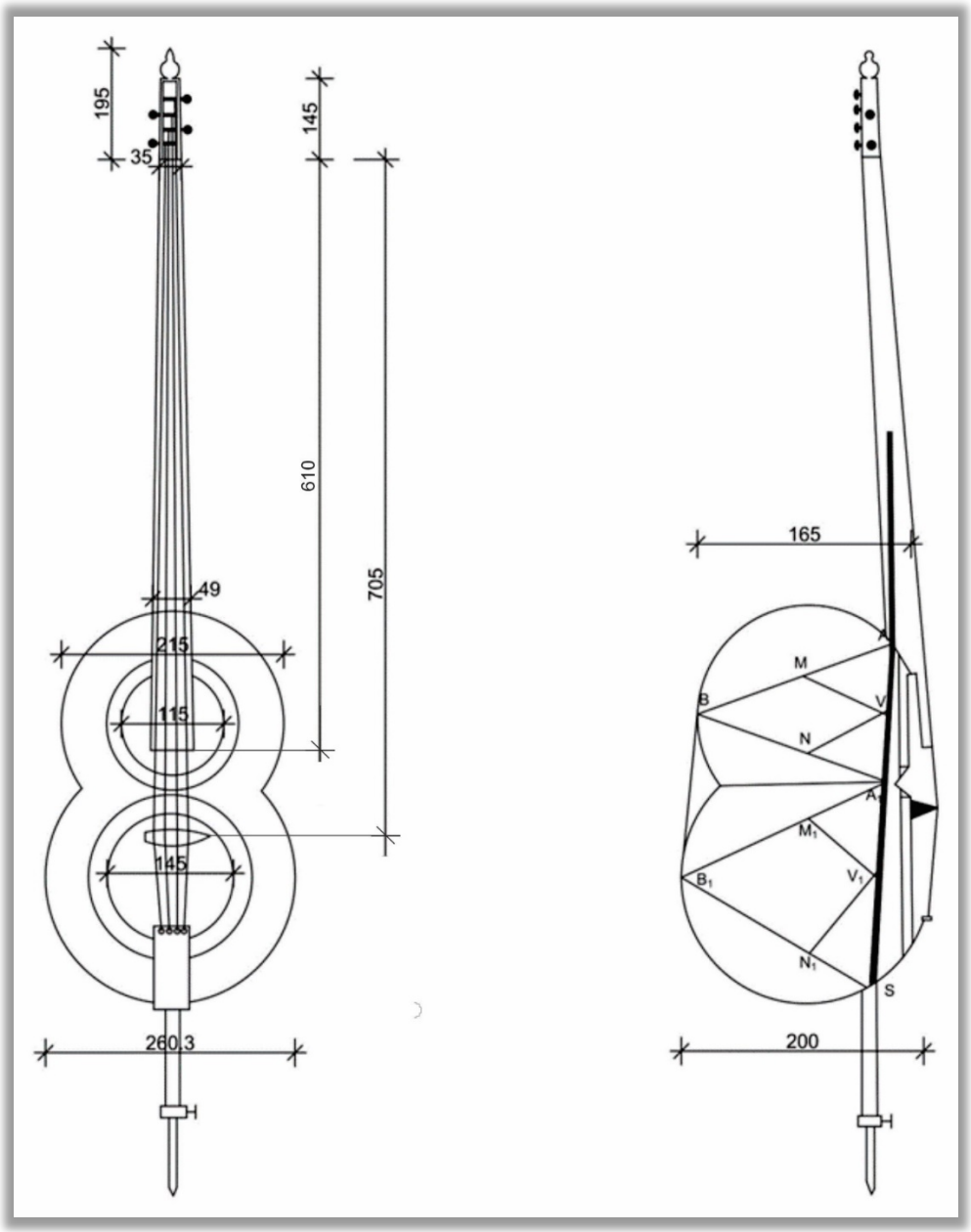

Figure 6. The Double Bass Kamancheh

The dimensions of the double bass kamancheh are as following: (Picture 2, Figure 6)

No.	Names of the instrument parts	Dimension of double bass kamancheh
1	The diameter of the resonance box	215 mm, 2nd resonance box – 260.3 mm
2	The diameter of the resonance box's membrane	215 mm, 2nd resonance box – 260.3
3	Scale	165 mm, 2nd the resonance box – 200 mm
4	Neck length	610 mm
5	Height of the resonance box	705 mm
6	Total length	1080 mm
7	Length of the pegbox with the crown	195 mm
8	The diameter of the neck in the resonance box	49 mm
9	The diameter of the neck in the pegbox	35 mm
10	Wall thickness of the resonance box	7-8 mm
11	Diameter of the pegbox	40 mm
12	Diameter of the pegs	34 mm
13	Pegs' cone	14-13 mm
14	Length of the endpin	480 mm

Tunes of the strings in the octaves of the contrabass kamancheh are 13-14-15-16.
The dimensions of the contrabass kamancheh are determined as following
(Picture 3, Figure7)

Picture 3. The double contrabass kamancheh

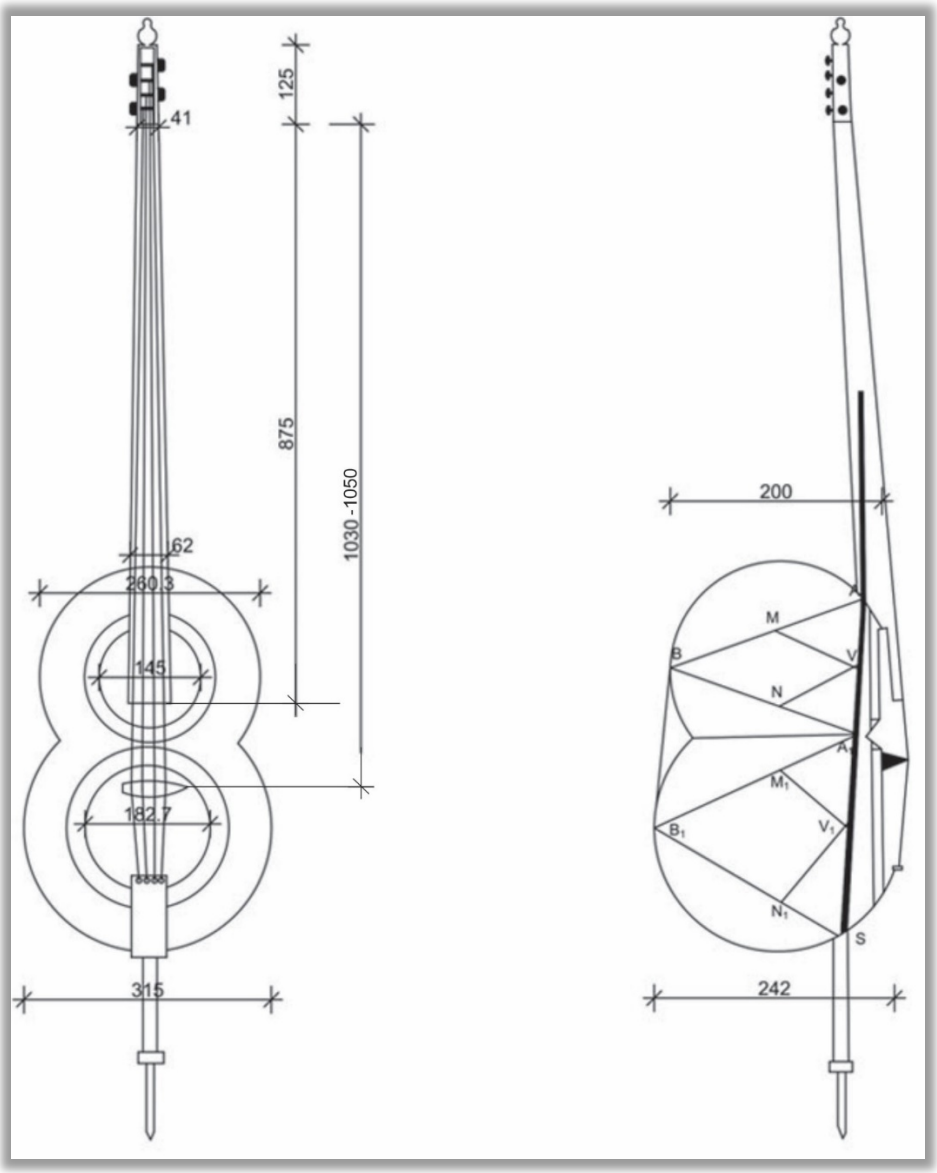

Figure 7. The double contrabass kamancheh

No.	Names of the instrument parts	Dimension of double contrabass kamancheh
1	The diameter of the resonance box	260 mm, 2nd resonance box – 315 mm
2	The diameter of the resonance box's membrane	145 mm, 2nd resonance box – 182.7
3	Scale	200 mm, 2nd the resonance box – 242 mm
4	Neck length	1030-1050 mm
5	Height of the resonance box	875 mm
6	Total length	1400 mm
7	Length of the pegbox with the crown	180 mm
8	The diameter of the neck in the resonance box	62 mm
9	The diameter of the neck in the pegbox	41 mm
10	Wall thickness of the resonance box	8-9 mm
11	Diameter of the pegbox	50 mm
12	Diameter of the pegs	Mechanical adjustment
13	Pegs' cone	480 mm
14	Length of the endpin	

Conclusion

The improvement work made to some instruments is related to the improvement of their tuning system and sound system. One of today's problems is the instruments becoming out of tune quickly:

- In order to overcome this problem in the kamancheh, the moisture resistance of pegs has been increased.
- The same work was carried out on tar's pegs, i.e. the moisture resistance of pegs was increased.
- As you know, it is difficult to tune up the tar's strings. The tension of these strings influences on them becoming out of tune. These strings are attached to a common tailpiece at the top of the big resonance box. To connect to the common tailpiece, the strings are passed over special bridge attached to the neck from the upper part of the tar's neck. That's why we have applied the method of continuously winding the strings for easy tuning of the strings (Patent protection of national musical instruments of Azerbaijan. p 33)
- Adjusting the pitch and tuning of the chang (harp) instrument caused several problems. In order to create conditions for easy tuning, the "law of the correlation of forces" of physics has been applied. The pegs of the improved chang are made of duralumin with a special construction. It is possible to tune the instrument chromatically and diatonically (Alasgarov and Abdullayeva, 1996:115)
- An improved version of the taj santoor, a percussion stringed instrument with a three-octave pitch, differs from the earlier santoor in its tuning. The tensional forces on the strings were not constant when tuning in the earlier santoor instruments. These forces are constant in taj santoor.
- Mechanical tuning of several instruments is also applied. This includes the Karabakh kamancheh and the electro-kamancheh (Ay kamancheh). That is, since the instruments are tuned mechanically, the problem of tuning does not occur and it is easily tuned.
- Innovations have been made to the tuning system of wind instruments. The tuning system of the balabans (a kind of wind instrument) prepared for the quartet has been changed, a "tuning ney" (a kind of musical wind instrument like flute) has been developed.
- The tuning system of the four cornered drum instrument, which is intended for playing in the military orchestra and is different from the drum belonging to the ancient Turkic peoples, is based on geometrical laws. As you can see, we have touched on the classification of other musical instruments (Badalbeyli, 2017:35-37)

But in the end, let's bring to your attention a short report of the work we have done on the kamancheh musical instrument:

- Constructive works were carried out to improve the sound effect in the kamancheh. Basically, two sided pinching of the resonance box was prevented. Inner mezrabs (plectrum) are placed on the endpin, which pass through the center of the resonance box of the instrument.
- The laws of physics have been applied to improve the sound effect of the kamancheh. That is, the oscillation frequencies that generated in the strings due to the effective sounding of the strings and the sound frequencies generated in the membrane are matched. (Huseynova and Karimov , 2015:56-59)
- The standards of the instrument were established by determining the coefficients and measurement system of the orchestral (professional) kamancheh. (Najafzadeh, 2004:128-130)
- According to the coefficients we obtained in the orchestra kamancheh, a kamancheh's family was created and the measurement system of each family member was determined. The Apprentice kamancheh, Orchestral kamancheh, Bam kamancheh, Double bass kamancheh, Double contrabass kamancheh.
- Many musical instruments of the kamancheh's family have been improved, Karabakh kamancheh, Zil (high-pitched) bam kamancheh, Two-cylinder kamanchh, etc. are among them. Each of these instruments has its own timbre.

It should be noted that defining the measurement systems of the Apprentice kamancheh has been registered and approved by the Copyright Agency (registration number 12/C-8997-17, registration date 28.04.2017, exclusive copyright owner is Mammadali Mirali oglu Mammadov) (web4)

Another improved type of the kamancheh musical instrument is the zil-bam kamancheh (high-pitched bass kamancheh). It is registered by the Copyright Agency (registration number 12/C-8997-17, registration date 28.04.2017, exclusive copyright owner is Mammadali Mirali oglu Mammadov) (Rahmanlı, 2016:39-42).

The improvement and restoration of our national musical instruments belonging to our people in accordance with the requirements of the modern era and with the application of new technology, accurate producing their measurement

system and coefficients, and the preparation of state standards are urgent issues that await their comprehensive scientific research in our modern era.

Acknowledgments

I would like to express my endless gratitude to the President of Azerbaijan and First Lady, Vice President Mrs. Mehriban Aliyeva, who support the development of Azerbaijani national music, mugham, and have a direct role in the preservation of folk music. Also, I would like to express my deep gratitude to the rector of the Azerbaijan National Conservatory, Professor Siyavush Karimi, and all my colleagues for their support. Great efforts of many skilful masters, scientists and musical instrument makers have been spent in the restoration and improvement of our scientific research and musical instruments of Azerbaijan. I can only be proud if this important and necessary restoration work has even a little significance in Azerbaijani musical culture (Karimi, 2017:32-34).

The study and promotion of the nation's cultural heritage belonging to the new renaissance of our culture has become global. Improving, restoring our musical instruments, which are one of the main elements of our national cultural values, and creating new musical instruments are one of the important components of our musical culture.

Biodata of the Authors

Mamedov Mamedali Mirali, music researcher, music instrument restorator. He has been working as the head of the research laboratory "Improving National Musical Instruments" at the Azerbaijan National Conservatory since 2010. Over the years, 64 scientific works of Mamedali Mamedov were registered with the Agency for Copyright and Intellectual Property Rights, and dozens of scientific articles and conference materials were published. The ensemble "From the Time of Ages," consisting of ancient musical instruments, was created by Mamedali. Mamedali Mamedov made 4 corner drums, a square drum and a "chovgan" (conductor's baton) for the National Military Band. Along with this, the scientist developed and registered with the Copyright Agency new musical instruments that sound in different registers in the database of our musical instruments. In 2018, the book "Improving Azerbaijani Folk Musical Instruments" was published.

References

Abdullayeva, S.A. (2002). *Azerbaijani folk musical instruments. Musicology-organological research.* Baku: Adiloglu

Abdullayeva, S.A. (2017). *Musical instruments in Azerbaijani folklore*. Baku: Adiloglu

Abdullazade, G.A. (2007). *Restoration and preservation of Azerbaijani national musical instruments - Instruments in Folk Music* (Proceedings of the International Society for Music Education symposium), 14-16th December, Kocaeli, Türkiye.

Abdullazade, G.A. (2017). *Scientific achievements in the restoration of national musical instruments in the field of organology/Patent protection of national musical instruments of Azerbaijan*. Baku: Patent and Trademark Center.

Azerbaijani National Musical Instruments: Our Past, Our Present // "Medeniyyet" newspaper-04.05.2017 Patent protection of national musical instruments of Azerbaijan (prepared on the basis of the materials of the scientific-practical conference "*Azerbaijani National Musical Instruments: Our Past, Our Present")* Baku: Patent and Trademark Center, 2017, 172 p. (compiler and project manager Karimli Sharif Hamid oglu)

Alasgarov S.A., and Abdullayeva S.A. (1996). *Azerbaijani folk musical instruments and orchestration*. B.: Maarif.

Azimli, F.N. (2004). *The names of our musical instruments: Sing, tar*. Baku: Tafakkur

Badalbeyli A.B. (2017). *An explanatory monographic musical dictionary*. Baku: East-West

Bardakçı, M.G. (1986). *Maraghali Abdulkadir*. Istanbul: Pan Publishing House.

Bunyadov T.A. (1993). *Voices of the ages*. Baku: Azerneshr

Daghli A. Ozan Garaveli. (Book I). B.: "MBM", 2006, 192 p. (the book was compiled and published by A. Najafzadeh on the basis of the author's manuscript protected by C-1021/9974 at the ANAS Institute of Manuscripts named after M. Fuzuli)

Gafarov, S.A. (2014). *Saadat Abdullayeva*. Baku: East-West.

Hajibeyli U.A. (2005a). *Selected works*. In two volumes, Volume II. B.:East-West

Hajibeyli, U.A. (2005b). *About the music of Azerbaijani Turks. The presenter, the author of the foreword and glossary is Aliyeva F.Sh*. Baku: Adiloglu

Hajibeyov, U.A. (1965). *A look at Azerbaijani musical life - Works,* Volume II. Baku: Azerbaijan SSR EA

Hamid, K.S. (2017). Patent protection of national musical instruments of Azerbaijan (prepared on the basis of the materials of the scientific-practical conference "Azerbaijani National Musical Instruments: Our Past, Our Present") Baku: Patent and Trademark Center

Huseynova S and Karimov M, (2015) *A researcher of ancient musical instruments* – 70. Baku: Apostrof, 207 p.

Ismayilov, M.J. (1984). *Genres of Azerbaijani folk music*. B.: İşıq.

Karimi, S.A. (2017). *Let's introduce our musical instruments to the world/Patent protection of Azerbaijani national musical instruments.* Baku: Patent and Trademark Center.

Karimov, M.T. (2003). *Azerbaijani musical instruments*. Baku: Yeni nesil.

Kasimi, S.A. (2019). *Cultural development periods of Azerbaijan*. Ankara. Iksad Publishing House

Mugham encyclopedia, (2008). Heydar Aliyev Foundation, President.az

Najafzadeh, A.I. (2004). *Explanatory dictionary of Azerbaijani musical instruments* (revised II edition) Baku: Min bir mahnı.

Rahmanli, A.M. (2016). *Mammadali Mammadov's contributions in improving our national musical instruments.* Baku: Red N Line.

Sarı, A. (2012). *Turkish music instruments (lute, tanbur, qanun, kamancheh, ney, kudum).* Istanbul: Berdan Publishing House.

Temel, H. (1999). *Language of instruments – musical dictionary.* Istanbul: Bestem Publishing House.

Yektabey, R. (1912). Music in the Caucasus. Şehbal, No: 59, p. 210

Web sites

Web 1. https://atlas.musiqisi-dunya.az/az/instr-history.html

Web 2. https://muğamradio.az/content/11

Web 3. https://ens.az/az/azerbaycan-musiqi-aletleri

Web 4. https://mk.musigi-dunya.az/az_simli_aletleri.html

Web 5. https://sputnik.az/20170512/qedim-milli-musiqi-aletleri-410222397.html

Web 6. https://azerhistory.com/?p=19759