

Clippo: a Speaker Clip on Mask

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Abstract— This paper includes an Introduction, basic laws and regulations, and technical explanations of loudspeakers on masks that could be used to make it easier for mask users to speak which is a solution to the problem of difficulty communicating in conditions of corona virus disease 2019 (COVID-19) which requires a person to wear a mask. Talking about solutions, the author takes the perspective of opportunities to help others, and makes it easier for medical personnel, the public and close relatives to communicate using masks without any disturbance in terms of how big or small the voice is. From this article, the author finds a solution to this problem, namely a loudspeaker that can be easily attached to any mask called CLIPPO with patent pending number S00202104532. The implication of further research is connecting the Clippo into Bluetooth Device for communication with gadget or other peripheral device.

Keywords—CLIPPO, loudspeaker, speaker, speaker clip on mask, covid19.

I. INTRODUCTION

WHO (World Health Organization or World Health Organization) officially declared the corona virus (COVID-19) as a pandemic on March 9, 2020. So everyone is required to wear a mask. In 2020, Indonesia, one of the countries affected by Corona Virus Disease (COVID-19) underwent a major overhaul of the legal system which required people to wear mask as a new part of normal life since the world declared Covid-19 virus as pandemic.

One of the basic elements in this problem is masks ranging from medical mask to fabric mask has been circulating in the market. Apart from the shortage of masks, other problems arise when communicating. When people wear their masks, they tend to lower or even take off their masks due to the difficulty of speaking and even listeners find it difficult to catch on what other people were saying. Even without lowering or removing the mask, it takes more energy to speak louder so that the other people could hear.

Based on this fact, the author creates a loudspeaker on the mask with the clip method. This is useful for making it easier for mask wearer to speak without requiring excessive energy and removing the mask.

II. LITERATURE REVIEW

The theory of sound was first discovered by James Maxwell who had a mathematical theory of energy. The theory was about energy that could be channeled through the air and was visible to the eye. However, this theory could not be proven until in 1887 Heinrich Hertz proved James Maxwell's theory through an experiment with two metal rods that were electrified and a strong receiver made of copper.

A loudspeaker is a transducer that converts an electrical signal to an audio frequency (sound) by vibrating its membrane-shaped components to vibrate the air so that

sound waves reach our eardrums and we can hear them as sound.

On the basis of these theories and books, CLIPPO was born to present sound transmitted by copper or other metals with the clip method.

III. DISCUSSION

A. The Obligation to Wear a Mask in Regulations

The World Health Organization (WHO) has declared a new corona virus named Corona Virus Disease 2019 (COVID-19) as a pandemic on March 9th 2020 and because of the urgency of the pandemic, Indonesia as a country participates in guarding borders, put it in a statutory regulation to provide coercive power for people who aim to fight against the COVID-19 infectious disease. The existence of this urgency COVID-19 was first given instructions by President Joko Widodo in Presidential Instruction No. 6 of 2020 concerning Improvement of Discipline and Law Enforcement of Health Protocols in the Prevention and Control of Corona Virus Disease 2019. In essence, the instruction mentions 4 points, namely the author quotes as follows:

"FIRST

Take the necessary steps according to their respective duties, functions and authorities in ensuring legal certainty, strengthening efforts and increasing the effectiveness of prevention and control of Corona Virus Disease 2019 (COVID-19) in all provinces and districts/cities in Indonesia.

SECOND

...

1) *Obligations to comply with health protocols include:*

a) *Individual health protection which includes:*

(1) Use personal protective equipment in the form of a mask covering the nose and mouth to the chin, if you have to leave the house or interact with other people whose health status is unknown.

...”

After the issuance of presidential instruction No. 6 of 2020, various legal instruments emerged, in this case the laws and regulations related to COVID-19, including:

1. Circular Letter Number HK.02.02/I/385/2020 concerning the Use of Masks and Provision of Handwashing Facilities with Soap (CTPS) to Prevent the Transmission of Corona Virus Disease 2019 (COVID-19);

2. Decree of the Minister of Health Number HK.01.07/MENKES/104/2020 of 2020 concerning the Determination of Novel Coronavirus Infection (2019-NCOV INFECTION) as a Disease That Can Cause Outbreaks and Efforts to Overcome it;
3. Instruction of the Minister of Home Affairs Number 13 of 2022 concerning the Implementation of Restrictions on Community Activities at Level 4, Level 3, and Level 2 Corona Virus Disease 2019 in the Java and Bali Regions;
4. Instruction of the Minister of Home Affairs Number 14 of 2022 concerning the Enforcement of Restrictions on Community Activities at Level 3, Level 2, and Level 1 and Optimizing the Command Post for Handling Corona Virus Disease 2019 at the Village and Sub-District Levels to Control the Spread of Corona Virus Disease 2019 in the Sumatra, Nusa Tenggara Region, Kalimantan, Sulawesi, Maluku, and Papua;
5. Letter of the Director General of Supervision of Labor and Occupational Safety and Health No. 5/193/AS.02.02/III/2020 of 2020 concerning Preparedness in Facing the Spread of Covid-19 in the Workplace.

As well as Regional Regulations related to COVID-19 in the areas of West Java, Bali, Banten, DKI Jakarta, South Sulawesi, and North Sumatra.

In addition, the available data also shows that exposure to air pollution can affect the transmission of COVID-19. Furthermore, air pollution can cause adverse effects on the prognosis of patients exposed to SARS-CoV-2 infection [1].

B. Problems Arising From The Use of Mask

Cause-and-effect theory proven in COVID-19 pandemic, which can be seen from the cause of the obligation to use masks according to the recommendations and laws and regulations arising from the use of masks. The consistent message conveyed by health stakeholders is that the fight against the pandemic requires significant behavior change [2].

Problems that arise as a result of using masks include the following:

- Medical masks are becoming scarce

Reporting from CNBC Indonesia, the scarcity of masks due to masks circulating in Indonesia are mostly imported masks. The availability of masks that are running low is certainly difficult for the community. Especially with the price spike [3].

- Skindemic

The use of masks for a long time makes the facial skin continue to rub against the mask. This friction triggers skin irritation, so that the facial skin will become inflamed and acne will appear more easily. In addition, breathing and talking while using a mask will also trap heat which makes facial skin becoming too moist. This condition not only causes clogged pores, but also makes it easier for bacteria and germs to multiply. The combination of irritation, soggy skin, and the number of bacteria on the facial skin are causes of various skin-

demetic problems, ranging from blackheads, rosacea, folliculitis to acne [4].

- Decreased sound level

The author encountered this problem when the author bought food at traditional market which was close to the author's house, in which case when the author wear a mask that makes the grocery store had difficulty in communicating and seemed to have reduced the author's volume so often that the words spoken by the author sound wrong by the seller. This problem also arises when the author conducted socialization with colleagues, and relatives who both wore masks.

As the theory of sound exists, there is a large frequency range over which longitudinal mechanical waves can be generated and sound waves are limited by the range of frequencies that can excite the human ear and brain to the sensation of hearing [5].

When the mask is on, the conversation can't be heard clearly. There are several patents that have made inventions as in the US patent with no. US20200315266 A1 dated October 8th, 2020 with inventor Kathleen Worthington McMahon entitled microphone mask. The patent mentions a device to help clarify pronunciation when someone is wearing a mask. But the weakness of this tool is that it uses a cable that is long enough so that it will interfere with the movement of the user.

On the US patent No. US6940984 B2 dated September 6th, 2005 with the inventor Robert Leonard Carpenter entitled Hands-free megaphone. The patent states that the device for amplifying pronunciation is hands-free. However, this tool can't be used for mask users, and the speaker at the waist makes the use of a long cable so that the function is not for mask users who need loudspeakers every day.

Another invention, namely the US patent No. US20020166557 A1 dated November 14th, 2002 with inventor David Cooper entitled Mask with a built-in microphone. The patent mentions a device to help clarify the pronunciation of someone wearing a mask. But the weakness of this tool is that it uses the transmitter first, and it received by the receiver so that it will require a complex and inflexible tool.

IV. THE DISCOVERY OF CLIPPO AS A VOICE LOUDER WITH A CLIPPER AS A SOLUTION FOR SOUND REDUCTION

The CLIPPO invention process itself has a brief history of the author wanting to modify the speaker and several existing patents. Basically, the sound-conducting medium can have various properties and shapes. It can be solid, liquid, and gas, depending on the extent to which the properties of the material can deliver sound through the air [6]. In general there are two characteristics of sound that can be felt by humans, namely loud and weak sound and high and low sound. Loudness of sound is related to amplitude and energy of the sound wave [7]. In connection with this, the author wants to make an invention based on the problem of reduced sound as a result of the use of masks.

Here is a schematic drawing of a brief history of the loudspeaker clamp.

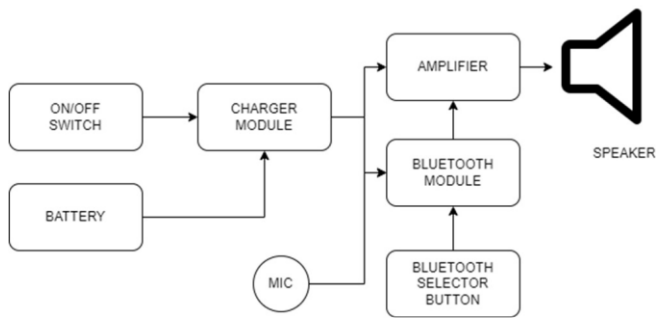


Fig. 1. CLIPPO Scheme

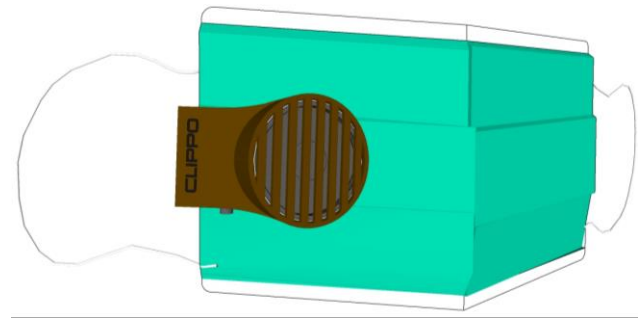


Fig. 5. CLIPPO On Medical Mask Front View



Fig. 2. CLIPPO Front Design

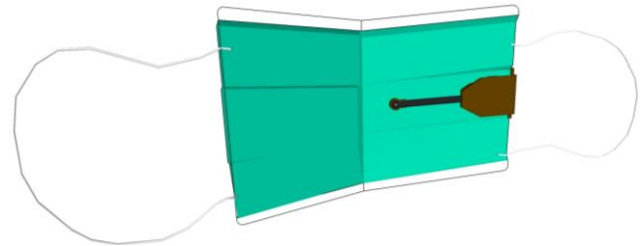


Fig. 6. CLIPPO On Medical Mask Back View

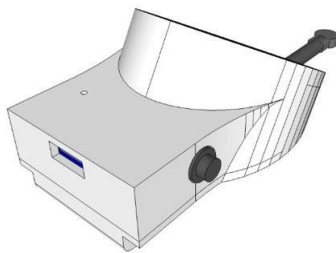


Fig. 3. CLIPPO Side Design

Fig. 3 is a side view design image, where we can see a hole for charging using a micro USB. In addition, in Fig. 3 there is also a button that functions as an off and on switch (ON/OFF).

In Fig. 4 there is a microphone with a copper cable that connects to the circuit. Furthermore, the clamp is also at the back of the product, so the loudspeaker can be clipped to the side of the mask. When this clamp is clamped on the mask, it can be seen in Fig. 5.

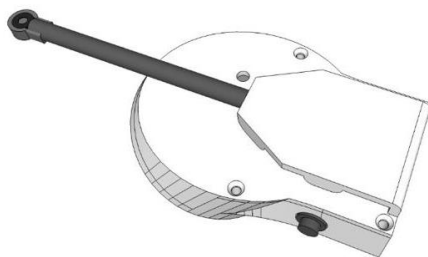


Fig. 4. CLIPPO Back Design

Fig. 6 is the back view of the clamp when it is attached to the mask.

Although the inventions made by the author are not perfect, according to the principle of sound transmission, "Any medium used for sound recording will eventually deteriorate" [8].

V. CONCLUSION

From the introduction, to the discovery of the problem and the resolution, it is concluded that this clip-shaped loudspeaker device can help amplify the voice in speaking. In addition, this loudspeaker can also be channeled to active speakers, so that to channel sound in a large room can be done with a Bluetooth connection. CLIPPO itself already has a patent pending number S00202104532. The implication of further research is connecting the Clippo into Bluetooth Device for communication with gadget or other peripheral device.

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