

Dental Toy Organizer – Smile Palace

Michael Avdeev



Introduction

Everyone wants their children to be taking care of their teeth properly and effectively. However, parents generally do not have much time to invest in teaching their children how to properly brush, let alone check their children's teeth after every brushing to make sure that they have brushed effectively and are properly taking advance of the most effective preventive dental care – brushing and flossing every day.

This paper focus on possible solutions to achieve the desired results without parents' substantial involvement – the use of a dental toy organizer that guides the child through proper brushing and flossing process with timing and tooth-coloring self-check. Finally, this paper sets out to prove the hypothesis that if children brush their teeth during timed play and use of plaque-disclosing tablets; they are more likely to brush properly.

Literature Review

Dental health is an important part of children's health effecting their overall development and well-being. Dental diseases are the most prevalent chronic infection diseases in the world, effecting up to ninety percent of schoolchildren.¹ The typical cause of dental disease is bacterial plaque. Yet, this disease is very preventable with proper dental care.²

It is well known that children are more likely to participate in an activity if it resembles playtime and is fun³. Moreover, children are more likely to learn a concept through interactive games and playtime.⁴ However, studies document lack of access to oral health care by many American households, especially minorities, immigrant and low income populations.⁵

Generally, children learn to brush their teeth between one and five years old. However, they brush is vastly different: some use incorrect brush strokes, some brush only once a day, some brush for thirty seconds, some do not floss, some use incorrect and inappropriate for their age toothpaste, some do not rinse well after brushing, some do not clean their tongue, and most do not check their teeth for cleanness after brushing. With so many variations and inconsistencies, how can the parents really be assured that their children are using the proper dental care process? Parents and dentists alike are aware of the inconsistencies. To be specific, seventy percent of the top 100 YouTube videos that cover tooth brushing are targeted towards children.⁶ Moreover, fifty-six percent of the top 100 YouTube videos were less than two minutes long.⁷ This is ironic because American Dental Association advices the children to brush for at least 2 minutes and this time does not include the recommended time for flossing or tongue cleaning.⁸ Of course, in addition to brushing, children are encouraged to floss and brush their tongue.

Experimental Procedure

To address the hypothesis, a prototype dental care organizer toy was created and give to be used by six participants, one at a time. The age of the participants ranged from seven years old to seventeen years old. Since participants were minor children, parent consent was obtained in writing prior to participation.

Dental Toy Organizer

Smile Palace – the toy organizer consists of plastic childproof mirror, a toothpaste dispenser, a plastic faucet that provides a limited amount of mouthwash, collapsible cup for rinsing and a plaque tooth-coloring self-checking mint.⁹

¹ Oral Health in America: A Report of the Surgeon General

² Id.

³ 3-5 years: learning to brush teeth; Spicer Susan; Today's parent, 2010, Vol.27 (5), p.172.

⁴ Id.

⁵ Oral Health in America: A Report of the Surgeon General

⁶ For further detail, review "An analysis of methods of toothbrushing recommended by dental associations, toothpaste and toothbrush companies and in dental texts;" Wainwrite J., Sheinham A., British dental journal, 2014, Vol.217 (3), p.E5-E5. Also See Analysis of 100 Most-Viewed YouTube Toothbrushing Videos; Alraiq, Hosam M, Zhou, Grace, Gorglio, Hayley, Edelstein, Burton L., Journal of dental hygiene, 2021, Vol.95 (5), p.32-40.

⁷ Id.

⁸ Expanding Dental Hygiene to Include Dental Therapy: Improving Access to Care for Children; Nash, David A., Journal of dental hygiene, 2009, Vol.83 (1), p.36-44.

⁹ See Figures 1 through 29 for complete detailed view of the parts of the organizer, as follows:

Fig.1 – General view of the toy organizer

Fig.2 – First floor of the toy organizer

Fig.3 -- Left tower of the toy organizer

Fig.4 -- Central part of the toy organizer

Fig.5 -- Right tower of the toy organizer.

Fig.6 -- Plastic carcass of the toy organizer

Fig.7 -- Face Panel of the toy organizer

Fig. 8 -- Plaque Disclosure Tablets Dispenser of the toy organizer

Testing Process

The participants were instructed to use the toy organizer by using the following steps:

1. Push the button in the center of the organizer to begin – music starts playing
2. One by one, each section of the organizer will light up in a row and the child is to perform the task according to the flashing section. The sections flash in the following order.
 - a. Wash your hands
 - b. Brush your teeth – this section flashes for 2 minutes
 - c. Rinse your mouth
 - d. Floss
 - e. Clean your tongue
 - f. Rinse your mouth
 - g. Use mint¹⁰ to check cleanness of your teeth
 - h. Rinse your mouth
 - i. Repeat if necessary

The participants were also instructed to conduct two separate brushing sessions as follows, where data was collected after each session:

1. Participants were asked to brush without timed play. Then participants were asked to use plaque disclosing tablet to reveal percentage of teeth stained (not properly cleaned)
2. On a different occasion, participants were asked to brush with timed play (at least 2 minutes). Then participants were asked to use plaque disclosing tablet to reveal percentage of teeth stained (not properly cleaned)

Fig.9 -- Part where Disclosure Tablets Dispenser is mounted

Fig.10 -- Face Cover of a part of the toy organizer.

Fig.11 -- Part of the first floor of the toy dispenser, where the dispenser is mounted.

Fig.12 -- Shows the dispenser assemble inside of a compartment.

Fig. 13 -- Shows how to receive mint (Plaque Disclosure Tablet).

Fig. 14 -- Right part of the first floor of the toy dispenser.

Fig. 15 -- Face Cover of the right part of first floor, which closes a front portion of the dental floss compartment.

Fig.16 -- Rotating part for a dental floss compartment of the toy-organizer, located inside of the compartment.

Fig.17-- Shows how to rotate this rotating part.

Fig. 18 -- Shows the location of a safe covered plastic knife to cut floss.

Fig.19 -- A middle part (compartment) of the first floor of toy-dispenser from where small figurine gets out via Smile Palace 's door to welcome the child when he/she finishes the play.

Fig. 20 -- Shows a figurine (baby bear), which is getting out from the opened door of Smile Palace.

Fig.21 -- Middle part of the second floor of toy-organizer, where toothbrushes and tongue cleaners are located.

Fig. 22 -- Shows how to put toothbrushes and tongue cleaners inside of the compartment.

Fig.23 -- Left tower of the second floor of toy-organizer where toothpaste and toothpaste dispenser are located; its part also has a plastic pocket on the left lateral wall to keep mirrors.

Fig. 24 -- Shows connection of toothpaste with the toothpaste dispenser.

Fig. 25 -- Location of the working part of the toothpaste dispenser.

Fig.26 -- Right tower of the second floor of the toy organizer.

Fig. 27-- Shows the opening, where mouthwash should be poured in.

Fig. 28 -- Shows the right lateral wall with a plastic pocket where a collapsible cup is located.

Fig. 29 -- Shows how and where to pour mouthwash.

¹⁰ For our purposes, we used Dental Tru-Clean Purple Chews.

Discussion of the Results

After results were recorded and analyzed, it is important to note that all of the participants recorded having cleaner teeth after brushing in a timed environment with dental toy organizer. Moreover, there was no direct correlation between older age and better brushing. The results pointed out that children of any age could benefit from timed toy organizer to improve better dental health.

Participants	Age	Percentage of teeth stained after brushing WITHOUT timed play	Percentage of teeth stained after brushing WITH timed play	Difference
a	8	56%	43%	13%
b	12	36%	29%	7%
c	17	40%	38%	2%
d	9	52%	47%	5%
r	10	55%	52%	3%
f	7	32%	28%	4%

Conclusion

Based on the data analyzed and presented, it is clear that children who brush their teeth during timed play using plaque-disclosing tablets, they are more likely to brush better and have healthier dental habits in the end.



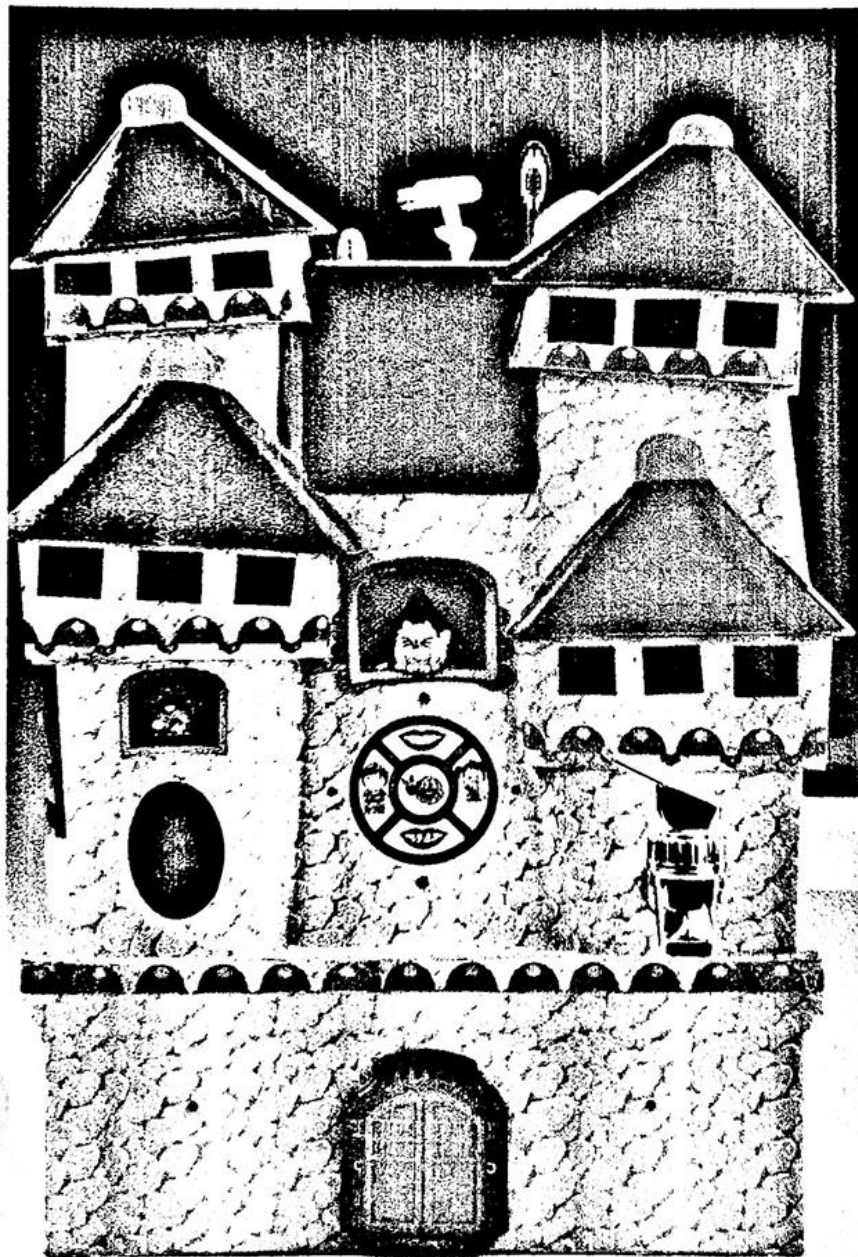
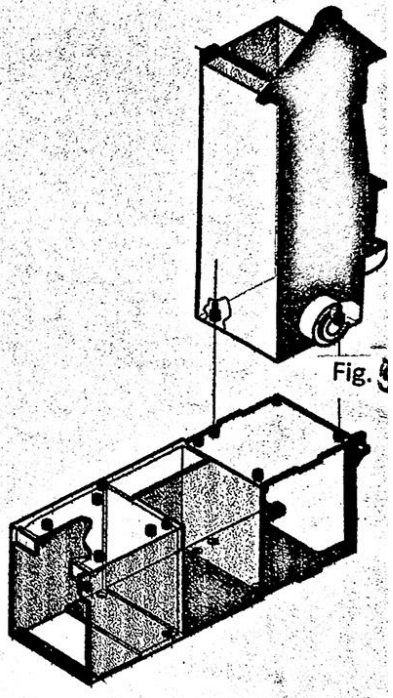
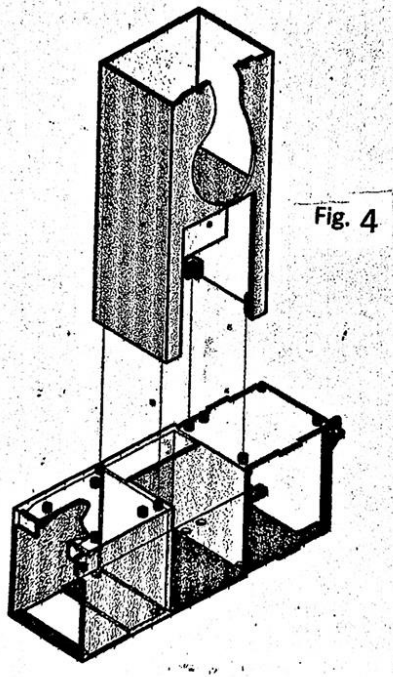
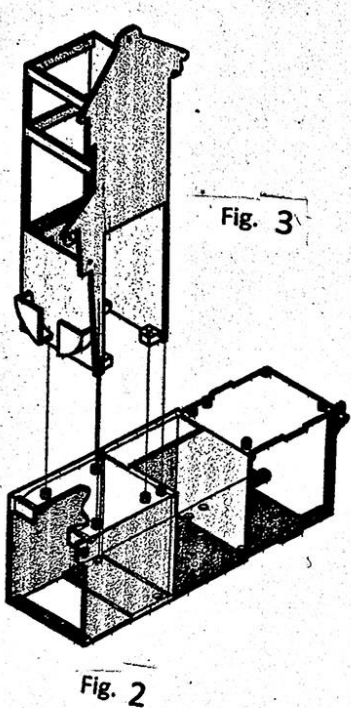


Fig. 1



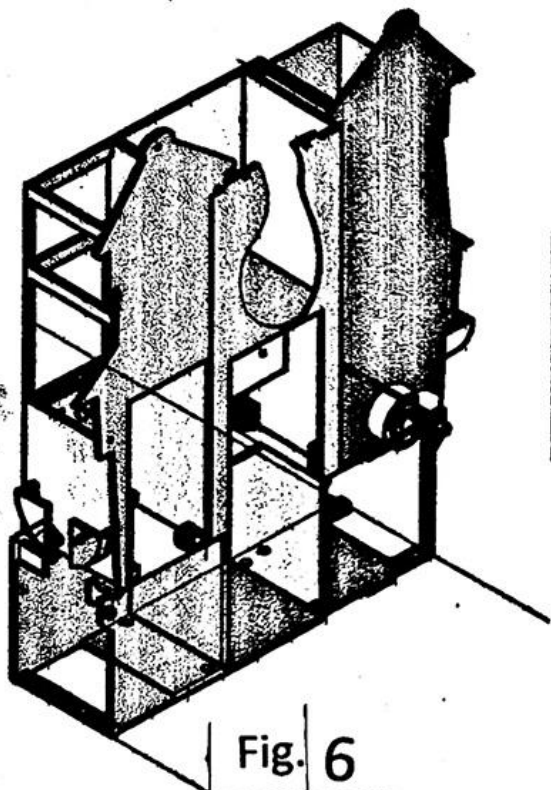


Fig. 6

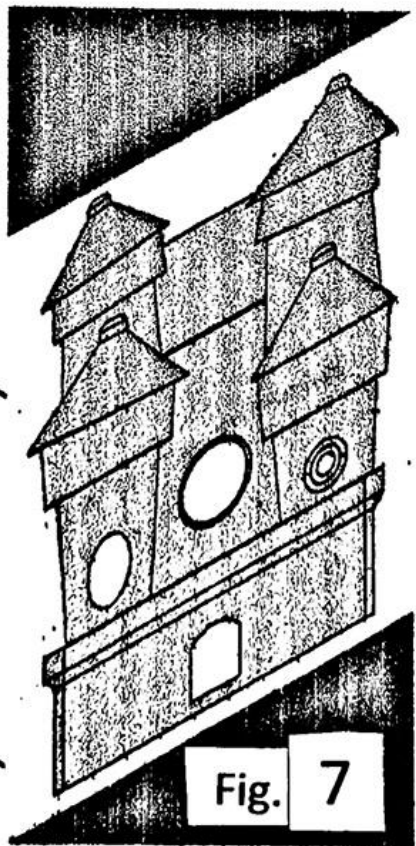
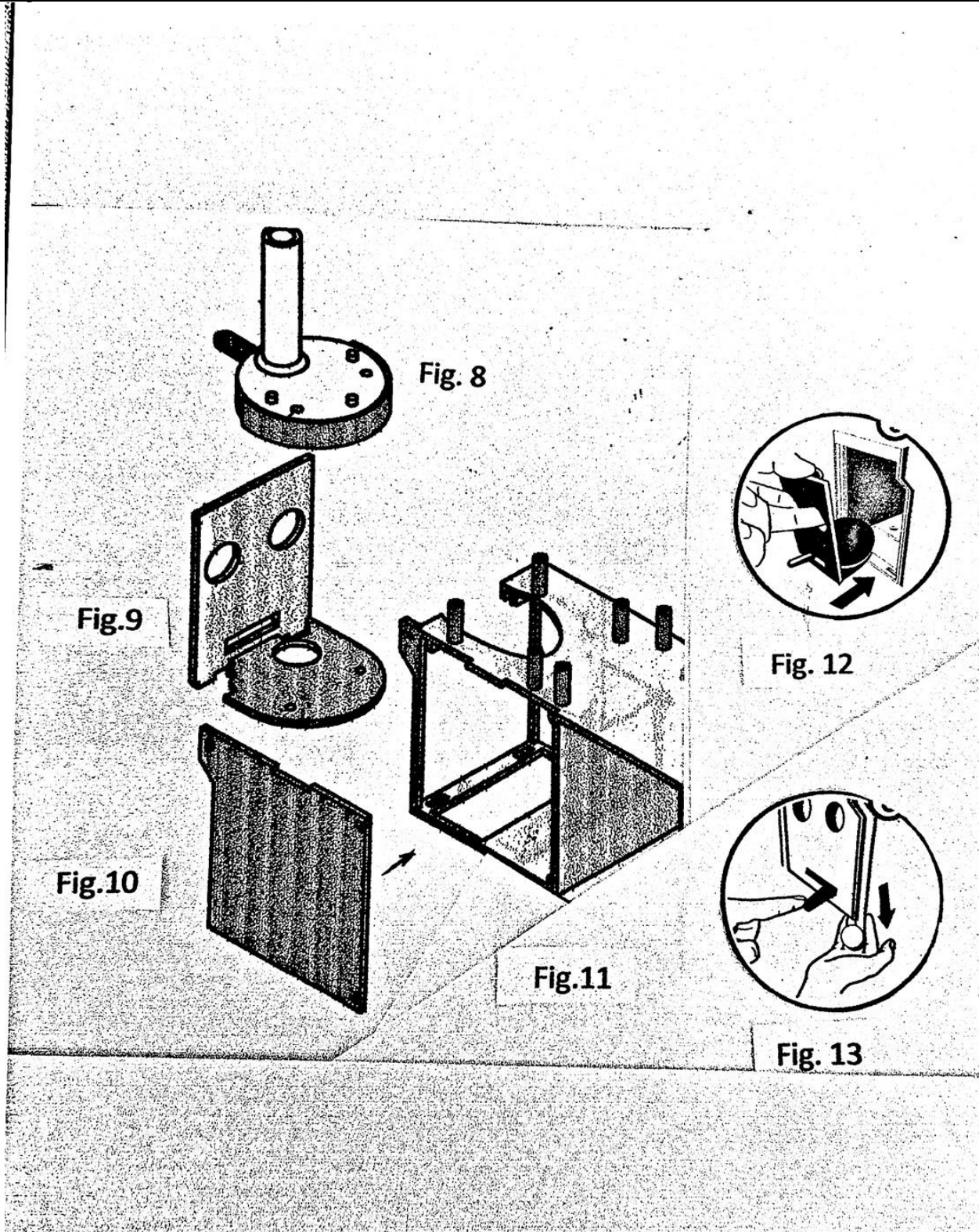
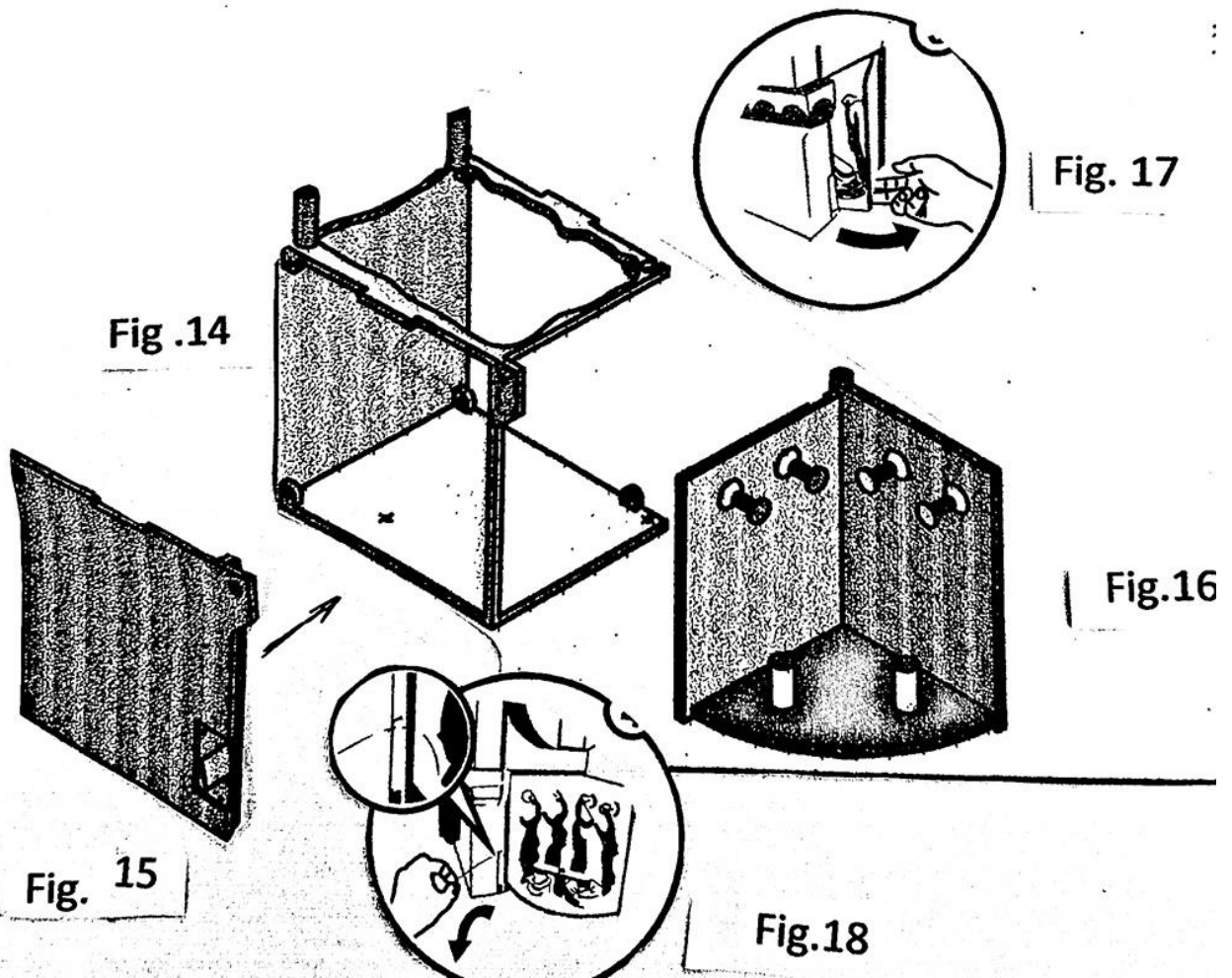


Fig. 7





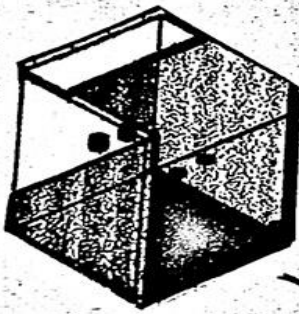


Fig.19



Fig. 20



Fig.22

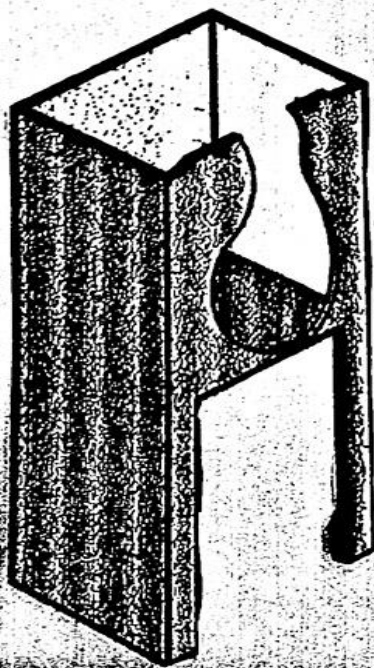


Fig . 21

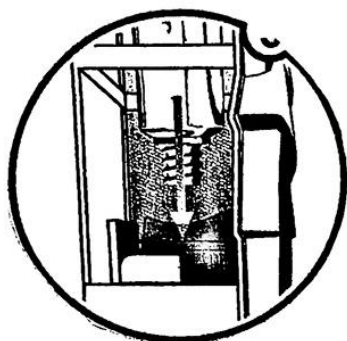


Fig.24

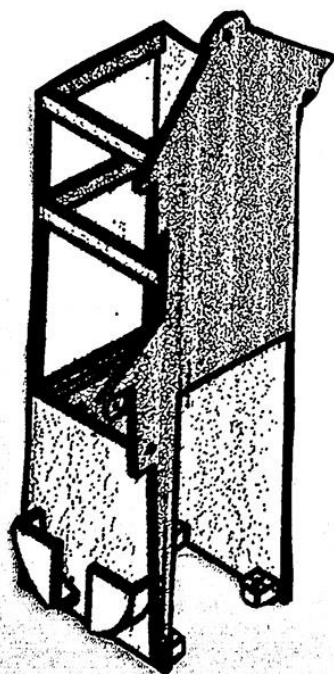


Fig.23



Fig . 25

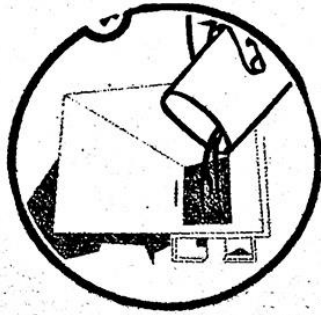


Fig.27

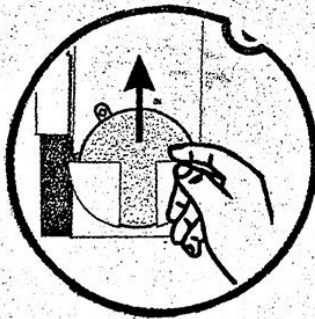
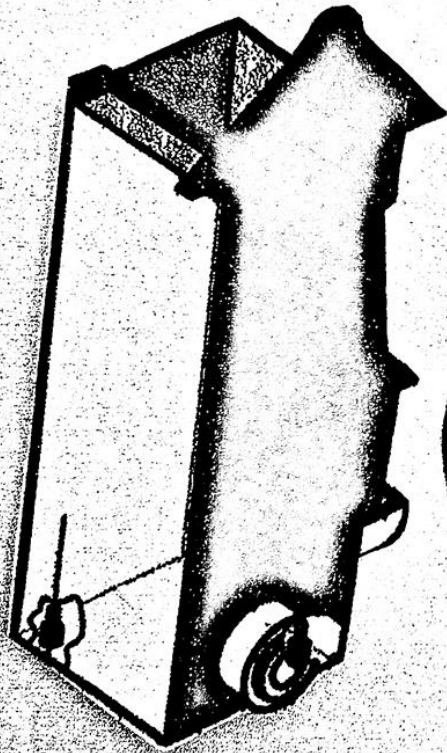


Fig. 28

19
.26



Fig. 29