June 2022 Number 1

Zespół Szkół i Placówek Oświatowych

w Skale

Erasmus+

Co piszczy w labie ...?

GDY TWOJE ŻONY PIŁUJĄ SZPONY

This journal is a periodical publication that can be printed or published electronically. It is published every school year and contains a variety of content on topics related to chemistry found in the real world. The first issue is dedicated to the topic of nail styling.

In this publication you will learn about the beginnings of the beauty industry and the different layers formed on the fingernail during nail styling. You will also learn why you feel different sensations on the fingernail when applying nail polish. These sensations include a cool, cold feeling followed by a burning sensation.

Parallel to this publication, a popular science program "What's in the lab...?" has been prepared, in which students of our school talk about chemistry.

(https://www.youtube.com/watch?v=kNSE7qXbXX0)

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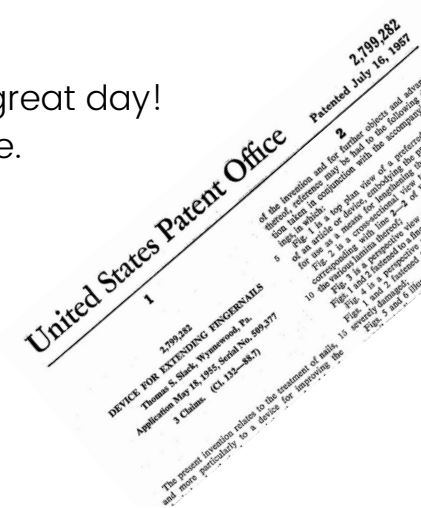
Co piszczy w labie ...?

THE FIRST SCENE – AT THE STUDIO

Presenter: Hello and welcome to the premiere episode of "What's in the lab...?". In today's episode we will look for a common theme between dentistry, chemistry and nail styling. I have invited a spokesperson from Nail Systems International (NSI - [n-es-i]) to our studio.
Good morning sir.
Spokesman: Good morning! Thanks for having me.
Presenter: For those of you who do not know, NSI is a major manufacturer of high quality products for the beauty industry, especially in nail styling [1, 2].
Spokesman: Yes, that's right, NSI is committed to nail technology, striving for more perfect techniques and faster applications. NSI was the first to market fiberglass-reinforced polymers, light-activated liquid and powder acrylics, and UV-curable gels.
Presenter: Please tell us how NSI got involved in the beauty industry.
Spokesman: NSI is a family business. Rick Slack, son of Fred Slack, is the owner and also the president of the company. Dr. Fred Slack was an innovator in the dental industry, and a leader in developing the first prosthetic products for the beauty industry.
Presenter: So we can say the beauty industry originates from dentistry?
Spokesman: Yes.In fact, on one occasion, in 1957, while working in his dental laboratory, Dr. Slack cut his fingernail on his thumb. As a solution, he used aluminium foil and dental acrylic to create a platform to attach the nail and the first artificial nail was created. If it were not for dentistry, the field of nail design would never have developed.
Presenter: I would say, if it wasn't for men, the field of nail design would never have developed.
Spokesman: We would do anything for women.
Presenter: Thank you very much for talking to us. Have a great day!
Spokesman: Thank you for inviting me! It was my pleasure.


United States Patent Office
2,799,282
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DEVICE FOR EXTENDING FINGERNAILS
Thomas S. Slack, Wynnewood, Pa.
Application May 18, 1955, Serial No. 509,377
3 Claims. (Cl. 132—48.7)

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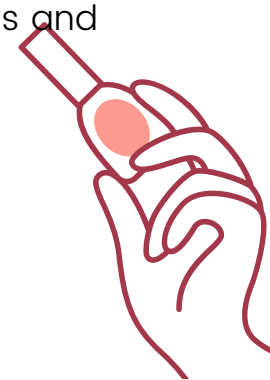
Co piszczy w labie ...?

THE SECOND SCENE - "BE BEAUTIFUL" SALON

Presenter: The first records of nail styling date back to the Bronze Age. In Babylonia, in 3200 BCE, painted nails were exclusively common among male warriors. Their nails were painted before the start of battle [3]. Today, beautiful, well-groomed hands are the business card of every woman. Let us now move to a beauty salon to see how the process of nail modelling looks like.

Customer: What should I consider when I want to have a manicure?
Beautician: Firstly the type of fingernails that you have, and secondly the type of job you work for. If clients have a job that requires intensive use of their hands then I advise against a hybrid manicure because the hybrid is soft and weak [4].
Customer: So the hybrid manicure should only be done for special occasions or jobs that do not require the use of hands often for physical labor?
Beautician: Correct. I recommend a hybrid manicure to women whose fingernails are strong, hard and also beautifully formed. A hybrid will not last long on a thin, flexible, inherently weak nails.
Customer: Aha, well based on what you said this type of manicure is not for me.
Beautician: I recommend the gel treatment to harden the natural nails. Nails made with the gel method will be more durable than hybrid nails and at the same time will be resistant to mechanical damage. They are perfect for women with brittle and fragile nails and those who want to make their nails longer.
Customer: What is the difference between the chemical composition of a gel and a hybrid?
Beautician: Chemically they are identical, differing only in the proportions of ingredients. They consist of methacrylate monomers and photo-ionizing compounds that start the polymerization reaction.



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Co piszczy w labie ...?

THE SECOND SCENE - "BE BEAUTIFUL" SALON

Customer: And why do I feel unpleasant burning sensation when holding my hand under the lamp?

Beautician: Polymerization occurs on the fingernail. This is an exothermic process. During this process, energy is released from the system and into the environment.

Customer: Indeed, you talked about this in our online classes. It's an extra bit of energy.

Beautician: Yes. On the other hand, when removing traditional nail polish with nail polish remover, the nail polish remover contains a chemical known as acetone. When applying acetone remover there is quite a different sensation - a cool sensation. This is because the evaporation of acetone is an endothermic process.

Customer: Yes, I remember that! Energy is drawn from the environment into the system.

Beautician: As you can see in beauty salons this knowledge can be put into practice.

Customer: I agree. Oh, what a beautiful manicure, thank you.

Beautician: You are very welcome.

Zdjęcie z zasobów programu canva.com

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Co piszczy w labie ...?

THE THIRD SCENE – AT THE STUDIO

Presenter: The market for professional nail styling is rapidly growing. Nail modelling is a beauty treatment that women opt for very often. What actually happens on the surface of the fingernail during this procedure? I will ask a Professor from the University of Pennsylvania about this.
Good morning, Professor.

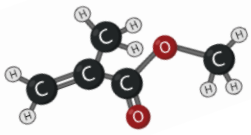
Professor: Good morning to you. Thank you for the invitation to the studio.

Presenter: Professor, we already know that the first artificial nail was made by dentist, Dr. Fred Slack, a graduate from the university where you presently teach. Please explain from a chemical point of view, what are the layers formed on the fingernail during its modelling?

Professor: Chemically, they are polymers. Polymers are made up of macromolecules, which are extremely large molecules, hence the prefix macro. A single macromolecule is built from monomeric units that are repeated many times. We can imagine such a macromolecule as, for example, a "string of beads" of very long length and very small diameter. When there are enough of these macromolecules they form a polymer [5].

Presenter: Did I understand you correctly? In order to form a polymer, we need to have a "bead" and many "beads" when connected will form a macromolecule?

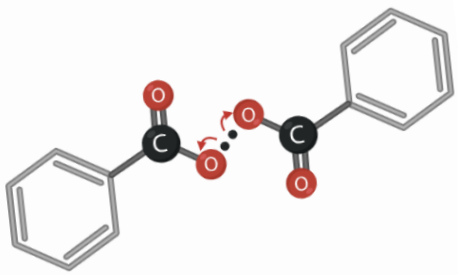
Professor: Yes, exactly! These "beads" are monomers. In this case the monomer is methyl methacrylate, or methyl 2-methylprop-2-enoate. It is the methyl ester of 2-methylprop-2-enoic acid.

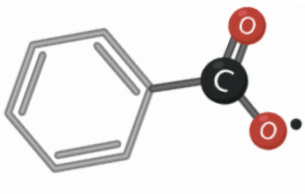


Presenter: Very difficult names.

Professor: This is the name recommended by IUPAC.

Presenter: And how is the polymer formed on the fingernail during the cosmetic procedure?





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THE THIRD SCENE – AT THE STUDIO

Professor: A polymer is formed by polymerization. It is a multi-step process. In the first stage, the initiator, benzoyl peroxide generates free radicals. The radicals are formed by the homolytic breakdown of the oxygen-oxygen bond in benzoyl peroxide. As a result of this breakdown, a particle with an unpaired electron is formed – known as a free radical which is highly reactive. In the second step, the free radical attacks the π bond present in the monomer. A macroradical is then formed. In the next step the macroradical attacks the π-bond of another monomer, this step is repeated many times. In this way the carbon chain, or backbone, of the polymer grows. In the final stage, the recombination stage, the two macroradicals combine to form a covalent bond between them and the polymerization process stops.

Presenter: And a durable and resistant polymer layer is formed on the fingernail. How does this layer differ from a layer of regular polish?

Professor: Layers of ordinary varnish are simply applied and left to dry, that is, until the solvent evaporates, a thin layer of polymer, usually cellulose triazotate(V), remains on the fingernail.

Presenter: Do you agree with this conclusion, Professor? The common theme among dentistry, chemistry and nail design relates to polymers.

Professor: I would go further in these considerations, polymers are everywhere. The objects around us are made of polymers. You and I are made of biopolymers, such as proteins, carbohydrates, and nucleic acids. So polymers are the common denominator for inanimate and animate matter.

Presenter: Amazingly, you could say that polymers are the building blocks of life. Thank you very much Professor for explaining the mechanism of the polymerization process and for making us realize what role polymers play in our lives.

Professor: Thank you for having me.

Presenter: This concludes our first episode of What's in the Lab...? Thank you for your attention. Subscribe to our channel that combines education and humor. We will see you next time.

Presenter: Oh wait, I nearly forgot, I have a chemical riddle for you.

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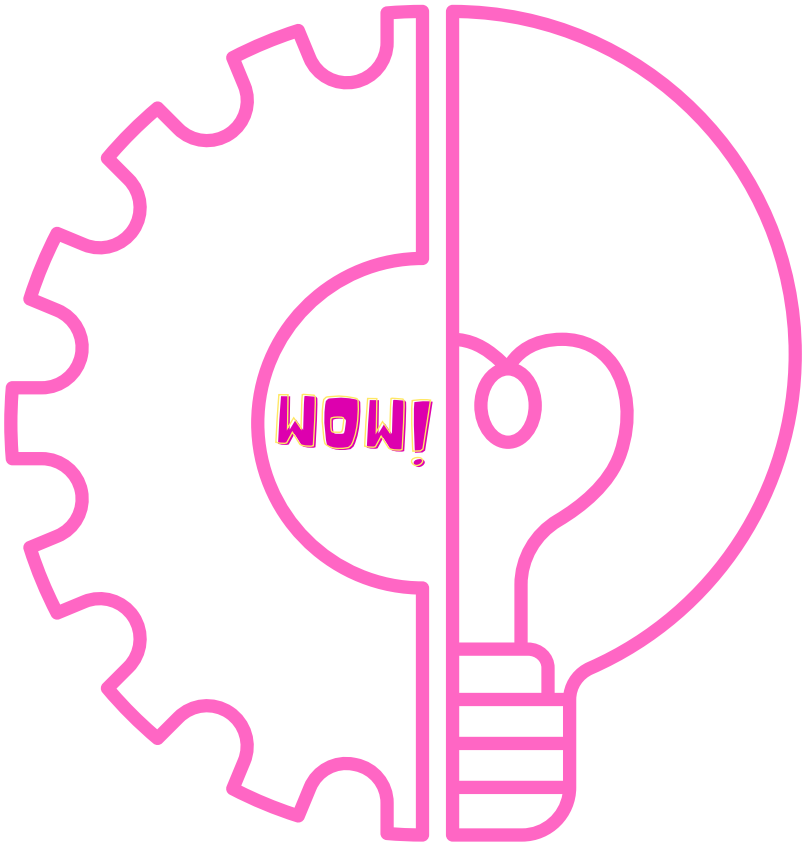
Co piszczy w labie ...?

THE FOURTH SCENE

A chemical riddle and a joke. A scene in the chemistry laboratory.

Student 1: Are you staying behind? What are you doing?
Student 2: I am finishing my chemistry project. And what are you up to?
Student 1: I'm in a rush. I have met a girl, I think she is the one for me! Today is our first date.
Student 2: Lucky her.I'm sure you will be the best possible partner for her.
Student 1: Why do you say that?
Student 2: Because you will be great at solving all kinds of problems.
Student 1: I still don't get it ...
Student 2: Because when you become a chemist you will have ...all the solutions!

Chemists make chemical solutions. Solutions are answers to problems.



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Co piszczy w labie ...?

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2. United States Patent Office 2799282, July 16, 1957;
3. https://semilac.pl/pl/blog/historia-stylizacji-paznokci;
4. Paulina Pastuszak, Wyssane z palca, podcast: "Żel, akryl czy hybryda? Który produkt najlepszy? Jaki zabieg wybrać";
5. Stanisław Penczek, Czym są polimery: https://www.youtube.com/watch?v=puDJKyfsGak&t=487s.

United States Patent Office 2,799,282 Patented July 16, 1957

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DEVICE FOR EXTENDING FINGERNAILS

Thomas S. Slack, Wynnewood, Pa.

Application May 18, 1955, Serial No. 509,377

3 Claims. (Cl. 132—88.7)

The present invention relates to the treatment of nails, and more particularly to a device for improving the physical and esthetic characteristics thereof and has for an object the provision of a device for applying a material to a human nail for extending it and to improve the strength and the appearance of the nail.

The problem of maintaining presentable nails, particularly finger nails, has always been of prime importance, particularly to women. This is particularly true where it is desired to enhance the appearance of the nail as by increasing its length, particularly in those instances where the nail to be improved has been severely broken or damaged, or is very thin or brittle and incapable of being naturally developed to a desired length. Artificial nails become detached too easily and do not lend strength to the body of the nail.

In accordance with the present invention, there is provided a device for use in guiding the application of a suitable coating material which not only adheres to the surface of a nail to improve the contour, shape and strength of the nail, but also forms an extension thereof of the same contour as the nail. The device is comprised of a portion extending forward beyond the nail to be treated, and another portion which extends backward on either side of the nail. The second-named portion provides a means for attaching the device to the digit bearing the nail. More particularly, the device is comprised of an open-ended body member for receiving the nail-bearing digit, for example, a finger, and has a portion which is placed adjacent to and in contact with the fleshy end portion of the finger. The body member or portion extends forward beyond the nail in a nail-lengthening direction so as to provide a platform upon which the material may be applied when it is desired to lengthen the nail. The platform portion of the device is located and maintained in a proper position relative to the nail and to the finger by means of spaced extending portions of the body member adapted to be positioned along the opposite sides of the finger. The extending portions not only provide the support for the device in such a manner that the device does not depend in any way on the finger nail for a means of attachment, but also provides means for shaping the platform to conform with the contour of the nail. In order to prevent the material applied to the nail from adhering to the platform, the surface is made resistant to adhesion with the material.

In a preferred form of the present invention the device is made flexible so that the platform may be shaped and conformed with the contour of the existing portions of the nail. The desired shaped relationship is maintained by providing a means for holding the device in fixed relation to the nail. In one form, this means is provided by a layer of adhesive material added on an undersurface of the device and being of a type which will form a bond with the flesh of the digit bearing the nail. In another form the device is metal and the resilience of the extending portions holds the device in place in matching contour with the nails. For a more detailed understanding of the invention and for further objects and advantages thereof, reference may be had to the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a top plan view of a preferred embodiment of an article or device, embodying the present invention, for use as a means for lengthening the nail;

Fig. 2 is a cross-sectional view taken along the line corresponding with line 2—2 of Fig. 1 and illustrating the various lamina thereof;

Fig. 3 is a perspective view of the device illustrated in Figs. 1 and 2 fastened to a finger;

Fig. 4 is a perspective view illustrating the device of Figs. 1 and 2 fastened to a finger whose nail has been severely damaged;

Figs. 5 and 6 illustrate the steps of applying a coating or nail-extending material to a nail and to the device;

Fig. 7 illustrates a finger and nail to which a coating material has been applied;

Fig. 8 illustrates another form of the present invention in which the device is formed from tube stock;

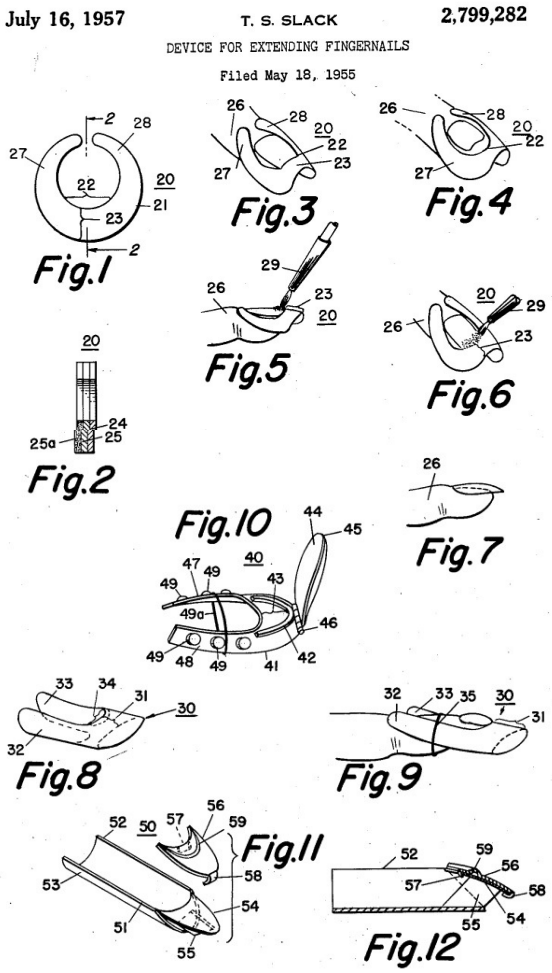
Fig. 9 illustrates the device of Fig. 8 in position on a finger; and

Figs. 10, 11 and 12 illustrate yet other forms of the present invention usable in the practice of lengthening and/or coating of a digit nail.

Referring now to the drawings wherein like reference characters designate the same parts throughout the several views and more particularly to Figs. 1 and 2, there is illustrated an expendable former or device 20 embodying the present invention.

The device 20 is substantially circular in shape with a circular cut-out portion eccentric with respect to the circular periphery to define a substantially ring-shaped body. The eccentricity provides a wider portion 23 which forms a platform for a nail-coating and nail-extending material. The width of the device 20 decreases from the platform area 23 to the side portions or extensions 27 and 28 which serve not only to secure the device 20 to a digit but also to control the shape and contour of the platform 23. The device 20 of Figs. 1 and 2 is of the expendable type. It is of low cost and is conveniently stamped from a laminated material, one side 24 of which may be a metal foil, such as aluminum or tin, with a base portion 25 of paper covered by a coating of adhesive 25a. The adhesive may be of the pressure-sensitive type, in which case it will be protected by a removable cover, or preferably it is of the dry type which after moistening will adhere to the finger.

As is well known, nails vary in their cross-sectional contour and, of course, in size. Nevertheless, the device 20 is universal in application and only one size need be supplied in order to apply the nail-coating and nail-extending material to the nails of each digit of hands widely differing in size. More particularly, the device 20 in Fig. 5 is shown in its final position affixed to a digit 26. It will be observed that the inner arcuate portion 22 has been moved beneath the end of the nail of the digit 26 and that the side extensions 27 and 28 have been pressed against the sides of the digit with their end portions extending along the sides and upwardly to the top of the digit. It will be understood, of course, that the adhesive coating 25a adheres to the fleshy portion of the finger. Accordingly, by moving the extensions 27 and 28 transversely of the axis of the digit 26, the platform portion 23 may be shaped to match the contour of the nail. This is one of the important features of the invention which makes it universal in its application and adapted to nails of all sizes. In this connection, if the extensions 27 and 28 meet, i. e., the device 20 is a continuous ring, the same end results can be achieved by having the cut-out opening large enough to accommo-



Teachers: Anna Opalska and Joanna Jarzmik