

THE CHEMICAL FORMULARY

THE CHEMICAL FORMULARY

A CONDENSED COLLECTION OF VALUABLE, TIMELY,
PRACTICAL FORMULAE FOR MAKING THOUSANDS
OF PRODUCTS IN ALL FIELDS OF INDUSTRY

VOLUME II

Editor-in-Chief

H. BENNETT



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PREFACE TO VOLUME II

The gratifying reception accorded Volume I of the Chemical Formulary together with the helpful and constructive criticisms received from reviewers and chemists have manifestly proved the need for a book of this type covering modern formulation in commercial chemistry.

While Volume I is complete in itself, the Editors felt it was impossible within the scope of one book to include all the formulae compiled for the numerous subject headings in the book. Volume II therefore is not a duplication or revision of Volume I but an entirely new work giving further formulae on the subjects treated in the first volume as well as more detailed information on processes and fundamental principles involved.

It will be noticed that all patented formulae have the patent number included. A helpful article on what is patentable in chemical compounding: infringements, licensing, etc., is another important addition to the book. It must be borne in mind in this connection that patented formulae cannot be used in the manufacture of commercial products unless prior arrangements have been made with the patentee.

The Editorial Board has been considerably enlarged and consequently it has been possible to include formulae hitherto unavailable.

A certain amount of criticism was directed toward the use of trade-names in Volume I. It was contended by the critics that formulae containing trade-names should be eliminated regardless of their value. Considerable thought was given to this contention and it was felt that, inasmuch as chemical trade-name products are being used in an ever-increasing number of formulae in every class of chemical manufacturing, these formulae should be included unless the application was exceptionally limited.

A second subject of criticism was the non-uniformity of systems of weights and measures used in the book. Since there is no uniformity in such systems in commercial practice and since the main purpose of the book is to familiarize the reader with commercial practice it was thought best not to attempt to standardize these systems.

In the Preface to Volume I, it was emphasized that the chemistry taught in schools and colleges is rightly confined to synthesis, analysis and engineering whereas in commercial manufacture many of the products so made are not synthetic or definite chemical materials but consist of mixtures, blends or highly complex compounds.

Because of the paucity or antiquity of the literature in this field and because of the difficulty encountered even by experienced chemists on entering new fields a definite need has existed for a modern compilation of formulae for chemical compounding and treatment.

In addition to an Editorial Board composed of chemists and engineers in many industries, publications, laboratories, manufacturers and individuals have been consulted to obtain the latest and best information in the numerous fields covered in the book.

It is important to remember that repeated experiments may be necessary to get the best results, especially when the field is intricate or unfamiliar. Again, although many of the formulae are being used commercially, some of them have been taken from patent specifications and the literature. Since these sources are subject to various errors and omissions, due regard must be given to this factor.

Formulae must be considered chiefly as starting points, variations have to be made to meet individual requirements and specifications. In cases of doubt or difficulty it is advisable at all times to consult other chemists or technical workers familiar with the particular field. This applies particularly in the case of the layman, as while a certain expense is involved this is more than compensated for by the saving of time, money and material.

As mentioned in Volume I it is hoped that those who have found a work of this kind helpful, will bring to our attention any errors they come across and will feel free at all times to make any constructive criticisms or suggestions.

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ADHESIVES

Adhesive for Aluminum	
Dextrin (very soluble type)	16 lb.
Sodium Metasilicate	4 lb.
Glucose	2 lb.
Water	25 lb.

Thermoplastic Adhesive	
Shellac	45 lb.
Gum Copal	55 lb.
Castor Oil	20 lb.
dissolved in	
Alcohol	65 lb.
Toluol	15 lb.

This solution which is of fairly high viscosity is spread by suitable means, the solvent allowed to evaporate and the coating dried thoroughly. It can be softened after application, by heat.

Adhesive for Laminating Satin (or Other Fabric) to Paper	
Casein	10 lb.
Ammonia (concentrated)	1.5 lb.
Water	40 lb.

Heat until casein is completely dissolved then add it slowly and with constant stirring to

Latex (concentrated)	100 lb.
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Self-Sticking Adhesive (Non-Drying)	
Nitro-cotton (20 sec.)	5 lb.
dissolve in	
Ethyl Acetate	4 lb.
Toluol	2 lb.

Add the following solution which has been previously prepared

Ester Gum	4.5 lb.
Castor Oil	3 lb.
Dibutyl Phthalate	3 lb.
Ethyl Acetate	2 lb.
Toluol	2 lb.

Low Alkali Flour Adhesive U. S. Patent 1,904,619

A glue having a moderate alkali content and a thinning or "cutting" agent is prepared at less than 43° C. as follows:

Tapioca Flour	100 parts
Potassium Bichromate	0.25-2.0 parts
Calcium Oxide (approx.)	1 part

Caustic Soda	5 parts
Water (approx.)	200 parts

Adhesive for Bands of Transmission Belting

Syrian Asphalt	1 part
Rosin	1 part
Gutta Percha	4 parts
Gasoline	6 parts
Carbon Disulphide	15 parts

Allow to stand until dissolved then stir and cover. The surfaces to be glued are rubbed and the adhesive applied, the bands being pressed between two hot metal plates.

Non-Permanent Adhesive British Patent 404,589

A composition, which is adhesive when moist and disintegrates and is non-adhesive when dry, is formed by heating to 100° C., glucose 40, lactose 8, sucrose 8 and water 40 and, after cooling, adding French chalk 10 and flour 80.

Quick Dissolving Casein Adhesive Formula 1 U. S. Patent 1,959,185

21 parts of the ground crude casein are soaked for a few minutes in a solution of from 1 to 2 parts of di-isopropyl, or dibutyl, naphthalene sulphonic sodium salt; a mixture of 3 parts of calcium hydroxide, 6 parts of aqueous caustic soda of 40° Bé. strength and 35 parts of water are then added, an adhesive ready for use being obtained after short stirring and homogenizing.

The aforesaid sulphonic acid salts may be replaced by sulphonation products or mineral or tar oil fractions the constituents of which have a high molecular weight, such as fractions boiling about 180° to 200° C., by sulphuric esters or sulphonic acids of palmitic, stearic, myristic, oleic, ricinoleic and like acids of the fatty acid series or of esters, amides, hydroxyalkyl amides of the said sulphonation products or, preferably, by the alkali metal salts of the aforesaid compounds.

Formula 2 U. S. Patent 1,959,185

42 parts of ground crude casein are intimately mixed with from 2 to 4 parts

of di-isopropyl, or di-butyl, naphthalene sulphonic sodium salt, 6 parts of calcium hydroxide and 4.2 parts of ground solid caustic soda. The mixture may be stored and furnishes on stirring with water an adhesive of any desired consistency which is entirely free from knots or lumps and which possesses a very high adhesive power.

Acid or Neutral Casein Solution
U. S. Patent 1,893,608

Casein (55 lb.) is soaked in water (30 gal.) at 65-70° containing sodium fluoride (5 lb.) and ammonium chloride (2 lb.) until swelling ceases, and crystalline borax (6 lb.) is added to produce a homogeneous viscous dispersion of pH 4.6-4.7, boric acid being added if necessary to produce the desired pH.

Casein "Solution"

Casein	5 lb.
Water	4½ gal.
Ammonia	11 oz.
Phenol	1½ oz.

Mix casein with hot water, add ammonia, stir until smooth and add phenol.

Casein Binder for Cork

Casein	32.7 parts
Glycerine	37.15 parts
Latex	12.75 parts
Sodium Silicate	12.4 parts
Triethanolamine	5.0 parts

Casein Adhesive
U. S. Patent 1,919,158

An intimate dry mixture of calcium hydroxide 10, sodium fluoride 4.2, and either peanut meal 84 and sodium phosphate 3, or peanut meal 76, wood flour 10, and sodium carbonate 1%, is stirred for 15 minutes with 3.8 parts of water to give a thin paste which is thickened by warming and stirring with 5-6 parts of 40% sodium hydroxide for 2 hours.

Liquid Casein Glue

Water	2,000 lb.
Casein	425 lb.
Borax (as dry crystals)	55¼ lb.
Phenol	81 lb.
Terpineol	10 oz.

Moisture-Proof "Cellophane" Adhesive
U. S. Patent 1,948,334

An adhesive composition comprised by weight from 70 to 29 parts of G rosin,

29 to 70 parts Venetian turpentine, and 1 to 20% of diethylene glycol monobutyl ether.

The method of preparing a composition for causing moisture-proof cellophane to adhere to similar or other materials, which comprises heating solid rosin to approximately 120° C. to liquefy the same, adding thereto Venetian turpentine, cooling the mixture to approximately 100° C., and then adding thereto a glycol ether, such as ethylene glycol monobutyl ether.

Moisture-Proof "Cellophane" Adhesive
U. S. Patent 1,953,104

1. Aqueous dispersion of rubber (45% rubber) 20 parts
Water-soluble agglutinant 50 parts
Condensed glycerol 10 parts
2. Aqueous dispersion of rubber (45% rubber) 5 parts
Water-soluble agglutinant 15 parts
Triethanolamine 2 parts
Ethyl lactate 5 parts
3. Aqueous dispersion of rubber (45% rubber) 5 parts
Water-soluble agglutinant 15 parts
Glycerol 3 parts
Ethyl lactate 5 parts

As a water-soluble agglutinant any of a large number of known compositions may be used, but to clearly define the above examples there is hereinafter set forth certain specific examples which have given successful results:

1. Starch, such as
Cornstarch 10 parts
Dextrin 2 parts
Water 63 parts
2. Starch, such as
Cornstarch 3 parts
Dextrin 1 part
Gum Arabic 4 parts
Water 22 parts

"Cellophane" Adhesive
U. S. Patent 1,929,013

An adhesive suitable for use on cellophane and the like contains gum 16.5, glyptal resin 17.9, acetone 16.6, ethyl acetate 9.0, castor oil 8.3, a 30% aqueous gelatin solution 14.5 and a 20% aqueous casein solution 17.2 parts.

Adhesive for Celluloid to Wood

Glue	10 parts
Water	10 parts
Glycol Bori-Borate	10 parts

Adhesive for Cellulose Acetate
U. S. Patent 1,950,954

Formula 1	
Diethyl Phthalate	5-100 parts
Ethyl Lactate	25-100 parts
Methyl Acetate	5- 50 parts
Formula 2	
Dibutyl Phthalate	100 parts
Butyl Acetate	50 parts
Ethyl Acetate	50 parts
Formula 3	
Tricresyl Phosphate	5 parts
Monoethyl Ester of Ethylene Glycol	100 parts
Acetone	5 parts
Formula 4	
Tricresyl Phosphate	25 parts
Ethyl Oxybutyrate	100 parts
Ethyl Alcohol	25 parts
Formula 5	
Diethyl Phthalate	50 parts
Dioxan	100 parts
Ethyl Alcohol	50 parts
Formula 6	
Triacetin	100 parts
Methyl Oxybutyrate	25 parts
Methyl Acetate	25 parts
Formula 7	
Dibutyl Tartrate	100 parts
Ethyl Lactate, Class B	20 parts
Diacetone Alcohol, Class B	20 parts
Ethylene Dichloride	15 parts
Formula 8	
Dimethyl Phthalate	5 parts
Monomethyl Ether of Ethylene Glycol	90 parts
Methyl Acetate	5 parts
Formula 9	
Monomethyl Xylene Sulphonamide	100 parts
Ethyl Lactate	50 parts
Ethyl Alcohol	50 parts
Formula 10	
Paraethyltoluol Sulphonamide	25 parts
Dioxan	100 parts
Acetone	10 parts

While these formulae are applicable to cellulosic plastics in general, Formulae 2, 3, 4, and 5 are especially suited for cellulose nitrate plastics, whereas Formulae 6, 7, 8, 9, 10, are especially suitable for cellulose acetate plastics.

Electrical Conducting Cement

Lampblack	1 part
Litharge	2 parts
Glycerol	3-8 parts

Electrical Lamp Circuit Paste

A device for maintaining the circuit when the filament of one of a number of series-connected lamps fails consists of a paste, containing powdered tin, carbon or other conductive substance, used to secure the cap to the bulb. As an example the paste consists of powdered conductive substance one part, lead oxide two parts and sufficient glycerol to form a paste that sets hard.

Electrical Heater Unit Cement

This method covers the process to be followed in the manufacture of cement for coffee percolator heater units (expressed in percentages by weight).

Powdered Silica	63 %
Pyrolusite (200 mesh)	9.5%
Sodium Silicate (1 part) Sp. Gr. 1.25	} 27.5%
Potassium Silicate (2 parts) Sp. Gr. 1.25	

Reduce the specific gravity of the potassium and sodium silicates to 1.25, using water not over 60° C. as a thinner. Then mix the two liquids. Place the silica and pyrolusite together in a mixing machine, then add the liquid. Continue to mix until a smooth uniform cement is obtained.

Make this cement only in such quantities that will be used within a week or 10 days.

Metal to Glass Cement

Plaster Paris	56%
Fine Clean Sand	20%
Rosin	20%
Drier	4%

Sufficient linseed oil is added to form a stiff paste.

Adhesive to Join Metal to Glass or Wood

Formula 1	
Black Pitch	3 parts
Rosin	10 parts
Yellow Wax	5 parts
Powdered Brick	3 parts

Formula 2	
Tar Resin	85 parts
Plaster	10 parts
Venice Turpentine	8 parts

Adhesive to Join Metal Letters to Glass

Marine Glue	12 parts
Slaked Lime	25 parts
Venice Turpentine	10 parts
Oil of Turpentine	5 parts
Copal Oil Varnish	35 parts
Boiled Linseed Oil	15 parts

Adhesive for Photographic and Optical Lenses

These are used hot.

Formula 1	
Black Pitch	85 parts
Tallow	10 parts
Powdered Wood Charcoal	5 parts
Formula 2	
Black Pitch	10 parts
Tallow	10 parts
Powdered Wood Charcoal	10 parts

Optical Glass Cement

U. S. Patent 1,921,948

Polyvinyl Chloride	33 parts
Polymerized Vinyl Acetate	42 parts
Canada Balsam	25 parts

Adhesives for Glass and Porcelain Surfaces must be heated before application.

Formula 1	
Burgundy Pitch	8 parts
Shellac, Orange	2 parts
Gum Mastie	4 parts
Gum Elemi	4 parts
Sulphur	12 parts
Kaolin	10 parts
Formula 2	
Black Pitch	1 part
Tallow	1 part
Slaked Lime	Sufficient

Cement for Wood, Porcelain, etc.

Melt together equal parts of shellac, gutta-percha, and rosin. Apply to the article, which must be dry and warm.

Grafting Adhesives

The following formulae are for protecting the cuts made by grafting, from the action of air, sun and humidity. The adhesives used hot are more economical than those used cold but somewhat more difficult to apply.

Formula 1	
Black Pitch	125 parts
Rosin	500 parts
Yellow Wax	120 parts
Tallow	110 parts
Sifted Wood Ash	Sufficient
Formula 2	
Black Pitch	150 parts
Rosin	150 parts
Yellow Wax	200 parts
Tallow	60 parts
Sifted Wood Ash	40 parts
Formula 3	
Black Pitch	280 parts
Burgundy Pitch	280 parts

Yellow Wax	160 parts
Tallow	140 parts
Sifted Wood Ash	140 parts

Formula 4
(National Horticultural School, Versailles)

Black Pitch	12 parts
Burgundy Pitch	50 parts
Rosin	12 parts
Yellow Wax	10 parts
Tallow	6 parts

This is applied hot.

Formula 5	
Applied hot,	
Burgundy Pitch	75 parts
Rosin	25 parts
Tallow	20 parts
Ochre	30 parts

Formula 6
This does not flow in the sun and can be applied in all weathers.

Black Pitch	50 parts
Yellow Wax	10 parts
Linseed Oil	20 parts

Formula 7	
Applied cold,	
Black Pitch	60 parts
Burgundy Pitch	50 parts
Yellow Wax	25 parts
Tallow	50 parts
Denatured Alcohol	25 parts

Formula 8	
Coal Tar	10 parts
Black Pitch	10 parts
Burgundy Pitch	10 parts
Yellow Wax	5 parts
Whiting	10 parts
Denatured Alcohol	8 parts
Essence of Turpentine	5 parts

Formula 9	
Applied hot,	
Black Pitch	20 parts
Burgundy Pitch	20 parts
Rosin	5 parts
Yellow Wax	5 parts
Tallow	3 parts

Formula 10
Can be thickened by addition of wood soot.

Coal Tar	15 parts
Yellow Wax	35 parts
Tallow	15 parts
Linseed Oil	35 parts

These can be used also for covering the crevices, fissures and bruises produced on vegetation by insects, and which it is desired to heal quickly.

Formula 11
This is recommended for combating the canker of apple trees. It is spread

on the wound which has previously been carefully rubbed.

Black Pitch	30 parts
Rosin	50 parts
Yellow Wax	5 parts
Tallow	10 parts
Denatured Alcohol	100 parts

Latex Adhesive (Patented)

To 100 parts of rubber as creamed latex add 20-40 parts of rosin oil as emulsion; 30-200 parts of carbon tetrachloride emulsion (carbon tetrachloride 60, water 38, glue 1, sodium oleate 1); 2-5 parts of oil of wintergreen. The use of the oil of wintergreen is optional. If a filler is desired, e.g. whiting, then 50-100 parts of this may be added to the above formula. Latex can be creamed with any available creaming agents such as pectin, Karaya gum, alginates, Irish moss, Iceland moss, and it may be creamed more than once if one creaming is unsatisfactory. Instead of rosin oil, one may use pine tar, white pine pitch or cumar, or any softener for rubber. In place of CCl_4 , one may use either benzol, high flash coal tar, naphtha or solvent naphtha, in emulsion form. These water insoluble organic liquids, by reason of their volatility, assist in the removal of water during the drying of the adhesive. Water dispersions in general do not dry as rapidly as rubber cements made with volatile organic solvents, and by the above described addition, the adhesive of the present invention is caused to dry more rapidly. Instead of oil of wintergreen, one may use either terpineol, anisic aldehyde, phenyl ethyl alcohol, methyl salicylate, oil of lavender.

Sticky Latex Adhesive

60% concentrated latex is diluted to a concentration of 45% with water and stabilized by the addition of a small quantity of casein dissolved in dilute ammonia (at the rate of 1 gram casein per 100 cc. of the original concentrated latex). The latex mix is then freed of ammonia as rapidly as possible by drawing air through it. The next step is to place 150 cc. of the ammonia-free latex in a large vessel, as considerable frothing occurs, together with 12.5 cc. of 20-volume hydrogen peroxide. The liquid is then slowly but efficiently stirred and warmed on a steam bath until frothing subsides. This takes 20 to 30 minutes. The whole is then cooled, and a further 12.5 cc. of the 20-volume peroxide added. Finally the mix is heated for 3 to 4 hours

on the steam bath, with constant stirring. If any tendency to clotting appears, a little dilute ammonia should be added. After cooling, the oxidized latex is strained, and a small quantity of ammonia added as a preservative.

Vulcanizable Latex Cement

U. S. Patent 1,745,084

90 parts sulphur: 15 parts bentonite: 590 parts water, are intimately mixed. 3% saponia may be added. To this is added 462 parts latex containing 38% solids. The bentonite keeps the sulphur from settling out. This makes a fluid cement free from volatile and inflammable solvents. Used for setting bristle brushes.

Liquid Glue.

U. S. Patent 1,950,483

Animal glue is mixed with about 20-50% of urea or biuret to form a product which is liquid at ordinary temperatures and which is hygroscopic when dried and suitable for use on articles which are to be exposed to low temperatures.

Liquid Glue

Liquefied Glue (conc.)	100 parts
Lactic Acid, 85% U.S.P.	10 parts
Alcohol (den.)	6 parts
Glycerin	2 parts
Boric Acid	1 part
Benzoic Acid	1 part
Oil of Sassafras	sufficient to cover glue odor

Glue Defoaming

U. S. Patent 1,957,513

Forty parts paraffin wax and ten parts aluminum stearate are heated until the aluminum stearate is dissolved. Fifty parts of sulphonated tallow are added and the mixture is heated to about 75° C. for 15 minutes under constant stirring and allowed to cool.

As an example of the use of the defoaming agent, produced as above, determine the amount of dry glue in the glue solution to be treated, and add to the glue solution an amount of the defoaming agent equal to two per cent of the amount of dry glue. This mixture should be made at a temperature of 60° C. and when thoroughly mixed, cooled and dried.

Glue Defoaming

U. S. Patent 1,927,927

In order to produce a smooth-working glue and to prevent foaming when water

is added to a stale dry glue base such as one containing casein, alkaline earth hydroxide and alkali metal compounds serving as casein solvents, a small proportion of pine oil is added to the water used, separately from the glue base.

Glue Binder for Cork Composition

Granulated Glue 1 part
Glycerin (95%) 1 part

Warm the glycerin in a steam bath, add the glue and stir until thoroughly mixed. Let stand for twenty-four hours. The product is a tough, rubbery, heavy material.

Glue for Sticking Labels to Tin

Dissolve copal gum in acetone. The best way is to cover the gum with acetone and to allow to stand for a day or two, then stir and thin to required consistency with acetone.

Glue and Gelatin Preservative

U. S. Patent 1,932,338

The addition of 0.1% ortho cyanphenol to gelatin solutions or 0.25% para cyanphenol to glue solutions prevents fungus growths.

Hardening of Gelatin

British Patent 408,085

Gelatin is hardened by addition (0.2-5% by weight) of an acid derivative of glyoxal (bisodium bisulphite or tetraacetate).

Preserving Glue

U. S. Patent 1,925,819

A small proportion (suitably about 0.1-5.0%) of ortho phenylphenol or its sodium salt is added to animal glue or similar material as a preservative.

Making Glue from Bones

U. S. Patent 1,951,260

1000 kilograms of bones are macerated for about 24 hours with 2000 litres of 7½% hydrochloric acid, whereas the complete maceration of the same quantity of bones would require 5000 litres of 7½% acid. Upon the expiration of this period the salt solution formed is run off and the bones are repeatedly washed in fresh water until the remaining acid has been completely removed.

The washed bones are then treated several times with boiling water until the largest part of the glue contained in the bones has gone into solution, although

only about 40% of the amount of hydrochloric acid theoretically necessary was used.

The glue still remaining in the bones can be obtained by the pressure method. Only one or two pressings are necessary for this purpose.

“Waterless” Glue

U. S. Patent 1,955,075

Defibrinated blood is acidified at 40° C. with 0.5% of lactic acid (the percentages refer to the dry condition of the blood) and then 2.3% of ammonium sulphate is added in dissolved condition. The mixture is continually stirred at 35-40° C. and is neutralized with alkalis after 1 to 3 hours, until an alkaline reaction just occurs. 8 to 12% of concentrated glycerin and 5% of alum are then added, intimately mixed and dried according to the form of the dry product on vacuum cylinders or gelatinizing machine.

The method of using the dry glue is so carried out, that the dry glue in suitable form is introduced between the bodies to be glued. The whole is then heated to a temperature of 100 to 120° C. and pressed together. By the hygroscopic substances water is added to the dry glue in such a quantity, that sufficient moisture is present for rendering soluble the glue corresponding exactly to the temperatures employed, so that the detrimental influence effected by the excess water in other gluing methods is avoided and moistening of the bodies to be glued is not necessary. By the addition of easily fusible salts or of salts, which have a high percentage of crystal water, the melting temperature of the dry glue is kept in practice very low, so that even a heating up to 100° C. suffices.

Waterproof Albumen Glue

Add 1 part of albumen to 1½ parts slightly tempered water (to make for better receptivity). Pour the albumen into the water, allowing it to precipitate at will. What does not readily precipitate, press under, but *do not stir*. Let it soak if need be overnight, after which the swelling of the flakes will have been consummated and stirring will bring it to a fine solution. Do not strain, since the small percentage of fibrinogen forms a very valuable matter from the standpoint of waterproofing.

After the solution is ready, prepare on the side, by creaming in a little cold water, 15% paraformaldehyde based on dry weight of albumen, and stir it in rapidly. Follow immediately with 5½%

ammonium hydroxide, also slightly diluted for better dispersion, stirring very rapidly. Then, allow the solution to set up into a firm jellylike mass, which, after standing 1 hour, will return to solution easily worked. This is the solution to employ and will last for approximately 8 hours to its inversion.

Insoluble Albumen Coatings

Dissolve 1 kilogram albumen in 8 litres water.

Add about 800 cc. water in which have been dissolved 40 to 50 cc. formaldehyde (40%).

Upon the addition of formaldehyde, the albumen solution becomes jellylike and hard, the time of setting being delayed by the addition of a small amount of ammonium hydroxide to the solution. Therefore, it is imperative to make immediate use of this jelly as a coating, since setting takes place rapidly, and only what one might be prepared to use in a short time should be made up. After 24 hours, the coating becomes insoluble in water.

Padding Glue

Glue (6-8 grade Nat.		
Assoc.)	33	lb.
Glycerin	33	lb.
Water	4 gal.	2 qt.
Titanium Dioxide	4	lb.
Beta Naphthol	1¼	oz.
Methyl Salicylate	3	oz.

After passing the titanium dioxide through a 20 mesh sieve mix it with the glycerin, add the beta naphthol and water then stir in the glue. Let soak overnight and then melt; mix the methyl salicylate in thoroughly and store in tin pails.

Glue Deodorizer

Glue can be almost completely deodorized by adding 3.0% by weight of potassium nitrate to the glue when starting to cook it.

Marble or Onyx Adhesive or Cement

Granular Marble	67%
Zinc Oxide	15%
Whiting	18%

The above ingredients are mixed dry and kept that way; for use the powdered material is mixed with sodium silicate until a paste condition is obtained.

Cements that are smoother can be obtained by mixing whiting or fine silica with sodium silicate until a smooth paste is obtained. There are several such mixtures on the market at present.

Adhesive or "Masking" Tape

U. S. Patent 1,933,026

Tape, made as below and coated, remains substantially permanently tacky and does not require the use of heat, a solvent, or the application of any agent other than mechanical pressure. The tape sticks with great tenacity to a highly polished or glazed surface. When it is removed it does not leave any stain. The coating further prevents permeation of the alcohol, cellulose acetate or other solvent with which the varnish or lacquer is mixed.

The tape is unimpaired after a single use and may be removed and used over again and again. It may be rolled on a core without the use of slip sheeting or otherwise treating to prevent adhesion of successive laps in the roll. The adhesive is colorless, tasteless, odorless, non-inflammable, and non-poisonous.

As a suitable reagent for treating kraft paper, first prepare a 20% aqueous solution of ammonium monophosphate (acid). Mix this solution with a 40% solution of commercial formaldehyde on the basis of 3 parts of the ammonium monophosphate solution by volume with 1 part of the formaldehyde solution.

During the mixing operation noted, there is a rise in temperature due to the breaking down of the formaldehyde and ammonia with the formation of hexamethylene tetramine. In order to prevent overheating the solutions may be mixed in a water jacketed mixer.

Next mix 1 part of ethylene glycol monoethyl ether acetate which acts as a check or modifier of the water content, to 2 parts of diethylene glycol by volume. In this solution the diethylene glycol is used as a hygroscopic agent to hold a desired water content. Triethanolamine is added in varying proportions to control the adhesive properties, thereby producing an adhesion of the desired degree. A mixture of 3 parts of the latter reagent with 1 part of the former produces a desired degree for the purposes specified.

The mixture referred to in the immediately preceding paragraph is mixed with the mixture resulting from the first two described reagents on the basis of 3 parts of the former with 1 part of the latter.

The final mixture or impregnating reagent may be placed in a bath and the paper webbing passed through the bath so that the fiber of the paper will absorb the solution. The webbing is then conducted through squeeze rolls to remove the excess of the solution.

While the web is still damp or moist, however, latex solution is applied to one surface of the tape, preferably by spraying. The web is then dried preferably by the application of heat, and in about 3 minutes it is dry enough to form into rolls. The impregnating solution is absorbed by the latex, increasing the tackiness of the latter, and acts as a binder to cause the latex coating to become firmly bonded to the fiber of the paper and tends to vulcanize and limit oxidation or decomposition of the latex solution. Ordinarily the solution is applied to a full roll of paper and the individual tapes are slit from the roll after the coating operation is completed.

Masking Tape Adhesive

Pale Crepe	50 parts
Tube Reclaim	50 parts
Cumar RS	30 parts
Bardol	10 parts
Zinc Oxide	25 parts
Lithopone	75 parts

Mill together—cut with solvent (benzol or naphtha) to the desired consistency and spread.

Adhesive for Metal U. S. Patent 1,631,265

Bentonite	20%
Sodium Silicate (65% solution)	58%
Rubber Solution	7%
Water	15%

The rubber solution may vary from 2% to 25% and may be latex or a solution of rubber in benzol, carbon tetrachloride, etc. For glass or wood, 2% to 10% of whitening or slaked lime is added.

Newspaper Agglutinant

Water	120 gal.
Fish Glue	90 gal.
Acetic Acid	30 gal.
Glycerin	10 gal.
White Medium Cooking Dextrin	560 lb.

The dextrin is stirred into the water and heated up gently. The glue is liquefied and the acetic acid added to it and this mix pumped to the tank containing the dextrin mix. After a uniform mix has been obtained the glycerin is incorporated and the liquid then drawn off through a straining-cloth.

Non-Slip Compound for Rugs (Patented)

Water	8 lb.
Glue	$\frac{3}{4}$ lb.

Glycerin	1 oz.
Latex	8 lb.
Formalin	$\frac{1}{2}$ oz.

Dissolve glue in water, add glycerin and then latex. Allow to stand one day and add formalin.

Enamel to Paper Adhesive U. S. Patent 1,936,152

Clay 27 parts, zinc oxide 6.5 parts and starch 6.5 parts are used in preparing a paste which is suitable for uniting paper to enameled surfaces.

Adhesives French Patent 748,441

An adhesive suitable for waterproofing paper, etc., is made by dissolving a vegetable gum (Dammar, Manila) in a volatile solvent (benzine, alcohol, acetone) and adding 3-6% of a vegetable fatty oil (linseed oil).

Adhesive for Bonding Paper to Moistureproof "Cellophane"

This preparation successfully sticks paper to moistureproof "Cellophane," "Sylphwrap" and similar types of transparent sheeting.

Solids

Cellulose Nitrate dry basis (High Viscosity) by weight	7%
Rosin	50%
Ester Gum	40%
Castor Oil	3%

Solvents

Benzol	48%
Methanol	32%
Butyl Acetate	20%

Solids 45% Solvents 55%

The solvents are mixed and then the dry cellulose nitrate added. If the cellulose nitrate is already in solution, an equivalent amount of solvent is deducted from the above before adding the solvent portion. Clean, colorless, transparent celluloid scrap may be used instead of the cellulose nitrate. The rosin and ester gum are powdered and added and stirred until solution is complete. The castor oil is then added.

Wax Paper Adhesive U. S. Patent 1,964,380

Chicle	10 parts
Dammar	10 parts
Mineral Oil	$2\frac{1}{2}$ parts

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