The present invention relates to the production of assistants for the textile and related industries and particularly of wetting, cleansing, softening and dispersing agents.

We have found that excellent assistants for the textile and related industries and particularly wetting, cleansing and dispersing agents are obtained by reacting an aliphatic, that is aliphatic or cycloaliphatic, compound containing

\[
\begin{align*}
\text{in which } X & \text{ is either } -\text{OH (acid), } -\text{O.R (ester)} \\
\text{or } & \text{halogen, } R \text{ being an aliphatic radicle, and in which compound an aromatic hydrocarbon radicle may be directly connected} \\
\text{with a carbon atom, in the absence of a metal halide, having a condensing action, with an} \\
\text{ammonium base corresponding to the formula} \\
\end{align*}
\]

\[
\begin{align*}
\text{in which } X_1 \text{ denotes hydrogen, an aliphatic open chain- or isocyclic aliphatic radicle or aliphatic-} \\
\text{aromatic radicle and } X_2 \text{ denotes either hydrogen, an aliphatic radicle as denoted by } X_1, \text{ or an} \\
\text{aromatic radicle provided } X_1 \text{ is one of the said organic radicals, which bases are free from aliphatic} \\
\text{alcoholic groups and in which any aromatic, that is aryl or aralkyl, radicles connected to nitrogen} \\
\text{atoms are free from chromophorous groups, the} \\
\end{align*}
\]

\[
\begin{align*}
\text{constitutes a heterocyclic radicle. According to the} \\
\text{definition given above the number of carbon} \\
\text{atoms of } R \text{ should be at least 7 if } X_1 \text{ and } X_2 \\
\text{be hydrogen atoms, whereas it may be 1 if } X_1 \\
\text{be a hydrogen atom and } X_2 \text{ contains for example} \\
\text{6 carbon atoms, or if the sum of the carbon} \\
\text{atoms in } X_1 \text{ and } X_2 \text{ be 6.} \\
\text{Different specific types of the products according to the present invention will be more} \\
\text{clearly exemplified by the following general}
\end{align*}
\]
formule in which $Y$ denotes a sulphuric ester or sulphonatic acid radical.

Products of Group II prepared from amines instead of ammonia are preferred for many purposes and those of Group III prepared from secondary amines usually have the most valuable properties. The sulphuric ester and sulphonatic acid groups need not be in the free state in the final products but may be neutralized by alkali or organic bases of any kind. We wish it therefore to be understood that the terms sulphuric ester and sulphonatic acid groups are intended to embrace the said acid groups in the free state as well as in the salt form.

In the following we will describe first the initial materials generally employed in our process and then the different methods for the production of the sulphuric derivatives of the amines.

The acid components of the amines may be chosen from any aliphatic open chain saturated or unsaturated fatty acids which may contain hydroxyl or keto groups and/or other substituents, such as aryl radicles as for example acids of the type of Twitchell fatty acids; further from cycloaliphatic carboxylic acids; or from 3 condensed nuclei, such as hexahydrobenzoic, resinic and naphthenic acids and from heterocyclic aliphatic carboxylic acids, such as the different pyridine carboxylic acids. Carboxylic acids having more than 3 condensed nuclei should not be employed since the resulting products are not very efficient for the purposes in view. Generally, carboxylic acids with at least 6 carbon atoms are preferred as components of the amines though acids with less carbon atoms give also valuable products in many cases. Particularly valuable for the process according to the present invention are acid components chosen from the acids of oils or fats of vegetable, that is animal or vegetable, origin, such as the acids of coconut, palm kernel and palm oil which contain fatty acids with from 6 to 18 carbon atoms, of soya bean, linseed, olive, rape-seed, cotton-seed, peanut and castor oils which contain large proportions of unsaturated fatty, or unsaturated hydroxy fatty, acids, the acids of tallow, fish or seal oils, whale or shark oils and hydrogenated acids of the said sources; the synthetic high molecular fatty acids, obtainable by the oxidation of paraffin wax and similar high molecular hydrocarbons by means of gaseous oxidizing agents, resinic acids, such as abietic acid, or the different naphthenic acids and long-chain fatty acids having an aromatic hydrocarbon radical directly connected with the aliphatic chain (Twitchell fatty acids) as are obtainable from oleic, ricinoleic, single acids may be employed as for example capric, pelitic, heptyl, caprilic, sebacic, undecylic, lauric, myristic, palmitic, stearic, behenic, arachic and cerotic acids as well as similar saturated and/or hydroxylated fatty acids, such as undecylic, oleic, erucic, linoleic and linolenic acids, ricinoleic and hydroxy-stearic acids. Lower aliphatic carboxylic acids, such as acetic, propionic, butyric, valeric and caproic acids may also be employed but in these cases the amines should contain such a high number of carbon atoms that the total number of carbon atoms in the amines is at least eight. In the place of these saturated lower acids the corresponding unsaturated and/or hydroxylated acids may be employed as for example acrylic and crotonic acids, lactic acid or pyro-racemic acid and the like. As pointed out above sulphuric esters and sulphonatic acids of the aforesaid acids may be employed, an extended enumeration of these compounds being not necessary as they are well known in the art, reference being made for example to hydroxy-stearic sulphuric acid or hydroxy-stearic sulphonic methyl ester (obtainable by reacting oleic methyl ester with chrolosphonic acid in the presence of ethyl ether and washing with alkali), the sulphuric ester of oleic methyl ester (obtainable by acting on oleic methyl ester with sulphuric acid at about 20°C), ricinoleic sulphuric ester, palmitic sulphonic acid and the like. As described above all the said acids or their esters may be employed as such for the reaction but in most cases the employment of their anhydrides or halides facilitates the reaction if it be carried out in an aqueous medium.

The ammonia bases may be chosen from ammonia and primary and secondary aliphatic amines, that is amines containing at least one aliphatic radicle. As specific examples of such amines may be mentioned as primary amines: mono-methyl or -ethyl amines, mono-allyl amine, mono-n-butyl, mono-hexyl or -cetyl amines, as cyclo-aliphatic primary amines: cyclohexylamine or its homologues and bornyl amine, as a primary aliphatic-aromatic amine: benzyl amine; as secondary aliphatic amine, secondary amines containing methyl, ethyl, propyl, butyl, hexyl or cetyl groups, as for example the type of N-methyl-N-ethyl amine secondary mixed aliphatic-cycloaliphatic amines containing a group of cyclohexylamine or its homologues, secondary aliphatic-aromatic amines, such as for example N-methyl-N-benzyl amine, secondary mixed aliphatic-aromatic amines, such as N-alkyl.
and piperidine. In any case it is preferable that these amines do not contain aliphatic alcoholic groups. Since otherwise esters might be obtained instead of the desired amides depending upon the reaction conditions, and the amines as well as the acid components of the amides must be free from such aromatic nuclei connected to nitrogen atoms as contain chromophorous groups, as for example nitro andazo groups, since otherwise colouring materials might be obtained. The said bases may be employed in the free state or also in the form of their salts when alkaline agents are present during the formation of the amides. As explained above, instead of the acid components the amines may contain one or more sulphuric ester or sulphonic groups as is the case for example in mono-ethanol amine sulphonic ester (NH₂-C₄H₉-O-SO₃H) and taurine bodies such as taurine (NH₂-C₄H₉-O-SO₃H) and methyl, N-butylic, N-cetyl, N-cyclohexyl or N-phenyl taurines or amino methane sulphonic acids, and the aromatic amines may contain sulphonic groups as for example N-ethyl sulphanilic acid and benzyl aniline sulphonic acid and in these cases the subsequent, treatment with sulphonating agents may be dispensed with.

The amides containing a lower number of (one or two) sulphuric ester or sulphonic acid groups are usually particularly suitable as wetting, dispersing, softening, washing and scouring agents and their solubility in water may be increased by introducing further sulphuric ester or sulphonic acid groups. Amides containing a lower number of sulphuric ester or sulphonic acid groups and prepared from unsaturated acids and/or amines show a particularly high solubility in water and are precipitated by calcium and magnesium salts. Generally speaking, it is advisable to take higher amines containing at least 6 carbon atoms such as cetyle amine or ethyl amine for the reaction when lower carboxylic acids (containing less than for example by a condensation of the free acids, with the amines intended for the conversion to amides, by simple heating salts of the amines concerned with the amines intended or by reacting esters of the acids, if desired while heating, with the amines. The free acids may be replaced by the corresponding anhydrides or halides while employing a quantity of basic agents sufficient for neutralizing free acid formed by the interaction of one acid radicle with a hydrogen atom connected to nitrogen of the amine chosen; the basic agents may be chosen from aqeous alkali or from inert organic (tertiary) bases, such as tri-alkyl amine, pyridine or dimethylamline, which then may simultaneously act as diluents.

Products similar to those obtainable in the aforesaid reactions by the use of secondary amines, amino sulphonic acids and sulphuric esters of secondary amines can be obtained by subsequently treating amides obtained with the aid of ammonia, or of primary amines, with alkylating or aralkylating agents either before or after the sulphonation. Thus, for example, the well known stearic anilide may be improved by a methylation with the aid of dimethyl sulphate after the anilide has been converted into its sodium salt.

The action and results of a desired subsequent treatment sulphonating agent depend on the materials to be sulphonated and on the conditions of the treatment. Sulphuric esters, for example, can be obtained from amides containing olefinic and/or hydroxyl groups. For the production of sulphuric esters the reaction may be carried out with sulphuric acid or also with stronger sulphonating agents such as fuming sulphuric acid, sulphur trioxide or chlorosulphonic acid, which latter agents are usually employed in cases when the initial materials contain one or more hydroxyl groups. The reaction may be carried out in the presence of inert diluents such as carbon tetrachloride, trichlor ethylene, nitrobenzene, acetic acid and the like which usually allow of reducing the temperature of the treatment, and/or in the presence of agents removing water, such as anhydrides or chlorides of organic or inorganic acids. At least one molecular proportion of sulphonating agent is usually employed with each molecular proportion of the amides, but in the aforesaid case of acting on compounds containing hydroxylic groups with strong sulphonating agents, such as sulphur trioxide or chlorosulphonic acid, or with mixtures of milder sulphonating agents with the strong sulphonating agents or with agents removing water, the quantity of the strong sulphonating agents, or of the agents removing water, should not exceed one molecular proportion for each hydroxylic group. In most cases, the temperature employed during the sulphonation should not considerably exceed 40°C when more than one molecular proportion of sulphonating agent is employed for each molecular proportion of amide.

If, however, sulphonlic acids are to be produced and when the primary reaction products do not already contain one or more sulphonlic groups and no aromatic radicles, the temperature of a sulphonation by means of sulphuric acid monoxide must exceed 40°C, a temperature of about 100°C being preferably chosen, since otherwise sulphuric esters are formed or no reaction takes place. When stronger sulphonating agents such as fuming sulphuric acid, sulphur trioxide or chlorosulphonic acid or mixtures of...
mild sulphonating agents with these or with agents removing water be employed for this sulphonation of compounds containing one or more hydroxyl groups, the quantity of these strong sulphonating agents or of the agents removing water must exceed one molecular proportion per each hydroxyl group present. It is obvious that variations of the conditions described may lead to the production of mixed products. When the amides contain aromatic nuclei the sulphonation will generally lead to sulphonated acids but also sulphuric ester radicles may be introduced into an aliphatic radicle of such an amide when the latter contains olefinic groups in the acid or in the amino radicle of the amide and/or hydroxyl groups in the acid radicle. When working with considerable quantities of strong sulphonating agents, however, sulphonic radicles may be introduced into an aliphatic radicle of such an amide together with a sulphonation of the nucleus.

The resulting products are generally distinguished by excellent wetting properties, in neutral, acid or also alkaline baths. The products also possess high stability in hard water or solutions made therewith. Consequently the products according to the present invention constitute highly valuable assistants for all the branches of the textile and allied industries.

The amides and anilides prepared from unsaturated or hydroxyl bearing fatty or resinic acids, and treatment with sulphonating agents, may generally find useful application especially as wetting agents, whereas amides prepared from olefinic or mixed aliphatic-aromatic secondary amines and fatty acids free from hydroxyl groups or from mixed (secondary) aliphatic-aromatic amines, and treatment with sulphonating agents, are particularly valuable washing, scouring and emulsifying agents, as well as the products prepared by the condensation of high molecular carboxylic acids and amines containing sulphonic acid or sulphuric ester groups or by the condensation of higher amines with carboxylic acids containing sulphonic acid or sulphuric ester groups. The wetting, emulsifying and washing power of the amides, in which both hydrogen atoms of the amide group are substituted by alkyl, cycloalkyl, aralkyl or aryl groups, and in the definition given above, is considerably higher than that of the amides which contain one or two hydrogen atoms connected with the nitrogen atom of the amide group. They are particularly stable even in hot alkaline baths, have a particularly high emulsifying and levelling power and a far reaching power for dispersing water-insoluble or difficultly water-soluble solid substances such as alkali earth metal soaps, water-insoluble dyestuffs or other water-insoluble colouring materials, fats, waxes and the like.

The amides containing sulphuric derivative groups according to the present invention may be employed as such or in conjunction with other wetting or emulsifying agents such as soaps, products of the type of turkey red oils, sulphonated acids from mineral oils or aromatic oils, and especially of polynuclear aromatic compounds or their salts, with hydroxy-alkyl amines, quaternary ammonium bases or their salts, or with protective colloids, such as glue, gelatine or vegetable mucilages or gums. Salts as for example sodium carbonate, sodium bicarbonate, waterglass, common salt, neutral or acid sodium sulphates may be added, or organic solvents, such as ethylene glycol monoresyl ether, trichlorehlylene or bleaching agents such as perborates, percarbonates or para-toluene sulphonphlic chloramide sodium. The said agents are employed in quantities depending on the desired purpose and several of them may be added conjointly. Thus for example the quantity of these additions may be the same as that of the sulphonated amides or considerably higher depending on the purposes of emulsifying, wetting, washing, cleaning or diming of the materials to be treated with water. In baths for the treatment of textiles the quantity of the sulphonated amides may be as low as a few per cent or even a few per thousand of the whole liquor.

The present application is a continuation-in-part of the application Ser. No. 441,717, filed April 4, 1930.

The following examples will further illustrate how the said invention may be carried out in practice, but the invention is not restricted to these examples. The parts are by weight.

The following Examples 1 to 7 show the production of sulphuric esters containing sulphuric ester radicles in the carboxylic acid radicles of 100 the amides.

**Example 1**

282 parts of oleic acid are converted, in the usual manner, into oletic amide, and this, by treatment with about 350 parts of concentrated sulphuric acid at about 35° C. In the presence of 50 parts of trichloethylene, is converted into the acid sulphuric ester of oleic amide. The resulting product freed from trichloethylene possesses excellent wetting properties, even in alkaline baths and especially after conversion into a salt thereof with an alkaline or organic base such as sodium, potassium, ammonia, methylamino, butylamino, pyridine or ethanol amine 150 such as mono, di- or tri-ethanol amine or mixtures thereof when no solvent is employed the sulphonation is carried out at about 100° C. The product corresponds to the formula

CrH₂(OSO₃H) — CO—NH₂

**Example 2**

282 parts of castor oil are dissolved in 1000 parts of ethyl alcohol and the solution is saturated with gaseous ammonia. After standing for some time the castor oil is converted practically completely into the amide. The remainder of ammonia are then removed and the alcohol is distilled off. The mixture of the amide and glycerol is then suspended in 3000 parts of ethyl ether and 976 parts of chlorosulphonic acid are then added at from 0° to 10° C. After the evolution of hydrochloric acid has ceased a mixture of the sulphuric ester of ricinoleic amide (CrH₄(OSO₃H) — CO—NH₂) with glycerol monosulphuric ester and free mineral acid is obtained. This mixture is poured onto ice, then rendered neutral with the aid of caustic soda solution and the reaction product is allowed to settle. Three layers are formed, the upper of which consists of the main quantity of the ether, the middle layer of the reaction product, whereas the lower layer is an aqueous salt solution. The middle layer is separated and the ether is evaporated therefrom by warming. Instead of the ethyl ether, ethyl acetate or another inert solvent different may be employed. The product obtained possesses a very high wetting capacity and wets quickly difficultly wettable unbacked cotton goods.

CrH₂(OSO₃H) — CO—NH₂
Example 3

31 parts of ricinoleic methyl ester are treated with a mixture of 10 parts of ethyl ether and 10 parts of chlorosulphonic acid. As soon as a sample is soluble in water the reaction product is neutralized with gaseous ammonia and the ether is distilled off in vacuo. The product is then heated in a closed vessel together with 100 parts of ammonia for 1 hour to 100° C. After removal of remnants of ammonia and methyl alcohol the product is treated with water and the aqueous solutions show a good wetting, cleansing and emulsifying effect.

The product has the same structure as that described in Example 2 but is prepared by first introducing the sulphuric ester radicle into the carboxylic acid, or its ester respectively, and then converting the sulphuric ester into the amide.

Example 4

100 parts of hydroxystearic methyl ester are heated in a pressure-tight vessel with 200 parts of ammonia for 4 hours at 150° C. The product obtained is then freed from ammonia and methyl alcohol and led at from 10° to 15° C. into a mixture of 50 parts of acetic anhydride and 100 parts of sulphuric acid monohydrate. After stirring for 2 hours at room temperature the reaction product is poured onto ice, rendered neutral with the aid of caustic soda solution and salted out. The product corresponds to the formula $\text{C}_9\text{H}_{17}\text{(OSO}_2\text{Na)}\text{--CO--}\text{NH}_2$.

Example 5

100 parts of oleic ethylanilide obtainable by boiling under reflux a solution in ethyl alcohol of oleic methyl ester and ethyl amine, are dissolved in 300 parts of trichlorethylene and then treated with 85 parts of sulphuric acid monohydrate preferably at a temperature below zero centigrade. After dilution with water containing some ice the lower layer formed is separated and then neutralized with the aid of caustic soda solution. The solution obtained which generally is quite clear, becomes turbid by adding more water and separates after standing for some time into two layers, the layer of which contains the trichlorethylene and the constituents which have not reacted with the sulphuric acid, and is drawn off. The upper layer which still contains some trichlorethylene and water is evaporated to the desired concentration. The product obtained, which corresponds to the formula $\text{C}_9\text{H}_{17}\text{(OSO}_2\text{Na)}\text{--CO--}\text{NH}_2$, possesses a particularly high wetting power which is superior to that of the product obtained from oleic amide and is also superior to that of a sulphuric ester of an oleic mono-alkyl-amine. Each 0.4 gram of the product obtained is dissolved in 1 litre of water. Even with this low concentration the bath shows an excellent wetting effect which is about 3 times that of sulphonated oleic amide and about 4 to 5 times that of sulphonated oleic acid.

Example 7

100 parts of oleic ethylanilide (obtainable by heating oleic acid and ethyl aniline until the distillation of water has ceased) are dissolved in 200 parts of trichlorethylene and are then treated at about zero centigrade with 75 parts of sulphuric acid monohydrate. The reaction mixture is then incorporated with water containing some ice, the sulphonated layer is then drawn off, neutralized with caustic potash solution and freed from trichlorethylene by distillation. The properties of the product obtained, which corresponds to the formula $\text{C}_9\text{H}_{17}\text{(OSO}_2\text{K)}\text{--CO--}\text{N}_2\text{H}_4\text{CH}_2\text{CH}_2\text{SO}_2\text{K}$, are similar to those of the product obtained according to Example 6.

By acting on 100 parts of the resulting product, dissolved in sulphuric acid monohydrate, with about 100 parts of fuming sulphuric acid containing about 23 per cent of $\text{SO}_3$, a product is obtained which contains a sulphonic radicle besides the sulphuric ester radicle and corresponds to the formula $\text{C}_9\text{H}_{17}\text{(OSO}_2\text{K)}\text{--CO--}\text{N}_2\text{H}_4\text{CH}_2\text{CH}_2\text{SO}_2\text{K}$.

When cotton is dyed with a bad-leveling vat dye with an addition of 2 grams per litre of the vat of the first mentioned product very uniform dyes are obtained even in pale shades, the levelling effect and particularly the wetting effect of the sulphonation product being superior to that from oleic anilide.

The following Examples 8 to 11 show the production of a sulphuric ester in which the sulphuric ester radicle is connected to the amino radicle of the amide either by the introduction of the ester radicle into the amide or by condensing the carboxyl compound with an amino sulphuric ester.

Example 8

374 parts of palmitic chloride are slowly introduced at from 0° to 10° C. into an aqueous solution of 120 parts of allyl amine sulphate, the reaction mixture being continuously kept alkaline by adding an aqueous caustic soda solution. The resulting palmitic amyl amide is filtered off, dried and compressed.
and then worked with 300 parts of sulphuric acid monohydrate at from 35° to 40° C. until a sample is soluble in water. The reaction product is then poured on ice and rendered neutral with the aid of aqueous caustic soda or aqueous ammonia. A pasty mass is obtained from which the aqueous solution of Glauber’s salt separates after some settling. The product is particularly valuable for scouring and levelling purposes.

The same product can be obtained by first converting the allyl amine sulphate into its sulphuric ester and then reacting the sulphuric ester with palmitic chloride as described above. The product corresponds to the formula

$$\text{C}_9\text{H}_8\text{N} - \text{CO} - \text{NH} - \text{CH}_2 - \text{CH} - (\text{OSO}_2\text{H}) - \text{CH}_3$$

**Example 9**

95 parts of mono-ethanol amine sulphuric ester are dissolved in 200 parts of water. After adding 110 parts of a 50 per cent aqueous caustic soda solution, 190 parts of stearic chloride are slowly introduced while stirring continuously, whereby the temperature is kept at about 10° C. by cooling. The paste of the sodium salt of stearic acid hydroxy-ethylamide sulphuric ester obtained after the reaction is completed may be directly employed as a wetting, washing or softening agent for artificial silk or cotton and like textile purposes.

The product obtained in the said manner corresponds to the formula

$$\text{C}_9\text{H}_8\text{N} - \text{CO} - \text{NH} - \text{CH}_2 - \text{CH}_3 - \text{O} - \text{SO}_2\text{Na}$$

If 2 grams of the product be added to each litre of a dyeing bath for dyeing artificial silk, the dyed and dried silk shows a soft and supple touch.

**Example 10**

900 parts of oleic chloride are added at 20° C., while stirring, to a solution of 500 parts of amino-mono-ethanol sulphuric ester and 250 parts of caustic soda solution in 1300 parts of water. The reaction mixture is then stirred for 1 hour whereby an about 40 per cent paste of the sodium salt of oleic mono-ethanol amide sulphuric ester (C_{18}H_{35}CO-NH-C_{2}H_{5}O-SO_{2}Na) is obtained which may be directly employed, even with hard water, as a highly efficient washing and wetting agent.

**Example 11**

66 parts of caustic soda and 150 parts of water are added to 260 parts of an aqueous solution of n-butyl-amino-ethanol sulphuric ester (obtainable by acting with ethylene oxide on n-butyl-amine and by treating the resulting N-n-butyln-ethanol amine with chlorosulphonic acid). 120 parts of coconut oil fatty acid chloride are added to the solution at about 35° C. A viscous emulsion is formed which is readily soluble in water and which is suitable as a wetting agent in acid and alkaline baths, the product corresponding to the formula

$$\text{C}_{7}\text{H}_{8}-\text{CO}-\text{N}-\text{CH}_{2}-\text{CH}_{2}-\text{O}-\text{SO}_2\text{Na}$$

in which $\text{R-CO}$ denotes the radicles of the fatty acids of coconut oil.

The following example shows the production of a compound which is presumably a di-sulphuric ester, the sulphuric ester radicles of which are situated in the carboxylic and the amine radicles both.

**Example 12**

100 parts of oleic N-allyl-meta-toluidide

(\text{C}=\text{H}_3-\text{CO}-\text{N}-\text{CH}=\text{CH}_2)

obtainable from oleic chloride and N-allyl-meta-toluidine) are mixed with 100 parts of sulphuric acid monohydrate while cooling and then stirred therewith after adding 100 parts of trichloroethylene. After neutralizing with concentrated aqueous potash solution (1:1) and, if desired removing the solvent, the product is diluted with water up to 300 parts. The viscous liquid, containing the compound presumably corresponding to the formula

$$\text{C}_9\text{H}_8\text{N} - \text{CO} - \text{N} - \text{CH} - \text{CH} - (\text{OSO}_2\text{K}) - \text{CH}_3$$

constitutes an efficient wetting and emulsifying agent.

The following Examples 13 to 18 show the production of sulphonamic acids containing the sulphonamic acid radicle in the carboxylic acid radicle of the amides either by the condensation of sulphonated carboxylic acid compounds with ammonia, or amines, or by the sulphonation of amides.

**Example 13**

125 parts of the sodium salt of the methyl ester of palmitic sulphonamic acid (\text{C}_{15}\text{H}_{31}\text{SO}_2\text{Na} - \text{COOCH}_3) are heated with 375 parts of concentrated ammonia for 3 to 4 hours at 150° C. in an autoclave. The remainders of ammonia and 120 methyl alcohol are evaporated and the sodium salt of the sulphonamic acid of palmitic amide (\text{C}_{15}\text{H}_{31}\text{SO}_2\text{Na} - \text{CO-} - \text{NH}_3) is dried in vacuo.

**Example 14**

10 parts of oleic amide are stirred with 50 parts of ethyl ether, whereupon 29 parts of chlorosulphonic acid are added while stirring. Stirring is continued for five hours at about 30° C. The alkal metal salt of the sulphonamic acid can be separated from the reaction mixture by rendering neutral the reaction product with aqueous caustic soda solution and extracting unsulphonated constituents with the aid of di-ethyl ether mixed with a little ethyl alcohol. The product then corresponds to the formula

$$\text{C}_{15}\text{H}_{31}\text{CH} (\text{OH}) (\text{SO}_2\text{Na}) - \text{CO} - \text{NH}_3$$

**Example 15**

100 parts of oleic acid are boiled under reflux with 900 parts of cyclohexyl amine until splitting off of water has ceased whereupon remainders of the amine are distilled off. 10 parts of the oleic cyclohexylamide are stirred while cooling into 35 parts of chlorosulphonic acid whereupon the mixture is stirred for 8 to 10 hours, then heated to from 50° to 60° C. until the product is soluble in water and poured onto ice. The solution is rendered neutral with caustic soda solu-
tion and inspissated, the main product corresponding to the formula

\[ \text{C}_8\text{H}_8\text{O}(\text{OH})(\text{SO}_3\text{Na})\text{--CO--NH}_2 \]

**Example 16**

10 parts of oleic N-dimethylamide are stirred with 50 parts of ethyl ether, whereupon 29 parts of chlorosulfonic acid are added while stirring. Stirring is continued for five hours at about 30°C. The sulphonation product can be separated from the reaction mixture in the form of an alkaline metal salt for example as described in Example 14. The reaction product corresponds to the formula

\[ \text{C}_8\text{H}_8\text{O}(\text{OH})(\text{SO}_3\text{Na})\text{--CO--NH}_2 \]

**Example 17**

30 parts of oleic ethylene diamine, obtained by reacting with oleic chloride on ethylene diamine and removing the small quantities of the monoamide formed, are worked up for 24 hours at from 15°C to 20°C, with 10 parts of acetic anhydride and 30 parts of sulphuric acid mono-hydrate. The reaction mixture is then poured onto ice, rendered neutral with caustic soda solution and inspissated. The product corresponds presumably to the formula

\[ \text{CH}_2\text{NH--CO--C}_8\text{H}_8 \]

The acetyl radicles may be split off by any usual method of saponification with the aid of aqueous alkali or acids.

**Example 18**

100 parts of phenyl-stearic chloride (Twichtel's acid chloride) are stirred with 100 parts of n-butyl amine dissolved in ethyl ether; remainders of butyl amine and of its hydrochloric salt are removed by washing with water and the ether is distilled off. 10 parts of the phenyl-stearic butyl amide are dissolved in 90 parts of sulphuric acid monohydrate and stirred with 40 parts of fuming sulphuric acid containing 22 per cent of SO_3 at from 100°C to 105°C until the product is soluble in water. The reaction mixture is then poured onto ice, rendered neutral with caustic soda solution and inspissated. The product corresponds presumably to the formula

\[ \text{C}_8\text{H}_8\text{O}(\text{OH})(\text{SO}_3\text{Na})\text{--CO--NH}_2 \]

The following Examples 19 to 21 show the production of a mixture of a sulphuric ester with a sulphuric acid, or of products which contain both sulphuric ester and sulphuric acid radicles in the carboxylic acid radicles of the amides.

**Example 19**

1000 parts of ricinoleic amide are introduced into 5000 parts of liquid sulphur dioxide whereasupon 500 parts of gaseous sulphur trioxide are let into the mixture. The sulphur dioxide is then distilled off and the reaction is completed by keeping standing the reaction mixture at room temperature for 10 hours; it is then incorporated with ice and rendered neutral whereby the sulphonation product of the amide separates out as an oily liquid. The product is a mixture consisting mainly of compounds corresponding presumably to the formula

\[ \text{C}_8\text{H}_8\text{O}(\text{OH})(\text{SO}_3\text{Na})\text{--CO--NH}_2 \]

**Example 20**

100 parts of fused ricinoleic amide are incorporated at 70°C to 75°C with a mixture of 300 parts of ethyl ether and 430 parts of chlorosulfonic acid in a vessel provided with a stirring device and a reflux condenser. The temperature decreases to about 40°C and the mixture is stirred for 2 hours whereupon the reaction mixture is poured onto ice, rendered neutral with the aid of aqueous caustic soda and freed from the ether. The upper oily layer contains the desired sodium salt of the sulphonation product, the main constituent of which corresponds presumably to the formula

\[ \text{C}_8\text{H}_8\text{O}(\text{OSO}_3\text{Na})\text{--CO--NH}_2 \]

together with some of the other bodies referred to in the foregoing example.

**Example 21**

100 parts of fused ricinoleic N-diethyl amide are incorporated at from 70°C to 75°C with a mixture of 300 parts of ethyl ether and 430 parts of chlorosulfonic acid in a vessel provided with a stirring device and a reflux condenser. The temperature decreases to about 40°C and the mixture is stirred for 2 hours whereupon the reaction mixture is poured onto ice, rendered neutral with the aid of aqueous caustic soda and freed from the ether. The upper oily layer contains the desired sodium salt of the sulphonation product. The following Examples 22 to 26 show the production of amides which contain sulphonic acid radicles in the amino radicles by sulphonation of amides.

**Example 22**

150 parts of caproic allyl amide are introduced into a mixture of 120 parts of sulphuric acid monohydrate and 130 parts of acetic anhydride, prepared at from 10°C to 15°C, whereasupon the whole is stirred at from 20°C to 25°C for from 6 to 8 hours. The resulting product is heated to boiling with an equal quantity of water while passing through steam so that acetic acid is split off. The mixture is then rendered neutral with the aid of caustic soda solution and evaporated to dryness. The resulting product, the caproic amide of amino-hydroxy propane sulphonic sodium salt, can be employed as a wetting agent in aqueous solutions containing large quantities of electrolytes such as acid or alkaline baths as for example in mercerising cotton with sulphuric acid.

**Example 23**

100 parts of commercial naphthenic acid mixture are boiled for 10 hours under reflux with 200 parts of benzyl amine until splitting off of water has ceased, whereasupon remainders of benzyl amine are distilled off. 50 parts of the naphthenic benzyl amide are dissolved in 50 parts of sulphuric acid and the solution is stirred at from 150°C.
100° to 105° C. with 90 parts of fuming sulphuric acid containing 23 per cent of SO₃ until the product is soluble in water. The reaction mixture is poured onto ice, rendered neutral with caustic soda solution and inpsissated. The product corresponds to the formula

\[
R-\text{CO} - \text{NH}-\text{CH}_2 - \overline{\text{SO}_3}\text{Na}
\]

in which \( R-\text{CO} \) denotes the radicles of the acids of the initial naphthenic acid mixture.

**Example 24**

1000 parts of a mixture of fatty acids obtained by the oxidation of paraffin with the aid of air while warming and separating the acids from unattacked initial material, are heated under reflux with 2000 parts of N-methyl aniline for 17 hours to from 180° to 190° C., the water formed during the reaction being continuously distilled off. The remainders of free aniline are then distilled off in vacuo and the residue is distilled in 4750 parts of sulphuric acid monohydrate. 2200 parts of fuming sulphuric acid containing 25 per cent of sulphur trioxide are then introduced into the solution at about 10° C. and the mixture is stirred for about 20 hours at 20° to 25° C. The reaction product is then poured onto a mixture of ice and common salt and filtered. The product which is a mixture of amides of the different fatty acids may be employed as such or after neutralization with caustic soda, if desired after removal of the mineral acid salts. It possesses a high resistance to acid and a high scouring power superior to that of soaps and is not precipitated from aqueous solutions by means of alkaline earth metals. The product corresponds to the general formula

\[
R-\text{CO} - \text{NH}-\text{CH}_2 - \text{Cl}
\]

in which \( R-\text{CO} \) denotes the radicles of the different fatty acids in the said oxidation products.

**Example 25**

284 parts of stearic acid are heated under reflux for 24 hours with N-mono-ethyl-a-naphthylamine, upon which remainders of the amine are removed with aqueous dilute hydrochloric acid. The product is then dried and dissolved in 400 parts of sulphuric acid monohydrate while warming, upon which 400 parts of fuming sulphuric acid containing a content of 23 per cent of sulphur trioxide are gradually added and the mixture is heated to 100° C. The reaction mixture is kept at this temperature until the product is soluble in water, and is then again neutralized with lime, a sodium salt being then prepared from the calcium salt by means of sodium carbonate. The product corresponds presumably to the formula

\[
\text{C}_8\text{H}_{15}-\text{CO} - \text{NH} - \text{CH}_2 - \text{SO}_3\text{Na}
\]

is soluble even in acid baths and possesses a good wetting power.

The following Examples 27 and 42 show the production of amides containing sulphonic radicles connected to the amino radicles by a condensation of carboxylic acid compounds with amino-sulphonic acids.

**Example 27**

200 parts of ethylaniline-meta-sulphonic acid are treated with 250 parts of oleic chloride in a weak aqueous caustic soda solution, the reaction mixture being constantly kept slightly alkaline by gradually adding caustic soda. After the reaction the mass is rendered slightly acid, so that litmus paper is coloured red and oleic acid formed is separated, whereupon the product is recovered from the solution by salting out and shows a very good wetting power. The product corresponds to the formula

\[
\text{C}_8\text{H}_{15}-\text{CO} - \text{NH} - \text{CH}_2 - \text{SO}_3\text{Na}
\]

10 parts of p-aminobenzyl sulphonic acid

\[
\text{HN} - \text{CH} - \text{SO} - \text{H}
\]

are dissolved in 10 parts of an aqueous caustic soda solution of 40° Bé. strength and 50 parts of water and 15 parts of oleic chloride are added at from zero to 10° C., the reaction mixture being continuously kept slightly alkaline by adding caustic soda solution. The reaction mixture is stirred 125 until the product is completely soluble in water, whereupon the mixture is rendered neutral with aqueous caustic soda solution and evaporated at about 95° C. The mixtures obtained of the sodium salt of N-oleyl-, p-aminobenzyl sulphonic acid

\[
\text{C}_8\text{H}_{15}-\text{CO} - \text{NH} - \text{CH}_2 - \text{SO}_3\text{Na}
\]

with sodium chloride constitutes a valuable washing and scouring agent.

**Example 29**

148 parts of the sodium salt of taurine

\[
\text{NH}_2 - \text{C}_2\text{H}_4 - \text{SO}_3\text{Na}
\]

In 1000 parts of water, 40 parts of caustic soda are added and 300 parts of oleic chloride are gradually introduced at from 20° to 25° C. After from 1 to 2 hours the solution solidifies to a liquid paste which may be employed as such for wetting and scouring purposes. The product corresponds to the formula

\[
\text{C}_7\text{H}_{15}-\text{CO} - \text{NH} - \text{C}_2\text{H}_4 - \text{SO}_3\text{Na}
\]
Example 30

300 parts of coconut oil fatty acid chloride are introduced into a solution of 300 parts of sodium taurine

\[ \text{NaH}_2\text{CO}_2\text{H}_2\text{CH}_2\text{SO}_2\text{Na} \]

in 3000 parts of water at from 0° to 10°C. The mixture is then stirred at room temperature until a sample is soluble in water. The product obtained is a highly efficient washing and scouring agent and corresponds to the formula \( \text{R} - \text{CO} - \text{CH}_3\text{CH}_2\text{SO}_2\text{Na} \), \( \text{R} - \text{CO} \) denoting the radicles of the fatty acids of coconut oil.

Example 31

354 parts of gaseous sulphuric anhydride are introduced at from 30° to 35°C, into 100 parts of ethyl alcohol whereupon 1000 parts of an aqueous 47 per cent solution of methylamine are introduced at 20°C. The mixture is then heated for 4 hours in an autoclave to 150°C. After cooling the reaction mixture, 900 parts of aqueous caustic soda solution of 40° Be strength are added and the remainder of methylamine is distilled off. After neutralizing with aqueous sulphuric acid and evaporating the solution \( \text{N}-\text{methyl taurine} \) is crystallized out, after sodium sulphate has crystallized and is separated. 150 parts of oleic chloride are then introduced, while stirring, into a solution of 85 parts of the \( \text{N}-\text{methyl taurine} \) in 300 parts of water and 30 parts of an aqueous caustic soda solution of 40° Be strength at 30°C, while stirring and keeping the reaction continuously slightly alkaline, whereupon stirring is continued for 6 to 8 hours at room temperature, the mixture is rendered neutral, evaporated and finally dried in vacuo. About 850 parts of a mixture of the sodium salt of oleic \( \text{N}-\text{methyl taurine} \)

\[ (\text{CH}_3\text{NHCO})_2\text{N}\text{H} - \text{CH}_3\text{CH} - \text{SO}_2\text{Na} \]

and some sodium chloride are obtained. The solutions of this mixture possess an extremely high washing and washing power and are entirely stable to alkaline earths and acids and are capable of softening artificial silk for example when added to a precipitating bath in the production of artificial silk from viscose for example by adding 2 parts of the aforesaid mixture to a solution of 100 parts of sodium sulphate and 50 parts of sulphuric acid of a specific gravity of 1.96 in 850 parts of water.

Example 32

300 parts of coconut fatty acid chloride are introduced into a solution of 300 parts of \( \text{N}-\text{methyl taurine} \) sodium chloride (\( \text{CH}_3\text{NH} - \text{CH}_3\text{CH}_2\text{CH} - \text{SO}_2\text{Na} \)) in 3000 parts of water at from 0° to 10°C. The mixture is then stirred at room temperature until a sample is soluble in water. The product obtained is a highly efficient washing and scouring agent and softening agent for fabrics from artificial silk and corresponds to the formula

\[ \text{R} - \text{CO}_2\text{H}_2\text{CH}_2\text{SO}_2\text{Na} \]

in which \( \text{R} - \text{CO} \) denotes the radicles of the acids of coconut oil.

Example 33

10 parts of palmitic acid are dissolved in about 100 parts of tri-\( n \)-butyl amine, whereupon the solution is introduced into 10 parts of \( \text{N}-\text{methyl taurine} \) and is separated and freed from remnants of the solvents by evaporation. A product is obtained, which either in the form of the free acid or after conversion of the original butylamine salt into an alkali metal salt constitutes a highly valuable assistant for the textile industries.

Example 34

A product having properties similar to those of the product according to Example 32 can be obtained by the interaction of 100 parts of laurie acid methyl ester with 20 parts of powdered anhydrous sodium salt of \( \text{N}-\text{methyl taurine} \) at 180°C, while stirring and passing through a slow current of nitrogen for the removal of methyl alcohol split off. The resulting product is taken up with some water, rendered slightly acid with the aid of hydrochloric acid and mixed with ethyl ether. The aqueous layer is drawn off whereupon, after some standing, laurie \( \text{N}-\text{methyl taurine} \) sodium salt crystallizes in the mixture and is filtered off by suction.

Example 35

10 parts of cetyl taurine (obtainable from cetyl amine and chloroethane sulphonic acid) are dissolved in 10 parts of an aqueous caustic soda solution of 40° Be strength and about 30 parts of water and stirred, while cooling, with 20 parts of acetic anhydride until a sample is completely soluble in water in contrast to the cetyl taurine which is soluble only in alkaline solutions. The product obtained is rendered neutral with the aid of caustic soda solution and evaporated to dryness. The acetyl-, \( n \)-cetyl amino-ethane sulphonic sodium salt

\[ (\text{CH}_3\text{CO})_2\text{N} - \text{CH}_2 - \text{CH}_3\text{CH} - \text{SO}_2\text{Na} \]

possesses a good wetting and washing power.

Example 36

300 parts of oleic chloride are introduced at from 15 to 20°C, into a suspension in 1,000 parts of water of 300 parts of the sodium salt of \( \text{N}-\text{cyclohexyl taurine} \) sodium salt

\[ \text{H}_2\text{H}_3\text{H}_2\text{H}_2\text{H}_2\text{H}_3\text{N} - \text{CH}_2\text{CH}_2\text{SO}_2\text{Na} \]

obtainable from cyclohexyl amine and chloroethane sulphonic acid at 150°C. By adding aqueous caustic soda solution of 40° Be strength the reaction mixture is continuously kept alkaline. The reaction mixture is stirred until the product 150
is completely soluble in water and is then rendered neutral with the aid of aqueous caustic soda solution of 40° Bé. strength. The oleic N-cyclohexyl tauride sodium salt

\[
\text{CH}_2\text{SO}_3\text{Na}
\]

possesses a very good foaming power.

**Example 37**

245 parts of the sodium salt of N-methyl taurine

\[
\text{IN} - \text{CH}_2\text{CH}_2\text{SO}_3\text{H}
\]

are dissolved in 1,000 parts of water and 250 parts of acetone and 450 parts of oleic chloride are added. While intimately stirring 650 parts of

10 per cent aqueous caustic soda solution are then gradually introduced in such a manner that the reaction mixture is continuously kept alkaline, the temperature being preferably kept at from 30 to 40° C. The resulting clear solution is rendered neutral with the aid of hydrochloric acid and inplissated. A colourless product consisting mainly of oleic N-methyl tauride sodium salt together with some common salt is obtained. The product resembles commercial soap powder in its touch and dissolves easily to a clear solution in cold water. The solutions of the sodium salt in water show a neutral reaction and possess a high foaming power, the solutions being neither rendered turbid by the addition of calcium salts or of acids nor is their foaming power reduced by the presence of such additions and the solutions possess a considerable wetting and emulsifying power independently on the presence of alkalies or acids.

**Example 38**

A mixture of 500 parts of oleic chloride and 200 parts of stearic chloride is gradually stirred at from 30 to 40° C. into a solution of 385 parts of the sodium salt of N-methyl taurine while 100 parts of an aqueous 10 per cent caustic soda solution are added in such a manner that the reaction mixture is continuously kept alkaline and that the temperature remains within the aforesaid range. The product is worked up as described in the foregoing example, the properties and the appearance of the mixture of tauride sodium salts corresponding to that of the oleic tauride.

**Example 39**

30 parts of the sodium salt of N-phenylaminoethane sulphonic acid

\[
\text{IN} - \text{CH}_2\text{H}_2\text{SO}_3\text{Na}
\]

are introduced into a solution of 42 parts of stearic chloride in 11 parts of pyridine, the mixture being stirred while raising the temperature to 80° C., until the reaction product gives a clear solution with water. The resulting mixture of stearic N-phenyl tauride sodium and pyridine salts

\[
\text{CH}_2\text{SO}_3\text{Na}
\]

is a useful assistant in dyeing, especially of woolen goods with acid dyestuffs, and is preferably employed for this purpose in the form of 50 per cent aqueous solution.

**Example 40**

25 parts of an aqueous caustic soda solution of 40° Bé. strength are added to an aqueous solution of 40 parts of the sodium salt of Piperidine sulphonate acid (mainly)

\[
\text{IN} - \text{CH}_2\text{H}_2\text{SO}_3\text{Na}
\]

in 100 parts of water. While intimately stirring 60 parts of phenylesteric chloride are slowly added at from 15 to 20° C. The reaction mixture is then stirred for from 3 to 4 hours and neutralized with hydrochloric acid, whereby, after adding some common salt, a salve-like reaction product separates at the top of the aqueous solution. After removal of the aqueous layer the product which mainly consists of the amide

\[
\text{CH}_2\text{H}_2\text{SO}_3\text{Na}
\]

may be employed as a softening agent for textile materials especially for those from artificial silk.

**Example 41**

A commercial naphthenic acid mixture is converted into the corresponding chloride with the aid of phosphorous trichloride. 200 parts of this chloride are then stirred into an aqueous solution of 180 parts of bornyl amine sulphonate acid sodium salt

\[
\text{IN} - \text{CH}_2\text{H}_2\text{SO}_3\text{Na}
\]

obtainable by the reduction of camphor oxime sulphonate acid) dissolved in about 1000 parts of water and of 150 parts of caustic soda while keeping the reaction mixture at from 15 to 20° C. and continuously alkaline by adding an aqueous caustic soda solution. After the reaction, the whole is stirred for 1 hour at about 35° C. The reaction product is then allowed to settle and is separated from the mother liquor, the product being then take up in a little warm water. A 10 per cent aqueous solution of the product is a viscous liquid.

In the place of the N-bornyl amine sulphonate acid sodium salt salts of other amino sulphonic acids, as for example the alkali metal salts of amino cyclohexyl sulphonic acids (such as

\[
\text{IN} - \text{CH}_2\text{H}_2\text{SO}_3\text{Na}
\]

or of the amino sulphonic acids from hydrocarbons of the resinic or naphthenic acid series may be employed, the naphthenic acid being replaced for example by a resinic acid or by a mixture containing the same such as tall oil, which is a mixture of resinic and vegetable long chain fatty acids obtained as a by-product in the production of paper pulp by the sulphate process.

**Example 42**

200 parts of abietic acid are converted into abietic acid chloride by means of phosphorus trichloride in excess over the amount theoretically necessary and, if desired, in the presence of an inert liquid diene such as carbon tetrachloride. Any solvent and unaltered phosphorus trichloride are then removed by distillation in vacuo and the resin-like residue is suspended in a small quanti-
tity of acetone. The suspension is introduced at
30° C. into a solution of 500 parts of the potassium
salt of N-methyl taurine in 2000 parts of aqueous,
alkaline by means of caustic soda. After about 1 to
2 hours the mixture is neutralized with aqueous
sulphuric acid, the acetone is distilled off and the
residue is evaporated to dryness. A product is
thus obtained which may be ground readily and
is an excellent wetting agent.

What we claim is:
1. The process for the production of amides
containing sulphuric derivative radicals which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

2. The process for the production of amides
containing sulphuric derivative radicals, in which
radical is denoted by X, in the absence of a metal halide having a condensing action, with an ammonia base corresponding to the formula

\[
\text{H-N} \quad \text{X,}
\]

3. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

4. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

5. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

6. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

7. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]

8. The process for the production of amides
containing sulphuric derivative groups, which
comprises reacting an aliphatic compound con-
taining the grouping

\[
\text{R-C=O} \quad \text{X}
\]
in which X is either halogen or

\[
\text{-OH,-OR, -O-C=O}
\]
5. R being an aliphatic radicle, with a taurine body, the carbon containing reacting components being so selected that the total number of carbon atoms in the resulting amide is at least 8.

7. The process for the production of amides containing sulphuric derivative groups, which comprises reacting an aliphatic compound, containing the grouping

\[ \text{in which } X \text{ is either halogen or } \]

\[ \text{R}-\text{O}-\text{R}, \text{O}-\text{R}, \text{O}-\text{R} \]

20. R being an aliphatic radicle, in the absence of a metal halide, having a condensing action, with an N-alkyl taurine body, the carbon containing reacting components being so selected that the total number of carbon atoms in the resulting amide is at least 8.

6. Amides containing sulphuric derivative radicals, corresponding to the formula

\[ \text{R}-\text{CO}-\text{N}^+ \text{-R}, \text{X} \]

in which R denotes an aliphatic open chain-, a heterocyclic- or aliphatic-aromatic radicle containing up to three condensed nuclei, X denotes hydrogen or an aliphatic open chain-, or an isocyclic aliphatic radicle containing up to three condensed nuclei, and X3 denotes hydrogen or a radicle as denoted by X1, or an aromatic radicle provided X1 is one of the said organic radicles, or X1 and X2 form a conjoint aliphatic radicle, in which amides the total number of carbon atoms is at least 8. Any aromatic nuclei connected to nitrogen are free from chromophorus groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom.

9. Amides containing sulphuric derivative radicals corresponding to the formula

\[ \text{R}-\text{CO}-\text{N}^+ \text{-R}, \text{X} \]

in which R denotes an aliphatic open chain-, heterocyclic- or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, X1 denotes hydrogen or an aliphatic open chain-, an aliphatic aromatic- or an isocyclic aliphatic radicle and X2 denotes hydrogen or a radicle as denoted by X1, or an aromatic radicle provided X1 is one of the said organic radicles, or X1 and X2 form a conjoint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei connected to nitrogen are free from chromophorus groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom.

12. Amides containing sulphuric derivative radicals, corresponding to the formula

\[ \text{R}-\text{CO}-\text{N}^+ \text{-R}, \text{X} \]

in which R denotes an aliphatic open chain- or isocyclic aliphatic radicle containing up to three condensed nuclei, X1 denotes hydrogen or an aliphatic open chain-, or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, and X3 denotes hydrogen or a radicle as denoted by X1, or an aromatic radicle provided X1 is one of the said organic radicles, or X1 and X2 form a conjoint aliphatic radicle, in which amides the total number of carbon atoms is at least 8. Any aromatic nuclei connected to nitrogen are free from chromophorus groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom.
hydrogen or a radicle as denoted by $X_1$, or an aromatic radicle provided $X_1$ is one of the said organic radicles, or $X_1$ and $X_2$ form a joint aliphatic chain in which amides the total number of carbon atoms is at least 8, any aromatic nuclei connected to nitrogen are free from chromophoric groups and several sulphuric derivative radicals, selected from the group consisting of sulphuric ester and sulphonic acid groups, are connected to carbon atoms of the said organic radicles.

14. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

in which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, $X_1$ denotes hydrogen or an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, and $X_1$ denotes hydrogen or a radicle as denoted by $X_1$, or an aromatic radicle provided $X_1$ is one of the said organic radicles, or $X_1$ and $X_2$ form a joint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophoric groups and at least an amino radicle of said amide contains a sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, connected to a carbon atom.

15. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, $X_1$ denotes an aliphatic open chain or an aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, and $X_1$ denotes an aliphatic radicle as denoted by $X_1$, or an aromatic radicle, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophoric groups and at least an amino radicle of said amide contains a sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, connected to a carbon atom.

16. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, $X_1$ denotes an aliphatic radicle and $X_2$ denotes hydrogen or an aliphatic open chain, or an aliphatic-aromatic radicle or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8 and a sulphonic acid radicle connected to a carbon atom of an aliphatic amino radicle.

17. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, $X_1$ denotes an hydroxy-alkyl radicle in which a hydrogen atom is substituted by a $\text{SO}_2\text{H}$ radicle and $X_2$ denotes hydrogen or an aliphatic open chain- or an aliphatic-aromatic radicle or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8 and any aromatic nuclei are free from chromophoric groups.

18. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei and $X_1$ and $X_2$ denote aliphatic radicles, in which amides the total number of carbon atoms is at least 8 and at least an amino radicle of said amide contains a sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, connected to a carbon atom.

19. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to 115 three condensed nuclei, $X_1$ denotes an aliphatic radicle and $X_2$ denotes hydrogen or an aliphatic open chain, or an aliphatic-aromatic radicle or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8 and a sulphonic acid radicle connected to a carbon atom of an aliphatic amino radicle.

20. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes a radicle of a fatty acid of vegetable origin, $X_1$ denotes an aliphatic radicle and $X_2$ denotes hydrogen or an aliphatic open chain, or an aliphatic-aromatic radicle or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8 and a sulphonic acid radicle is connected to a carbon atom of an aliphatic amino radicle.

21. Amides containing sulphuric derivative radicals, corresponding to the formula

\[
R-\text{CO-N}^+X_1
\]

In which $R$ denotes a radicle of a fatty acid of vegetable origin, $X_1$ and $X_2$ denote aliphatic radicles and in which amides the total number of carbon atoms is at least 8 and at least one of the radicles $X_1$ and $X_2$ contains a sulphonic acid radicle connected to a carbon atom of said radicles.
22. Taurides containing sulphuric derivative radicals, corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain-, heterocyclic- or aliphatic-aromatic radicle, or an isocyclic aliphatic radicle containing up to three condensed nuclei, \( X_1 \) denotes hydrogen or an aliphatic open chain-, an aliphatic aromatic- or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8 and any aromatic nuclei are free from chromophorous groups.

23. Taurides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain-, heterocyclic- or aliphatic-aromatic radicle, or an isocyclic aliphatic radicle containing up to three condensed nuclei, or an aromatic radicle in which taurides the total number of carbon atoms is at least 8 and any aromatic nuclei are free from chromophorous groups.

24. Taurides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R = \text{CO} \) denotes a radicle of a fatty acid of vegetable origin and \( R_1 \) denotes an aliphatic open chain-, or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, or an aromatic radicle, in which taurides the total number of carbon atoms is at least 8 and any aromatic nuclei connected to nitrogen are free from chromophorous groups.

25. Taurides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R = \text{CO} \) denotes a radicle of a fatty acid of vegetable origin and \( R_1 \) denotes an aliphatic open chain-, or an isocyclic aliphatic radicle containing up to three condensed nuclei, or an aromatic radicle, in which taurides the total number of carbon atoms is at least 8 and any aromatic nuclei connected to nitrogen are free from chromophorous groups.

26. Oleic N-methyl tauride bodies corresponding to the formula

\[ \text{CH}_3 \]

in which \( X \) denotes hydrogen or a radicle of an organic or inorganic base.

27. Amides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain-, heterocyclic- or aliphatic-aromatic radicle, or an isocyclic aliphatic radicle containing up to three condensed nuclei, \( X_1 \) denotes hydrogen or an aliphatic open chain-, an aliphatic aromatic- or an isocyclic aliphatic radicle, \( X_2 \) denotes hydrogen or a radicle as denoted by \( X_1 \) or an aromatic radicle provided \( X_1 \) is one of the said organic radicles, or \( X_1 \) and \( X_2 \) form a conjoint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophorous groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom of \( R \).

28. Amides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain-, heterocyclic- or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, \( X_1 \) denotes hydrogen or an aliphatic open chain-, an aliphatic aromatic- or an isocyclic aliphatic radicle, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophorous groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom of \( R \).

29. Amides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, \( X_1 \) denotes hydrogen or an aliphatic open chain-, or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, and \( X_2 \) denotes an organic radicle as denoted by \( X_1 \), or an aromatic radicle provided \( X_1 \) is one of the said organic radicles, or \( X_1 \) and \( X_2 \) form a conjoint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophorous groups and at least one sulphuric derivative radicle selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom of \( R \) and of at least one of the organic radicles denoted by \( X_1 \) and \( X_2 \).

30. Amides containing sulphuric derivative radicals corresponding to the formula

\[ R - \text{CO-N} \]

in which \( R \) denotes an aliphatic open chain- or an isocyclic aliphatic radicle containing up to three condensed nuclei, \( X_1 \) denotes hydrogen or an aliphatic open chain-, or aliphatic-aromatic radicle or an isocyclic aliphatic radicle containing up to three condensed nuclei, and \( X_2 \) denotes hydrogen or a radicle as denoted by \( X_1 \) or an aromatic radicle provided \( X_1 \) is one of the said organic radicles, or \( X_1 \) and \( X_2 \) form a conjoint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophorous groups and at least one sulphuric derivative radicle selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom of \( R \).
Amides containing sulphuric derivative radicals, corresponding to the formula:

\[
R-\text{CO}-N_x
\]

in which \(R\) denotes an aliphatic open chain or an isocyclic aliphatic radicle containing up to three condensed nuclei, \(X_x\) denotes hydrogen or a radicle as denoted by \(R\) and \(X_x\) denotes hydrogen or a radicle as denoted by \(R\), or an aromatic radicle provided \(X_1\) is one of the said organic radicles, or \(X_1\) and \(X_2\) form a conjoint aliphatic chain, in which amides the total number of carbon atoms is at least 8, any aromatic nuclei are free from chromophorous groups and at least one sulphuric derivative radicle, selected from the group consisting of sulphuric ester and sulphonic acid groups, is connected to a carbon atom besides a sulphuric ester radicle connected to a carbon atom of \(R\).

**Certificate of Correction**

Patent No. 1,932,180.

FRITZ GUENTHER ET AL.

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows: Page 9, line 58, strike out the formula and insert instead \((\text{CH}_2-\text{NH-CH}_2-\text{CH}_2-\text{SO}_2\text{NA})\); page 10, line 124, for "take" read taken; page 13, line 43, claim 15, for "aliphatic" read aliphatic; page 15, lines 90 to 95, claim 34, strike out the formula and insert instead:

\[
\text{C}_6\text{H}_5-\text{CO}-\text{N-SO}_2\text{H}
\]

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of May, A. D. 1934.

BRYAN M. BATTLEY,
Acting Commissioner of Patents.