

# ALIEN PROPERTY CUSTODIAN

## MANUFACTURE OF RECORDS ESPECIALLY SOUND RECORDING RECORDS FROM VINYL POLYMERS

Wilhelm Wehr, Ellenburg, Germany; vested in the Alien Property Custodian

No Drawing. Application filed October 25, 1939

The use of vinyl polymers for the manufacturing of records, for recording as well as reproducing sound, is very well known. The physical qualities of most of the polymers make it necessary to obtain plasticity, required for correct registration of sound waves with the aid of a record cutter, by adding as swelling agents well known substances. The noted tendency of vinyl polymers, to hold back rests of the solvent and to gradually release them during storing, comprises the disadvantage that the surface qualities of the foils are subdue to a continuous uncontrollable change making distortions of sound-track and sound-reproduction inevitable.

One undertook therefore the forming of vinyl polymers into foils or sheets by heat only, with or without applying pressure simultaneously. In order to accomplish the necessary even distribution of the plasticizer in the foils of the vinyl polymers, an intense, repeated rolling process could not be avoided. During this process an occasional tearing off of finest metal splinters was inevitable. Although these minute splinters do not impede many practical appliances of the foils, they damage the stylus when using the records for sound registering purposes and this again causes an impure sound reproduction. It is however possible to form in a thermoplastic way plasticizer-containing foils from vinyl polymers, which show the even softness and elasticity of a surface, needed for sound cutting- and recording purposes, if the uniform distribution of the plasticizer is accomplished prior to the plastic process. It was proposed therefore to add plasticizers to the emulsion of vinyl polymers obtained from the polymerisation of emulgated monomers, before or during this polymerisation, in order to give useful qualities to the polymers, which in this case are coagulated from the emulsions by salt solutions. It was known also that watery emulsions of polymers, being free from plasticizers, were easily precipitated by organic liquids e. g. solvents, especially by alcohols.

The progress in emulsion technique lead to an increase in emulsion-stability of vinyl polymers to such an extent that plasticizers could be stirred without coagulation into the emulsions of a polymer. The improvement in emulsion-stability towards plasticizers caused in the meantime a considerably increased stability towards aliphatic alcohols. To work up these plasticizer-containing emulsions, salt solutions, especially aluminium salts were added. In applying salts a special careful washing process of the resulting coagulate was necessary, in order to avoid disturbances

later on. But the extensive washing together with the not negligible energy to be applied, when stirring the plasticizers into the emulsions, had increased the total cost of the process considerably, without any security that all salt particles, especially from the harder portions were removed completely.

It was however discovered that an electrolytic coagulation was not necessary and that an even distribution of the plasticizer in the coagulate without intense prior emulsifying could be effected, if the emulsions of polymers or interpolymers of the vinyl-group were coagulated with a mixture of plasticizer and aliphatic alcohols. Such a mixture, the corresponding quantities of which are balanced according to the applied plasticizer and alcohol, coagulates the emulsion immediately. The coagulate contains the plasticizer evenly distributed, so that the rolling process is limited to the forming into foils only.

The following examples are an illustration of the invention whereby a polyvinylchloride-emulsion serves as representative of emulsions of polymers and interpolymers of the vinyl-group.

### Example I

To 100 g. polyvinylchloride-emulsion (25%) are added 100 g. ethyl alcohol (94%). After about 24 hours the emulsion has thickened very much without showing any coagulation. If into 100 g. polyvinylchloride-emulsion, prior filtered for the removing of coarse impurities, 10 g. tricresylphosphate are stirred by using a quick rotating stirrer, a plasticizer-containing emulsion is obtained which is stable for days. If however 100 g. polyvinylchloride-emulsion is mixed with 10 g. tricresylphosphate in 50 g. ethyl alcohol (94%), after two minutes already, a complete coagulation takes place. The coagulate contains the plasticizer uniformly distributed. It is sufficient to remove the adhering mother liquor by washing once. After drying the coagulate is formed into foils in the usual manner between 120-150° C hot rolls, in order to be pressed onto a plasticizer-free layer of polyvinylchloride and to be used as sound-recording record. The records obtained in this way show an even elasticity all over and the material does not tear off. It can be cut uniformly on its whole surface. A distortion of the track and the sound during reproduction is thus avoided to a very great extent.

### Example II

100 g. emulsion according to Example I are treated with a solution of 5 g. phthalic acid dibutyl-

ester in 50 g. ethyl alcohol. This mixture coagulates after about 20 minutes. The coagulate is worked up according to Example I. If the phthalic acid-ester by itself only is stirred into the emulsion, a mixed emulsion of polyvinylchloride and plasticizer forms, which is stable for days.

*Example III*

100 g. of the emulsion according to Example I are treated with 10 g. ethyl alcohol. A coagulate has not started even after 48 hours. If however (sulfäuremethylamid) are added to this alcoholic emulsion, coagulation begins immediately. The coagulate is worked into records in the same way as in Example I.

*Example IV*

100 g. of a 25% emulsion of an interpolymers of vinyl-chloride and acrylic acid-ester are mixed with a solution of 10 g. tripropylphosphate in 10 g.

butanol. Coagulation forms immediately. The same quantity of emulsion mixed with the same quantity of butanol is still stable after several days.

5 The sound-recording record obtained in this way guarantees an even detrition of the stylus, so that a soft sound reproduction without disturbing ground noises is produced.

10 Instead of the ethyl alcohol, as described in the above examples, also methanol or propanol or mixtures thereof may be used. The proportion of plasticizers to alcohol quantities depends on the kind of plasticizer as well as on the alcohol and is different with emulsions of different polymers of interpolymers of the vinyl-group. In  
15 any case however the simultaneous application of plasticizer and aliphatic alcohol accelerates rapidly the coagulation of the emulsion.

WILHELM WEHR.