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ADHESIVE

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This invention relates to a water soluble adhesive for the preparation of gummed papers and other cellulosic sheet materials used in the manufacture of labels, stamps, and the like.

The surface characteristics of many articles are such that it is difficult to make a label or stamp adhere to them. Important examples of such articles are aluminum ware, various other metal articles made by stamping or drawing operations or which have plated surfaces, grapefruit, oranges, lacquered and enamel surfaces, and articles made of Bakelite, and other plastics. The present invention aims to solve the problem presented by these conditions.

In many cases the surface characteristics which prevent adhesion of the label thereto is due to the presence of an extremely thin film of oily or waxy material. This is not true in other cases, however, which give practically as much trouble, and the real cause of the difficulty in producing a satisfactory bond between the label and such a surface appears to defy analysis. I have found, however, that these difficulties can be effectually overcome by coating the paper or other cellulosic material which forms the main body of the label stock with a novel adhesive of the following composition:

	Parts
Hydroresin	25
Rezinel	7.5
Animal glue	12.5
Potassium hydroxide	.5
Water	85

In this formula the chief adhesive agent is the glue. It should be some good grade of a glue of animal origin such as bone, hide, fish or animal glue, or mixtures of the same, all such glues being hereafter included in the term "animal glue." Another essential constituent is the hydroresin, this being the common commercial name for trihydroxylethylamine abietate. It is of a resinous or pitchy nature and has the property of blending with the glue and maintaining it indefinitely in a sticky and tacky condition. In some measure this undoubtedly is due to its ability to hold water and to refuse to give it up except under unusual conditions, acting in this respect like a sticky pitch. While other substances of this general nature are available, they all have characteristics or limitations which are objectionable for the purposes of this invention. A diligent search has failed to disclose any completely satisfactory substitute for hydroresin. The rezinel is a common commercial product consisting of a mixture of polymerized terpenes. It comes in different grades, and the No. 2 grade is preferred for the present purposes. It serves in the mixture above described as a smoothing or plasticizing agent for the hydroresin and the glue and it is especially valuable in the machine application of the adhesive to the sheet material. The potassium hydroxide, or equivalent caustic alkali, appears to perform the dual function of cutting or saponifying any oily, greasy, or waxy film on the surface to which the label is applied, and to etch said surface to a minute degree, both of these results enabling the glue to obtain a stronger hold on the surface. This constituent is not absolutely necessary for many purposes, but it preferably is used because it practically always produces a stronger bond between the label and the article to which it is secured, and in applying labels to surfaces which are at all oily, greasy or waxy it performs a very important function in improving the strength of the bond. The proportion of water used in the mixture necessarily will depend, to a large degree, upon the consistency desired.

In making up the adhesive above described it is preferable first to dissolve the caustic alkali in about twenty-five parts of water heated to the boiling point, or thereabouts. The hydroresin and the rezinel then are added, these ingredients preferably having first been heated to a temperature of, say, 50° C. prior to stirring them into the alkali solution. The glue, which desirably is in a granulated form, is first dissolved in the remaining proportion of the water, say sixty parts, heated to a temperature of 80° C., or thereabouts, and the two solutions then are mixed together and stirred until they are well blended.

While the formula above given is preferred, it will be understood that other constituents can be added and sometimes are of value. For example, other plasticizing agents, such as urea, are sometimes useful. When slower drying is necessary, such agents as methyl abietate, rosin oil, or carbitol can be added in suitable proportions to give the desired results. Carbitol is a commercial name for diethylene glycol ethyl ether. In some cases aquaresin (glycol bori-borate) or glycerine may be used for the same purposes as the urea above mentioned.

The best results, however, have, in general been obtained with the formula above given, labels and equivalent devices, such as stamps, stickers, and the like, coated with this adhesive adhering indefinitely to the articles to which they are affixed. At the same time it should be understood

that the formula is susceptible of variation while still producing good results. A satisfactory range of proportions of the constituents is as follows:

	Parts
Hydroresin	20 to 25
Rezinel	0 to 8
Glue	3 to 15
Potassium hydroxide	.4 to 1

Water, varying with the consistency desired, but usually from 50 to 75 parts.

The adhesive usually is applied to the paper or other sheet material while the latter is in the form of a web, the application being made in any suitable form of gumming machine. From the machine the paper is taken through a dryer where the coating is thoroughly dried, after which the product is ready for shipment to the printer or other user. While, as above stated, the mixture retains its adhesiveness indefinitely after the labels have been moistened and applied to the work, nevertheless the coating dries hard and remains in a hard and substantially non-tacky condition during printing or other label manufacturing operations and the stock does not cake in the rolls or stacks. Consequently, it does not require interleaving.

Having thus described my invention, what I desire to claim as new is:

1. A water soluble adhesive composition comprising a mixture of animal glue, "Hydroresin" and "Rezinel", the "Hydroresin" being the predominating constituent, and the proportion of glue being less than that of the "Hydroresin", the "Rezinel" being present in a substantial percentage.

2. A water soluble adhesive composition comprising a mixture of animal glue, "Hydroresin" and "Rezinel", and caustic alkali, the "Hydroresin" being the predominating constituent, and the proportion of glue being less than that of the "Hydroresin", the "Rezinel" being present in a substantial percentage, and the proportion of caustic alkali being very small.

3. A water soluble adhesive composition consisting essentially of the following constituents:

	Parts
"Hydroresin"	20 to 25
Animal glue	3 to 15
"Rezinel"	0 to 8
Potassium hydroxide	0 to 1

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