METHOD OF ATTACHING TOGETHER PAPER SHEETS

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This invention relates to a method of attaching together paper sheets, including the steps of preparing the sheets for attachment. The subject matter hereof is a division of our application Serial No. 7,690, filed February 23, 1935, now Patent No. 2,123,903, dated July 19, 1938.

The method hereof is of utility in offices or business houses, wherein it is the practice in many offices or departments to have sets of similar paper forms or memoranda for distribution to various individuals or departments as for notation or remarks before they are filed as a single group. The three or more sheets or forms have heretofore been attached together as a group prior to filing by machines such as drive staples through the sheets or strike out tongues and unite such tongues to the bodies of the sheets. Not only are such machines liable to get out of order, but they add significantly to the bulk or body thickness of the group of paper forms or sheets and thus commensurately detract from the capacity of the cabinets in which they are filed.

The paper sheets constituting the group to be attached together by the method hereof comprise two sheets provided at their upper margins or edge portions with flexible rubber coatings coherent with similar coatings but non-adherent to uncoated surfaces. The group further comprises one or more intermediate sheets whose upper marginal portions are uncoated but perforated. The sheets of a group are attached together by the method hereof by bringing their upper edges into substantial coincidence and pressing the coated surfaces or upper edge portions of the outer sheets into contact with each other through the perforation or perforations of the intermediate sheet or sheets, thereby locking in place the intermediate sheet or sheets. By virtue of the fact that the flexible rubber coatings carried by the outer sheets are extremely thin and yet perform the desired bonding function quite satisfactorily, the method of attaching together sheets according to our invention not only dispenses with fastening machines and lends itself to quick performance but results in a group of attached sheets whose body thickness has been only imperceptibly increased and can thus be filed in a cabinet with the occupation of minimum space.

With the foregoing and other features and objects in view, the present invention will now be described in further detail with reference to the accompanying drawing, wherein:

Figure 1 shows in perspective a pad or pile of sheets comprising groups of sheets prepared for the performance of the method hereof. Figures 2, 3, 4, and 5 show in perspective the upper marginal portions of an outer sheet, and intermediate sheet, a second intermediate sheet, and an outer sheet, respectively, of each of the groups or series of sheets in the pad of Figure 1. Figure 6 shows in perspective a fragment of the upper marginal portion of another form of intermediate sheet that might be used in the method hereof.

Figure 7 is a section through a single group of sheets in the pad of Figure 1. Figure 8 depicts the manner of attaching together the sheets in a group preparatory to their filing.

Figure 9 is a section through the attached group of sheets on the line 5—6 of Figure 8. A pad of sheets comprising successive groups of sheets prepared or conditioned for the performance of the method hereof is illustrated in Figure 1 as being bound at its side edge 17, as by a canvas or cheesecloth binding strip impregnated with glue or similar adhesive. A group of sheets in such pad may be four in number and, as shown, may comprise an outer sheet 18 carrying a stripe of very thin rubber coating 19 on its inner upper marginal face and another outer sheet 20 carrying a stripe of very thin rubber coating 21 on its outer upper marginal face. Each of the two intermediate sheets 22, which are devoid of coatings, may be provided at its upper marginal portion with a row of spaced perforations 23 permitting such intermediate sheet to be locked in place between the attached outer sheets, as will presently appear. If desired, the perforations in an intermediate sheet may take the form of slots 24 extending downwardly from the upper sheet edges, as appears in Figure 6. Of course, a single elongated slot extending transversely through an intermediate sheet adjacent to its upper edge is the equivalent of a row of perforations. Since the intermediate sheets 22 are without coatings, their upper edges may be made to coincide in the pad with the upper edges of the outer sheets 20, but the upper edges of the outer sheets 18 preferably lie, as shown in Figure 1, just below the stripe of coating 21 in the outer sheets 20, thereby avoiding contact between the cohesive coatings of the outer sheets, such as might tend to bond together the four sheets of a group while still in the pad. If desired, however, the sheets to constitute a group need not be bound together at their edges in pad form but may be kept in suitable separate
stacks or piles. For instance, the intermediate sheets 22 may be kept as individual entities in one stack and the outer sheets 18 and 20 kept as individual entities in another stack, the uncoated face of a sheet being in contacting relationship with the coated face of a sheet 20 in the stack so as to avoid bonding together of such sheets. When the uncoated intermediate sheets and the coated outer sheets are thus kept in such separate stacks, it is possible to provide outer sheets of substantially the same dimensions, since there is no tendency for the outer sheets to become bonded together at their upper marginal portions by reason of the fact that the coating or coated face of one sheet is in contact with the uncoated face of an adjacent sheet.

Because the coatings on the outer sheets are of non-adhesive nature, no difficulty arises when the four sheets of a group are placed in quadruplicate form in a typewriter with their upper edges coinciding, since the coatings of the outer sheet have no tendency whatever to adhere to the carbon paper inserted between the sheets. Once the quadruplicate sheets have been typed on and have gone through the proper channels, and have been returned for filing, they may be attached together in the manner illustrated more particularly in Figure 8. Thus, the upper edges of the sheets to which the coatings of the outer sheets extend may be brought into substantially coincident and the upper marginal portions of the four sheets pressed together between the forefinger and thumb so as to bring the coated surfaces of the outer sheets into contact through the perforations of the intermediate sheets, as shown best in Figure 8. It is to be understood that, in lieu of attaching the sheets of a group at their upper edge portions, attachment of the sheets by the method hereof may be effected at their side edge portions, in which case the outer sheets may be coated at their confronting side edge portions and the intermediate sheet or sheets may be perforated near the corresponding side edge so that, when the sheets of a group are superposed with their side edges coinciding, the coatings on the outer sheets register and can be pressed into contact with each other through the perforation of the intermediate sheet or sheets, thereby causing the sheets of the group to be attached together. Ordinarily, however, it is preferable to attach the sheets at their upper edge portions, as hereinbefore described and as illustrated in the drawing.

Some instances, only the two coated outer sheets may constitute the group of sheets to be attached together for filing. In such case, the two sheets, which are provided at their confronting upper marginal surfaces or at their confronting side marginal surfaces substantially to their very edges with coating stripes adapted to cohere with similar coating stripes but non-adherent to uncoated paper, may be superposed with substantial coincidence of their upper edges or their side edges so as to bring the coating stripes into substantial registration and contact and thus cause the sheets to be attached together. Firm attachment of the sheets may be provided by applying some pressure, such as hand-wiping pressure, to the registering and contacting coated areas of the superposed sheets. Such coated outer sheets may, as already indicated, be of similar dimensions and kept as separate units or individual entities in a stack wherein the coating or coated face of one sheet is in contact with the uncoated face of an adjacent sheet.

There are various rubber coating compositions that may be used to produce the coatings necessary on the outer sheets of the group of sheets to be attached together by the method hereof. Generally speaking, such coating compositions comprise solutions or dispersions of rubber or equivalent substances therein. Such solutions or dispersions are applied in fluent state to the proper surfaces or areas and permitted to dry or set thereon. We have found that rubber latex compositions are especially suitable for the purposes of our method, since they are aqueous compositions which may be readily applied and dried on paper sheets to deposit the desired very thin and flexible rubber coatings, that is, rubber coatings which have practically no adhesive affinity for uncoated paper or other uncoated surfaces but which, when brought together, cohere with the desired tenacity or bond. The ordinary rubber latices of commerce, for instance, ammonia-preserved latex of normal solids content, any of about 30% to 35% solids content, dilute rubber latices, or so-called concentrated rubber latices of much higher solids content may be employed. If desired, the rubber latices may be compounded with various agents, such as fillers, vulcanizing ingredients, glycerine, or other agents designed to modify the degree of tenacity or cohesiveness with which coatings or dried films deposited from the rubber latices cohere. In all instances when we use aqueous rubber dispersions, rubber latices, or rubber solutions as the coating compositions, we prefer to compound therewith so-called anti-oxidants, as they tend to preserve the rubber coatings or dried films deposited from the compositions in a substantially stable or unoxidized condition, that is, to prevent such coatings or films from becoming more or less brittle and progressively losing their cohesive qualities as they are aged or exposed to atmospheric influences.

The word "upper" as used in the foregoing description and in the appended claims in characterizing the disposition of the sheet margins or the fact of real up direction and not direction relative to the user of the sheets or the pad in which such sheets may be bound. We claim:

1. A method of attaching together multiplicative paper sheets in a stacked group of at least three sheets each, which comprises perforating only the intermediate sheet of a group near an edge thereof, providing each of the outer sheets of a group near a corresponding edge thereof with flexible rubber coatings adapted to cohere with similar coatings but non-adherent to uncoated paper, said coatings on said outer sheets being capable of being brought into confronting relationship when said three sheets of a group are superposed with corresponding edges of said three sheets coinciding and said coatings on the outer sheets being registrable and pressable into contact with one another through the perforation of said intermediate sheet, superposing such three sheets of a group with corresponding edges of the three sheets coinciding and with the coatings on said outer sheets in confronting relationship and registrable and pressable into contact with each other through the perforation of said intermediate sheet, and pressing the coated surfaces of said outer sheets into contact with each other through the perforation of said intermedi
diate sheet, thereby causing the three sheets of a stacked group to be attached together.

2. A method of attaching together multiplicate paper sheets in a stacked group of at least three sheets each, which comprises providing each of the outer sheets of a group at their confronting upper marginal surfaces substantially to their upper edges with flexible rubber coatings adapted to cohere with similar coatings but non-adherent to uncoated paper, perforating the upper marginal portion of only an intermediate sheet, bringing such three sheets of a group together in superposed relationship with substantial coincidence of their upper edges, and pressing the coated surfaces of the outer sheets into contact with each other through the perforation of an intermediate sheet, thereby causing the three sheets of a stacked group to be attached together.

3. A method of attaching together multiplicate paper sheets in a stacked group of at least three sheets each, which comprises providing for each group an intermediate sheet perforated near an edge thereof and two outer imperforate sheets each carrying a dried rubber latex coating so disposed near a corresponding edge thereof that said three sheets can be superposed with the coatings on said outer sheets registerable and pressable into contact with each other through the perforation of said intermediate sheet, superposing such three sheets of a group with corresponding edges thereof coinciding and with the coatings on said outer sheets registerable and pressable into contact with each other through the perforation of said intermediate sheet, and pressing the coatings of said outer sheets into contact with each other through the perforation of said intermediate sheet, thereby causing the three sheets of a stacked group to be attached together.

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