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ADHESIVE PAPER

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FIG. 1

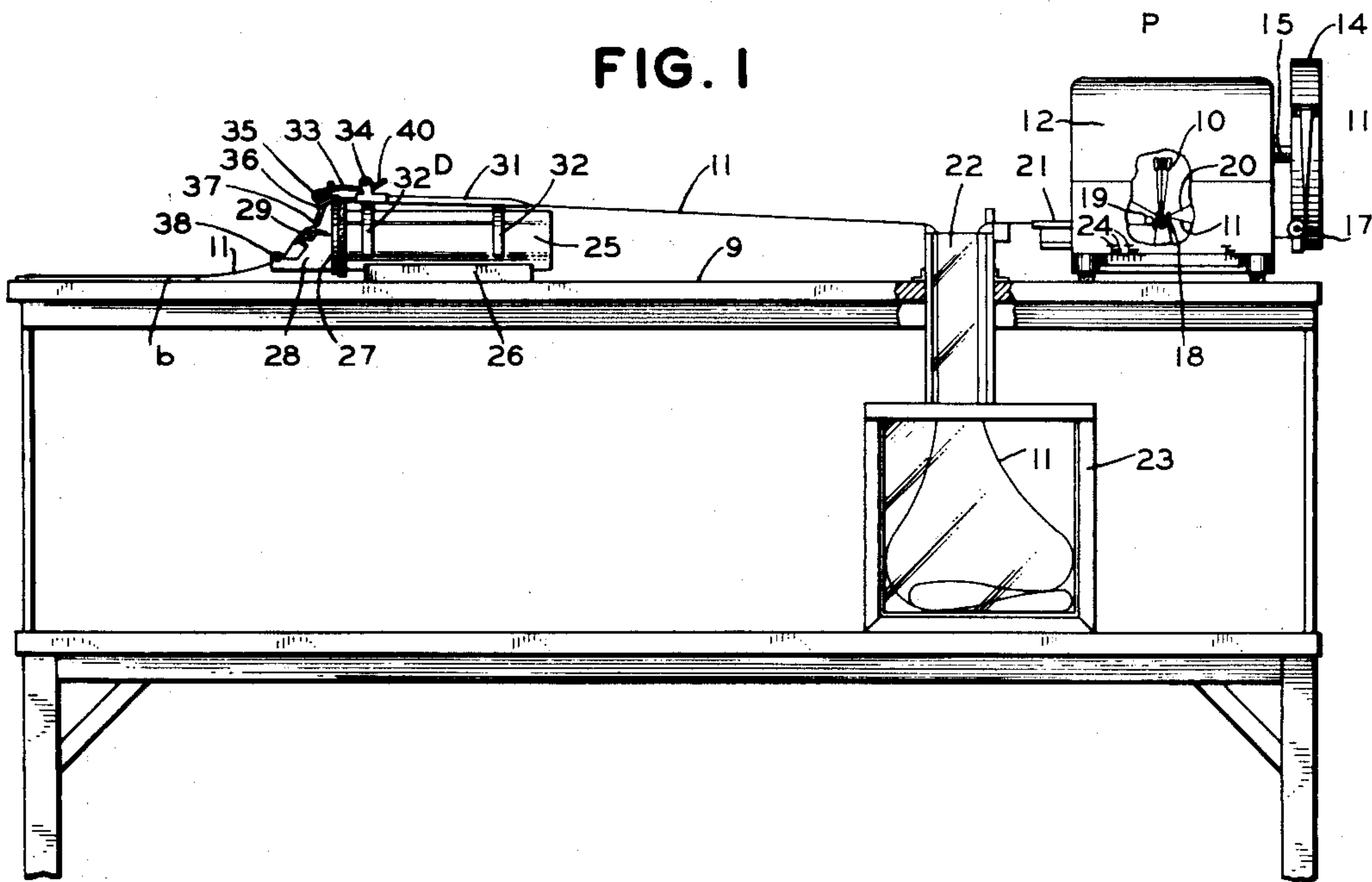


FIG. 2

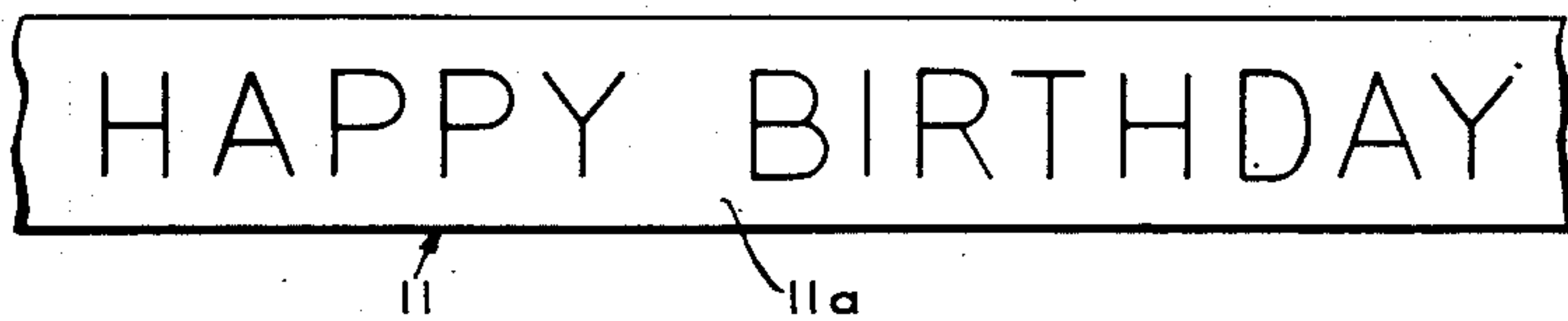
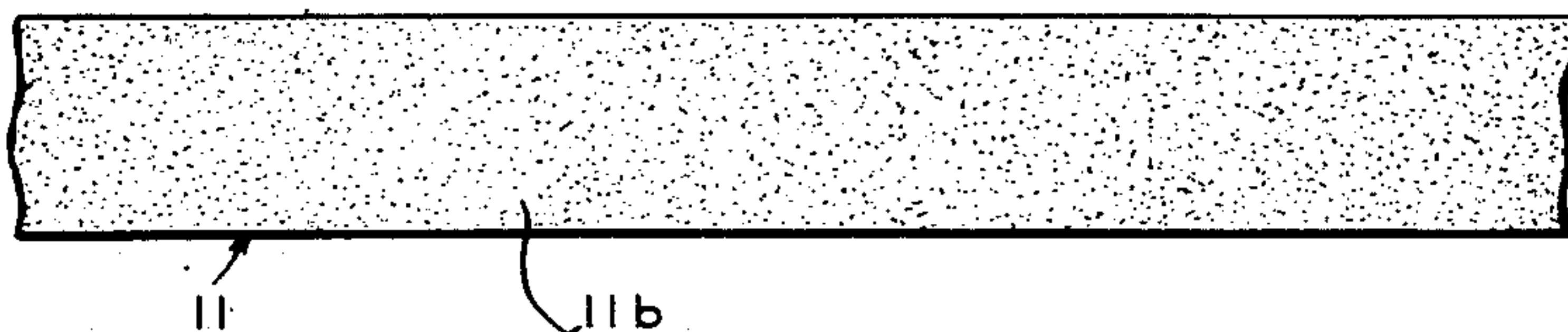


FIG. 3



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ADHESIVE PAPER

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5 Claims. (Cl. 117—122)

This invention relates generally to adhesive paper, and more particularly to an adhesive coated web or tape adapted for use with telegraph printers.

It is a general practice in the reception of telegraph messages to cause the messages to be printed, as by a high speed telegraph printer, on a narrow gummed paper tape which is supplied from a roll of such tape mounted adjacent to or within the printer housing, the tape being fed through the printer as the characters are impressed on the ungummed side thereof in response to the received telegraph signals. The printed tape which issues from the ticker passes to an accumulator or receptacle from which it is pulled by an operator who passes the tape through a manually held device that moistens the gummed side thereof, the operator then shearing off and applying lengths of the moistened tape to a telegraph delivery blank, the various lengths of printed tape thus applied each comprising a line of the message on the blank and disposed one below the other on the blank so that the message may readily be read by the addressee.

Prior to the present invention, various well-known animal and vegetable glues were employed as the adhesive on the gummed side of the tape, but such gummed tape has exhibited numerous disadvantages. For example, many of the adhesive coatings heretofore employed have been hygroscopic, and since the paper telegraph tape normally is hygroscopic to some extent, both the tape and adhesive coating absorb moisture from the surrounding air when the humidity is high, thus causing the adhesive coating to become sticky due to the absorbed moisture and tending to cause the gummed tape comprising adjoining convolutions of a tape roll to stick together, and the tape to stick to the platen and other parts of the printer and interfering with the operation of the printer and the proper advancement of the tape. If coatings were applied which were made substantially non-hygroscopic by the introduction of hardening compounds, then the adhesive was not readily moistened, particularly in dry weather, and the tape did not securely stick to the telegraph blank on which it was pasted. Moreover, with the coatings formerly employed to produce gummed tape, it was generally necessary that the gummed sheet or web, after drying and prior to slitting, be passed through a "breaking" operation to break up the adhesive coating, which breaking operation was necessary to reduce curling and warping of the

tape, spoking of the tape rolls, and other undesirable effects resulting from shrinkage of the glue coating on the tape.

An object of the present invention is to obviate various disadvantages of the gummed tape heretofore employed, and to produce a tape or web with an improved adhesive film or coating thereon, which coating is extremely thin and is substantially non-hygroscopic, does not appreciably curl or warp the web or tape, and in which spoking of the tape rolls does not occur, and in which there is no substantial shrinkage of the adhesive film.

Another object is a tape or web having on one side thereof an adhesive film which is thinner than that heretofore obtainable consistent with the characteristic of having strong adhesive properties, the film being so thin and of such character as normally to be substantially transparent, and in which means are provided for enabling the gummed side of the tape or web readily to be visually distinguishable from the ungummed side thereof.

Other objects and advantages will be apparent from the following description, taken in connection with the accompanying drawing, in which:

Fig. 1 shows a telegraph printer and associated apparatus employing a telegraph tape having an adhesive coating thereon in accordance with the invention;

Fig. 2 is a fragmentary view of the printed or ungummed side of the telegraph tape illustrated in Fig. 1; and

Fig. 3 is a fragmentary view of the gummed side of the tape of Fig. 2.

Referring to the drawing, Fig. 1 shows a table or cabinet 9 having on one end thereof a well known form of high speed telegraph printer P which receives the incoming telegraph signals in permutation code and prints, by means of selectable type bars 10, the message characters on the upper ungummed side 11a (Fig. 2) of a narrow tape 11. The printer is enclosed in a housing 12, a portion of which housing has been broken away in Fig. 1 in order to disclose certain of the elements employed in printing the messages and advancing the tape through the printer. The underside of the tape has thereon an extremely thin film of a water-soluble adhesive hereinafter described in detail, and indicated at 11b in Fig. 3. Referring again to Fig. 1, the tape with the adhesive film thereon is fed from a supply roll of tape rotatably mounted in a housing 14 which is secured adjacent to the printer P by means of a support 15 extending from the printer struc-

ture. As shown in the figure, the tape 11 is pulled through an opening in the housing 14, and then is passed around a tape guide roller 17 and thence into the printer housing, the roller 17 serving also to twist or change the plane of the tape so that it approaches the printer in a horizontal plane. The tape passes into the printer and over a platen roller 18 where the printing operations take place, and then passes downwardly between a pressure roller 19 and the platen roller, the pressure roller and platen roller serving as feed rollers for advancing the tape through the printer as the printing operations proceed. After leaving the rollers 18 and 19, the tape passes out of the printer through a tape guide 21 and down a tape chute 22 into an accumulator or temporary storage chamber 23. A typewriter ribbon 20 is positioned adjacent to the tape 11 so that as the selected type bars 10 are successively caused to strike on the ribbon 20 the proper characters will be printed on the tape 11. The printer shown in the figure is adapted to both send and receive, and for this purpose the printer has a keyboard with a group of keys 24 thereon, although it will be appreciated that the printer may be of the receiving-only type.

The printed tape is pulled from the tape accumulator chamber 23 by an operator who causes the tape to pass through a manually held device D for moistening the adhesive side of the tape in order to facilitate the application thereof to the backing sheet or telegraph delivery blank b, one of which blanks is shown lying on the top of the table 9. The tape moistening device may be any of various known types suitable for the purpose. Generally, and as shown, it comprises a hollow cylindrical body 25 which forms a water reservoir and is of a suitable size to be grasped in the hand of the operator. When not in use, and as shown in Fig. 1, the device may rest in a support 26 having an upper concave surface for receiving the cylindrical body 25. A removable screw cap 27 is provided on the forward end of the reservoir 25 and serves as a means for replenishing the water supply in the reservoir. The cap has a forwardly extending wedge-shaped wick support or nose piece 28 having at the front end thereof a flat bottom which is adapted to engage with and slide along the surface of the telegraph blank as the tape is applied thereto. The nose piece 28 has a well or recessed portion therein for receiving a wick 29 or other form of moisture carrying medium, the wick well being in communication with the interior of the receiver 25 by means of a passage, not shown.

A detachable tape guiding channel 31 is mounted on the reservoir by spring clips 32 and is held in proper position relative to the wick holder 28 by lugs in the manner shown in the figure or in any other suitable manner. A tape snubbing lever 33 is pivotally mounted on the tape guiding channel, as by means of a pin 34 mounted in lugs secured to the channel structure. The forward end of the tape snubbing member 33 has rounded portions 35 adapted to bear against a sloping shoulder or abutment 36 also secured to the tape guiding channel structure, and depending from the member 33 is a pin or tape guiding member 37 which insures that the gummed side of the tape will pass across the wick 29 in a manner to cause the entire gummed surface of the tape to be uniformly moistened. A small tape roller 38 is mounted in the nose

portion 28 and serves as a tape guide for the tape as it leaves the moistening device.

A coiled spring (not shown) surrounds the pin 34 and resiliently urges the forward portions 35 of the tape snubbing member 33 against the sloping shoulder portion 36, thereby to snub the tape sufficiently to facilitate shearing of the tape hereinafter referred to, and also, if desired, to exert a slight snubbing action on the tape as it is pulled from the tape moistening device, thereby to produce sufficient resistance to the movement of the tape to insure that the tape is pressed firmly against the moistening wick at all times. The rearward end of the tape snubber 33 has a projecting thumb piece 40 which may readily be engaged by the thumb of the operator for raising the snubbing member 33 out of contact with the tape or for lessening the snubbing action on the tape as may be desired.

When it is necessary to load the moistener with tape to be applied to the blank b, the moistener device is held in the hand of the operator, and the tape snubbing member 33 is held upwardly by means of pressure exerted downwardly on the thumb piece 40. The tape is then passed through the tape channel 31 and over the sloping shelf 36, under the guiding pin 37, over the face of the wick 29, and under the tape guiding rollers 38, after which the tape snubbing member 33 is released so that its portion 35 presses the tape against the shoulder 36 to produce the desired resistance to the movement of the tape through the moistening device. The forward end of the printed portion of the tape, the gummed side of which has been moistened when the tape is pulled from the device D, is placed in the proper position on the left hand portion of the blank b and the end held by the fingers of one hand of the operator as the tape moistening device is caused to press the tape firmly on the blank b, and as the right hand portion of the blank is approached the tape is sheared off, by means of a thimble having a shearing edge and worn on the hand of the operator, after which the operation is repeated until the entire message has been pasted on the blank b.

In accordance with the present invention the adhesive on the underside of the tape comprises an extremely thin film of a water-soluble powerful adhesive, such as one of the several forms of polyvinyl alcohol of the general formula $(-CH_2-CHOH-)_x$ which is a synthetic water-soluble resin. The polyvinyl alcohols have the desirable properties of causing the adhesive film formed thereby to be substantially non-hygroscopic, non-curling, non-spoking and having no appreciable shrinkage when applied to the telegraph tape, which tape ordinarily is a narrow manila paper tape. The polyvinyl alcohol is applied in an aqueous solution to a web which is then dried, and the coated paper web does not require "breaking." The web thus coated is later cut into narrow strips to form tapes.

Several of the suitable polyvinyl alcohols may be obtained as a commercial product and have the characteristic in that they dissolve readily in water of a temperature up to approximately 70° C., and the concentration of the aqueous solution of the polyvinyl alcohol may be such that the resultant adhesive film on the tape when dry is extremely thin, while at the same time retaining the characteristic of being a powerful adhesive. By reason of the fact that an extremely thin film may thus be employed, the

amount of polyvinyl alcohol, as compared to animal and vegetable glues of the types heretofore employed, may be very substantially reduced. For instance, on standard tapes of the type heretofore employed it was necessary to use approximately six pounds of glue per ream of paper (17 x 22 inches), but by using the solution of polyvinyl alcohol, particularly in the lower range of concentrations, suitable coatings in which the polyvinyl alcohol is used in amounts as low as three-quarters of a pound to a pound per ream of paper have been obtained. In general it will be found that from one to two pounds of polyvinyl alcohol per ream will give satisfactory results for most purposes.

The extremely thin adhesive coating obtained not only enables much less adhesive per ream of paper to be used but also enables the tape to lie flatter and closer to the telegraph blank *b*, and thus the possibility of having the strips of tape pasted on the telegraph blank caught and torn or mutilated during transfer and delivery of the blank is substantially minimized. For instance, it is common in large telegraph exchanges to feed the various receiving blanks into belt conveyors or chutes for transporting the same to various points of delivery or for routing the messages for further transmission thereof, and if any of the tape strips pasted on the telegraph blanks have projecting edges or ends, there is a possibility of such edges or ends being caught on the belt conveyors or chutes through which the telegraph blanks pass, with consequent mutilation or tearing of the messages thereon. The very thin adhesive coating obtainable with the present invention not only eliminates this possibility but also, due to the fact that the tape lies closer to the blank than was heretofore possible, the appearance of the blank and message thereon is greatly improved.

When very thin adhesive coatings of the polyvinyl alcohol are employed, due to the extreme thinness of the adhesive film and also because of the colorless character of the polyvinyl alcohol, the adhesive coating is substantially transparent and is not readily distinguishable from the ungummed side of the tape, so that when the tape *11* is pulled from the accumulator chamber *23* by the operator and passed through the tape moistening device *D* it has been extremely difficult for the operator to know which side of the tape is the coated or underside, particularly since the initial portion of the tape may not have any printed characters thereon. Thus, it has happened that the tape has been pulled through the tape moistening device with the adhesive side of the tape upwardly and when the printed characters on the ungummed side of the tape were reached they were underneath, so that the printed side of the tape would inadvertently come in contact with the moistening wick *29* and thus cause the printed characters to be defaced or mutilated for some interval of time before the operator noticed that the tape was being pulled through with the printed side underneath, thereby resulting in the mutilation and possible loss of one or more messages.

Moreover, when the tape supply for the printer becomes exhausted, it is necessary to insert a fresh roll of gummed tape in the tape housing *14*, and if an operator in pulling the tape *11* from the tape roll and passing it around the tape guide roller *17* cannot readily tell which is the gummed side of the tape, she may twist the tape in the

wrong direction where it passes around the roller *17*, thus causing the adhesive side of the tape to be uppermost, so that the printing will take place on the gummed side of the tape, and thus prevent the tape from being applied to the blank *b*. A considerable length of printed tape may run off before such a condition would be noticed, and it would be necessary to then locally reproduce the messages on the ungummed side of another piece of tape, thus resulting in delay and also additional handling and expense in connection with the forwarding or delivery of the messages.

In order to obviate the possibility of mistaking the gummed and ungummed sides of the tape, there is added a suitable coloring pigment or dye, preferably a water soluble dye such as water-soluble aniline dyes and water-soluble phenol dyes, the dyes or other coloring agent being dissolved or dispersed in the polyvinyl alcohol solution in an amount sufficient to cause the adhesive film on the tape to have a contrasting color from that of the ungummed side of the tape, and thus the adhesive side of the tape may readily be distinguished from the ungummed side. Dyes suitable for the purpose may comprise the so-called acid dyes, certain of which are water-soluble, such as Acid Fushsin Red, Acid Aniline Blue, and Acid Aniline Green, although preferably the so-called basic dyes or equivalents thereof are employed since they are substantially all soluble in water and usually are the strongest tinctorially, and of these dyes Rhodamine B, Magenta, Erythrosin, Naphthol Green, Malachite Green, Methylerte Blue, and Methyl Violet are particularly suitable for the purpose. In practice, the Rhodamine B or Magenta are preferred for use with telegraph tape. The amount of such dyes used is exceedingly small, being only a fractional part of one percent of the aqueous adhesive solution.

While all the foregoing dyes are suitable for the purposes of coloring the adhesive film on telegraph tape, if an adhesive web or film in accordance with the invention is employed for other purposes, it may be desirable to use those dyes which have been certified as suitable for food use, such as Acid Aniline Blue and Erythrosin. The addition of the foregoing dyes does not in any manner affect the desired adhesive properties of the film, and selection of the particular color of the dye or combination of dyes employed will depend upon the color of the uncoated side of the web or paper.

Preferably, the concentration of the polyvinyl alcohol in the aqueous solution is maintained low, but for various purposes the concentration may vary as, for example, from two to twenty percent of the aqueous solution, depending upon the character of the tape or web coated and the method of applying the adhesive film thereto, the lower concentrations giving the thinner coatings for a given method of application. In practice it has been found convenient to use a concentration of four to eight percent of the polyvinyl alcohol. The aqueous solution of the polyvinyl alcohol, together with the added dye or dyes, may be applied to the web in any of various suitable manners known in the art, as by spraying, brushing, roller coating, or the like, after which the web is dried and then is ready for processing or converting and use. A polyvinyl alcohol which is referred to in the trade as of medium viscosity (generally identified as having a viscosity of twenty centipoises in a 4% aqueous solution at 20° C.) preferably is employed, but if desired a

high viscosity polyvinyl alcohol (generally identified as having a viscosity of fifty centipoises in a 4% aqueous solution at 20° C.) may also be employed, both of the foregoing types of polyvinyl alcohol being soluble in water at ordinary temperatures.

In preparing the adhesive solution, the polyvinyl alcohol, which is obtainable commercially as a white or creamy-white powder, is stirred into the desired amount of water until all lumps are broken up and a smooth mixture is obtained, the mixture being heated slightly if desired to facilitate solution of the polyvinyl alcohol powder, the resulting solution being clear and substantially colorless. The desired pigment or dye is then added to this solution in an amount sufficient to give the desired color to the applied adhesive coating.

If desired, various well known animal or vegetable glues may be employed with the polyvinyl alcohol, so that a greater amount of adhesive per ream of paper may be used, thereby to assure complete coverage of the paper with the adhesive, the amount of such animal or vegetable glue preferably being insufficient to cause the adhesive coating to be hygroscopic to an undesirable extent.

For purposes of illustration, the invention has been described with reference to an adhesive film or layer on a telegraph tape or web, but it will be understood that various advantages of the adhesive film disclosed may be utilized in connection with tapes or webs which may be thus gummed over their entire areas or restricted areas thereof for various purposes, such as for wrapping and sealing, envelope flaps, labels, postage stamps, and others, and for certain of these purposes the addition of a pigment or dye for coloring the film may be unnecessary. For brevity, the expression "tape or web" is employed in a generic sense to define various of such tapes and webs and which may comprise paper, linen or other material suitable therefor.

I claim:

1. An adhesive paper having on one side thereof a thin, dry, remoistenable, substantially non-hygroscopic adhesive film comprising a water-soluble polyvinyl alcohol of the type which is readily soluble in water of a temperature up to approximately 70° C.

2. An adhesive paper tape having on one side thereof a thin, dry, remoistenable, substantially

non-hygroscopic adhesive film comprising a water-soluble polyvinyl alcohol of the type which is readily soluble in water of a temperature up to approximately 70° C.

3. An adhesive paper having on one side thereof a dry, remoistenable, adhesive film comprising a water-soluble polyvinyl alcohol of the type which is readily soluble in water of a temperature up to approximately 70° C., said adhesive film when dry being extremely thin and having the characteristic of being substantially non-hygroscopic, said polyvinyl alcohol being present in the adhesive film in an amount of the order of one to two pounds per ream of paper.

4. An adhesive paper having on one side thereof a dry, remoistenable, adhesive film comprising a water-soluble polyvinyl alcohol of the type which is readily soluble in water of a temperature up to approximately 70° C., said adhesive film being readily soluble in water at ordinary temperatures and so thin and of such character as normally to be substantially transparent and not readily distinguishable from the ungummed side of the paper, and means for causing the adhesive side of the paper readily to be visually distinguishable from the ungummed side thereof, said means comprising a water-soluble dye dispersed throughout said adhesive film, said dye being of a different color from that of the ungummed side of the paper to produce a distinct color contrast between the adhesive side and the ungummed side of the paper.

5. An adhesive paper having on one side thereof a dry, remoistenable, adhesive film comprising a water-soluble polyvinyl alcohol of the type which is readily soluble in water of a temperature up to approximately 70° C., said adhesive film being readily soluble in water at ordinary temperatures and so thin and of such character as normally to be substantially transparent and not readily distinguishable from the ungummed side of the paper, and means for causing the adhesive side of the paper readily to be visually distinguishable from the ungummed side thereof, said means comprising a water-soluble basic dye dispersed throughout said adhesive film, said dye being of a different color from that of the ungummed side of the paper to produce a distinct color contrast between the adhesive side and the ungummed side of the paper.

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