July 19, 1966 W. C. HOFF 3,261,044

HEAVY DUTY BINDING APPARATUS

Filed Nov. 17, 1964

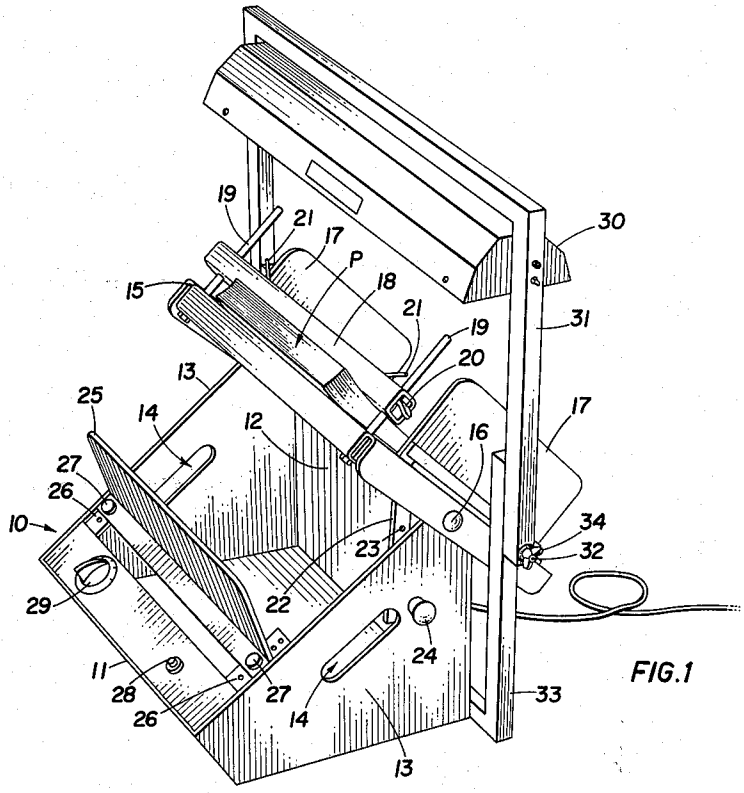


FIG.1

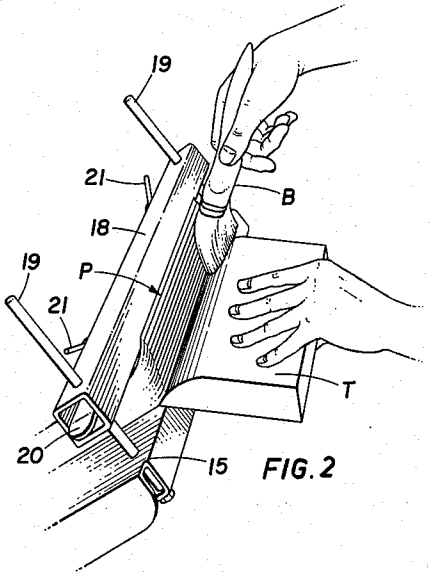


FIG.2

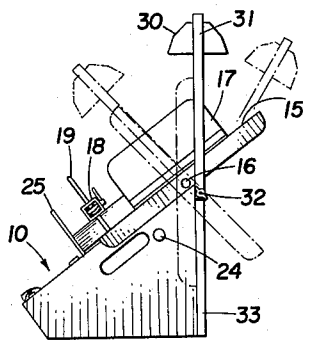


FIG.3

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United States Patent Office 3,261,044 Patented July 19, 1966

3,261,044

HEAVY DUTY BINDING APPARATUS

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Filed Nov. 17, 1964, Ser. No. 411,824
1 Claim. (Cl. 11—1)

This invention relates to a heavy duty paper binding apparatus and is particularly suited for the binding of papers and booklets for resale or for heavy use.

Various forms of binding machines are available which are particularly suited for binding pads of papers for office use or for binding papers for storage. One such device is described in United States Letters Patent No. 3,146,473 issued on September 1, 1964. Such binding machines provide a good adhesive bond between the edges of a stack of sheets of paper by bonding a layer of adhesive bonding material along the exposed edges when the same are stacked together and held tightly in position. Such edge bonding is adequate for light usage such as is found in offices and in the binding of so-called "dead" files and correspondence. However, when it is desired to bond larger pads of paper and when it is desired to bond pads of paper for resale as booklets or for continuous heavy wear, it is often found that a mere bond along the edges of the paper in a stack is insufficient to secure adequate adhesion and sheets become loosened.

This problem can be overcome by providing a film of adhesive material along a peripheral margin of each sheet adjacent to the edges to be bound whereby to establish a bonding zone extending between one-eighth and one-quarter of an inch from the edge of the sheets thereby providing bonding between the marginal portions of the opposed faces of each sheet in the stack instead of merely along their exposed edges. However, such prior apparatus as has been available has not proved satisfactory for this purpose since, in the majority of such machines, the individual sheets of paper were clamped too tightly together thereby preventing the application of adhesive along such marginal portions.

Accordingly, it is an objective of the present invention to provide apparatus for binding sheet material which is arranged to hold the material in a manner facilitating the application of adhesive thereto.

More particularly, it is an objective of the present invention to provide apparatus having the foregoing advantages which holds the material in three different operating stations without disturbing the arrangement thereof.

More particularly, it is an objective of the present invention to provide apparatus having the foregoing advantages which is provided with heating means for setting the adhesive material which can be directed from various positions.

A preferred embodiment of the invention will now be described by way of example only with reference to the following drawings in which like reference devices refer to like parts thereof throughout the various views and diagrams and in which:

FIGURE 1 is a perspective illustration of a binding machine according to the present invention;

FIGURE 2 is an enlarged perspective illustration of a portion of the apparatus shown in FIGURE 1; and

FIGURE 3 is a schematic side elevation of the apparatus shown in FIGURE 1 showing the three positions of the sheet material and the different positions of the heating means in phantom form.

From FIGURE 1 it will be seen that the binding apparatus according to the present invention comprises a body portion or casing **10** having a front panel **11** and a back panel **12** and opposed side panels **13** provided with hand holds **14** therein for carrying of the apparatus.

Towards the upper end of casing **10** clamping table **15** is provided being pivotally mounted about an axis substantially along its point of balance by means of bolts **16** for swinging between a downwardly directed position and a vertically oriented position. Abutment plates **17** are fastened to either side of table **15** for locating a stack of paper such as P thereon and a paper clamping bar **18** is provided, slidably mounted on clamping posts **19** and is lockable in any desired position thereon by means of the spring locking member **20** extending along the interior of bar **18** and movable outwardly to engagement with clamping posts **19** by means of locking levers **21**. The operation of clamping bar **18**, locking member **20** and locking levers **21** is more particularly described in United States Patent No. 3,146,473 issued September 1, 1964, which description has accordingly been omitted from this description for the sake of clarity. Table **15** may be fastened in three different positions by means of bracket **22** provided with a series of holes **23** therethrough for reception of a locking shaft (not shown) connected to and operated by knob **24**.

Towards the lower front portion of casing **10** paper abutment plate **25** is adjustably located on support flanges **26** to which it is releasably fastened by means of knurled screws **27**. An electrical on-off switch **28** and heater timer switch **29** are supported just forward of member **25** for easy access.

Heating for curing of the adhesive applied to paper P is provided by means of a group of infrared heating elements of known design (not shown) which are contained within and supported by reflector housing **30** designed to focus such heating onto paper P and protect an operator from unnecessary discomfort. Reflector **30** is supported on the arched bracket **31** which is swingably mounted by means of bolts **32** to support bracket **33** fastened to the back **12** of housing **10**. Butterfly nuts **34** are adjustable to provide frictional gripping of bracket **31** while rendering the same swingable to and fro between different positions.

In operation, a stack of paper P is first jogged on a separate piece of apparatus known as a jogger to provide an even stack having at least one smooth, regular edge which will provide the bound edge in the eventual stack. The stack of paper P is then manually lifted from such jogger (not shown) and is then brought to the apparatus described above. At this stage, table **15** will be swung downwardly in the position shown in solid lines in FIGURE 3 and the clamping bar **18** may if desired be completely removed from clamping posts **19** although this is not necessary so long as clamping bar **18** is slid upwardly away from table **15**. Paper P is then placed on the surface of table **15** with the smooth even edge abutting against member **25** as shown in FIGURE 3 and with one other edge abutting against one of members **17**. Clamping bar **18** is then manually slid downwardly along posts **19** and pressed firmly into engagement with the upper surface of paper P and locking levers **21** are then twisted outwardly away from one another thereby bringing locking member **20** into engagement with clamping posts **19** thereby forcing clamping bar **18** firmly downwardly against paper P and clamping the same firmly against table **15**.

Button **24** is then pulled outwardly and table **15** is swung upwardly until the clamped edge of paper P is oriented substantially at an angle of about 45° above the horizontal at which point button **24** may be released for locking engagement with bracket **22** thereby affixing table **15** in that position. It is at this station that the adhesive is applied to the edges of paper P substantially in the manner shown in FIGURE 2. With one hand, a tool T is grasped and pushed against the lower side of paper P wedging the same upwardly from the surface of table **15**

and causing the same to bend around clamping bar **18** substantially as shown. This sideways flexing or displacement of paper P will thus expose marginal portions of each of the sheets and adhesive may readily be applied by, for example, brush B and if necessary it may be worked in by repeated strokes of brush B or by flexing of tool T causing relative movement between the individual sheets of paper P thereby working the adhesive further between such individual sheets. Where necessary, the same operation may be repeated by using tool T from the upper side of paper P and flexing the same downwardly around the edge of table **15** and again applying adhesive and working the same in, however, such second operation is not specifically illustrated but it is thought that it will be apparent from an examination of FIGURE 2 and from this description. In the majority of cases, however, sufficient adhesive will be worked between the sheets of paper P to establish a marginal bonding zone of between one-eighth and one-quarter of an inch inwardly from the actual edges of paper P without disturbing the arrangement of paper P in the stack in any way.

As soon as such adhesive has been satisfactorily applied there may, if desired, although this is not always necessary, be applied a layer of cloth material or webbing to the exposed edges of paper P by means of further application of adhesive, but in the majority of cases, the bonding between the sheets alone will be found to be sufficient without such additional material.

When the application of the adhesive is completed, button **24** is again pulled outwardly thereby releasing bracket **22** and table **15** is then swung upwardly into the vertical position shown in phantom form in FIGURE 3 with paper P oriented directly upwardly towards reflector **30**. Electricity may then be switched on by operation of switch **28** and heating may be applied for a predetermined length of time by operation of a timing switch **29**. Where the stack of paper P is excessively thick and in all cases where the adhesive has been well worked in between the individual sheets as described above, it will be found advantageous to apply heat from various different directions in order to secure complete curing of the adhesive. For this purpose, arch bracket **31** may be swung first rearwardly and then forwardly as shown in FIGURE 3 in phantom form without moving table **15** which at all times when in the vertical position, will again be locked in position by means of engagement of the locking shaft (not shown) attached to button **24** in engagement with support bracket **22**. In this way, heat may be applied first from one side and then from the other side of paper P and thereby achieving complete curing of adhesive before paper P is released or disturbed from its predetermined arrangement.

Before using the apparatus for a particular run, i.e., binding of a large number of identical pads P, it may be necessary to readjust the location of abutment plate **25** by undoing screws **27** and moving plate **25** either towards or away from table **15** in order to provide the correct width of paper P exposed beyond clamping bar **18** to permit flexing thereof and introduction of adhesive as described above.

The foregoing is a description of a preferred embodiment of the invention only. The invention is not to be taken as limited to any of the specific features described but comprehends all such variations as come within the spirit and scope of the appended claims.

What I claim is:

Apparatus for binding sheet paper and the like material and comprising: a housing for standing on a support or the like and having a base and side walls; a paper support plate swingably mounted on said housing about an axis extending between opposite sides of said housing; clamping means operable to clamp said paper to said support plate; housing abutment means on said housing for locating said paper on said support plate; threaded fastening members passing through said abutment means and a plurality of threaded holes formed in said housing for receiving the same; plate abutment means on said support plate for further locating said paper thereon; a plate locating member swingably mounted on said plate and having at least one locking opening therein; a locking plunger member slidably mounted in said housing and oriented to register with said opening; heating means supported on said housing substantially vertically above said axis of said plate; a mounting bracket carrying said heating means and hingedly connected to said housing for swinging of said heating means on either side of said axis of said plate; axle members passing through said bracket and said housing; and, threaded means on said axle members operable to adjustably clamp said bracket and said housing and locate said heating means in position.

References Cited by the Examiner

UNITED STATES PATENTS

3,146,473 9/1964 Hoff ..... 11—1

LAWRENCE CHARLES, *Primary Examiner.*