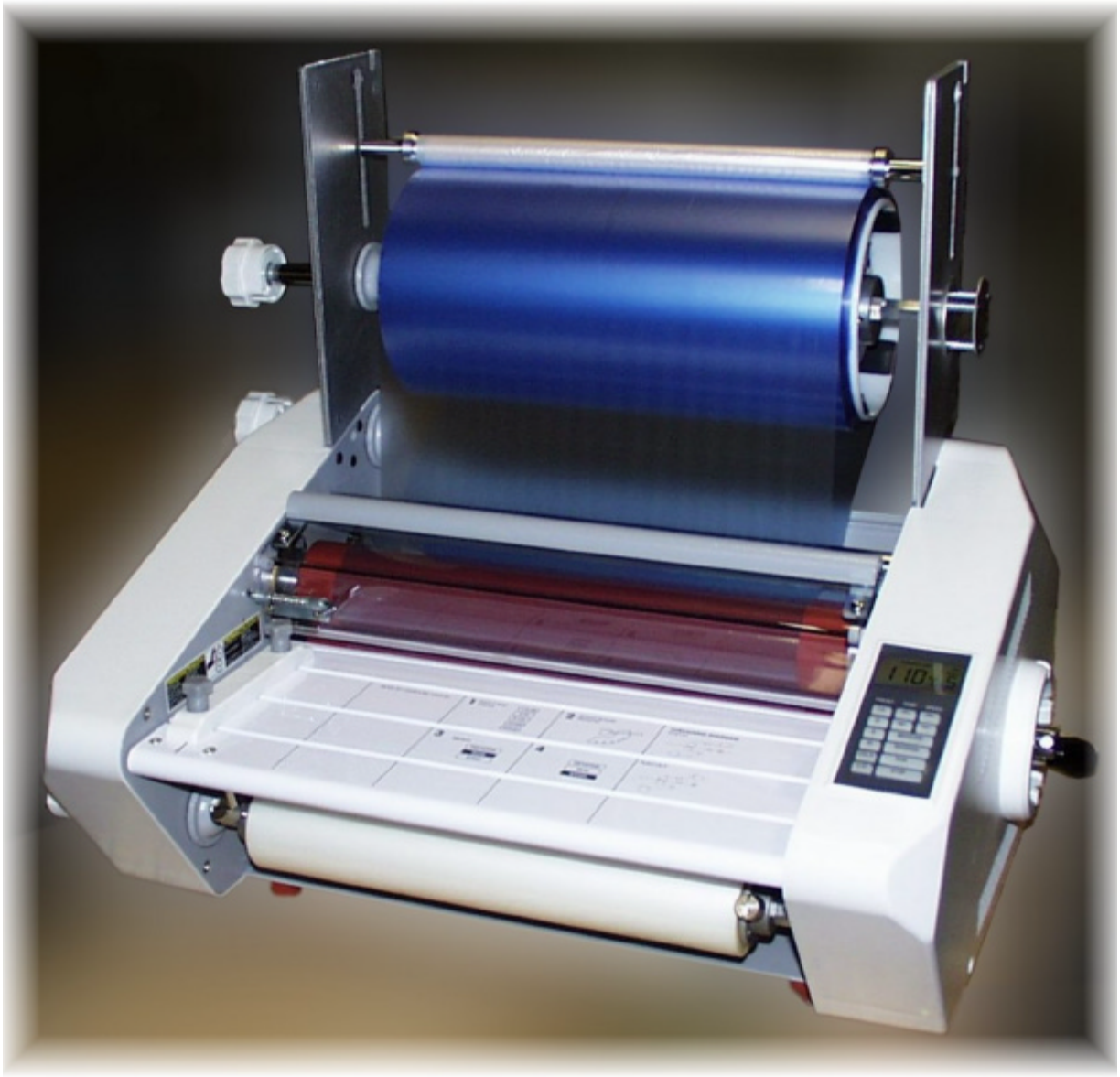
Think & Tinker, Ltd.

Dry Film Laminator

Operation Manual



Model 4200
5200
6200

Think & Tinker, Ltd.
Palmer Lake, CO

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IMPORTANT SAFETY INSTRUCTIONS

YOUR SAFETY AS WELL AS THE SAFETY OF OTHERS IS IMPORTANT TO THINK & TINKER, LTD. IN THIS INSTRUCTION MANUAL AND ON THE PRODUCT, YOU WILL FIND IMPORTANTSAFETY MESSAGES REGARDING THE PRODUCT. READ THESE MESSAGES CAREFULLY. READ ALL OF THE INSTRUCTIONS AND SAVE THESE INSTRUCTIONS FOR LATER USE.

THE SAFETY ALERT SYMBOL PRECEDES EACH SAFETY MESSAGE IN THIS INSTRUCTION MANUAL THE SYMBOL INDICATES A POTENTIAL PERSONAL SAFETY HAZARD TO YOU OR OTHERS, AS WELL AS PRODUCT OR PROPERTY DAMAGE.
THE FOLLOWING WARNINGS ARE FOUND UPON THE MODEL 4200.

THIS SAFETY MESSAGE MEANS THAT YOU COULD BE SERIOUSLY HURT OR KILLED IF YOU OPEN THE PROD-UCT AND EXPOSE YOURSELF TO HAZARDOUS VOLTAGE.

THIS SAFETY MESSAGE MEANS THAT YOU COULD BE BURNED AND YOUR FINGERS AND HANDS COULD BE TRAPPED AND CRUSHED IN THE HOT ROLLERS. CLOTHING, JEWELRY AND LONG HAIR COULD BE CAUGHT IN THE ROLLERS AND PULL YOU INTO THEM.

THIS SAFETY MESSAGE MEANS THAT YOU COULD CUT YOURSELF IF YOU ARE NOT CAREFUL.

WARNING: DO NOT ATFEMPT TO SERVICE OR REPAIR THE 4200 SERIES LAMINATOR.

WARNING: DO NOT CONNECT THE 4200 SERIES LAMINATOR TO AN ELECTRICAL SUPPLY OR ATTEMPT TO OPERATE THE LAMINATOR UNTIL YOU I HAVE COMPLETELY READ THESE INSTRUCTIONS. MAINTAIN THESE INSTRUCTIONS IN A CONVENIENT I LOCATION FOR FUTURE REFERENCE.

WARNING: TO GUARD AGAINST INJURY, THE FOLLOWING SAFETY PRECAUTIONS MUST BE OBSERVED IN THE INSTALLATION AND USE OF THE LAMINATOR.

IMPORTRANT SAFEGAURDS

General

Keep hands, long hair, loose clothing, and articles such as necklaces or ties away from the front of the heat and pull rollers to avoid entanglement and entrapment.

The heat rollers can reach temperatures over 300°F. Avoid contact with the heat rollers during operation or shortly after power has been removed from the laminator. Do not use the laminator for other than its intended purpose.

Do not place the laminator on an unstable cart, stand or table. An unstable surface may cause the laminator to fall resulting in serious bodily injury. Avoid quick stops, excessive force and uneven floor surfaces when moving the laminator on a cart or stand.

Do not defeat or remove electrical and mechanical safety equipment such as interlocks, shields and guards.

Do not insert objects unsuitable for lamination or expose the equipment to liquids.

Electrical

The laminator should be connected only to a source of power as indicated in these instructions and on the serial plate located on the rear of the laminator. Contact an electrician should the attachment plug provided with the laminator not match the receptacles at your location.

CAUTION: The receptacle must be located near the equipment and easily accessible.

Disconnect the attachment plug from the receptacle to which it is connected and keep the power supply cord in your possession while moving the laminator.
Do not operate the laminator with a damaged power supply cord or attachment plug, upon occurrence of a malfunction, or after the laminator has been damaged. Contact THINK & TINKER, LTD.'s Technical Service Department or your dealer/distributor for assistance.

SERVICE

Perform only the routine maintenance procedures referred to in these instructions.

WARNING: Do not attempt to service or repair the laminator. Disconnect the plug from the receptacle and contact THINK & TINKER, LTD.'s Technical Department or your dealer/distributor when one or more of the following has occurred.

-The power supply cord or attachment plug is damaged.

-Liquid has been spilled into the laminator.

-The laminator is malfunctioning after being mishandled.

-The laminator does not operate as described in these instructions.

INSTALLATION

1. **Shipping damage should be brought to the immediate attention of the delivering carrier.**
2. Place the Laminator on a stable flat surface capable of supporting at least 95 lb. (44 kg). The surface should be at least 30 inches high to assure comfortable positioning during operation. All four rubber support feet should be positioned completely on the supporting surface. The supporting surface may also be large enough to hold the material to be laminated.
3. The laminator should be located so that exiting film drops freely to the floor. Accumulation of laminate immediately behind the laminator as it exits the equipment may cause the film to wrap around the pull rollers, resulting in a "jammed" condition.
4. Avoid locating the laminator near sources of heat or cold. Avoid locating the laminator in the direct path of forced, heated or cooled air.
5. Connect the attachment plug provided with the laminator to a suitably grounded outlet only. **Avoid connecting other equipment to the same branch circuit to which the laminator is connected, as this may result in nuisance tripping of circuit breakers or blowing fuses.**

KNOW YOUR THINK & TINKER 4200 SERIES LAMINATOR

A. POWER SWITCH: Figure 1. Located at the back of the machine applies power to the laminator. The LCD display panel will illuminate when position marked "I" is pushed. The off position, marked "O", removes power from the laminator.

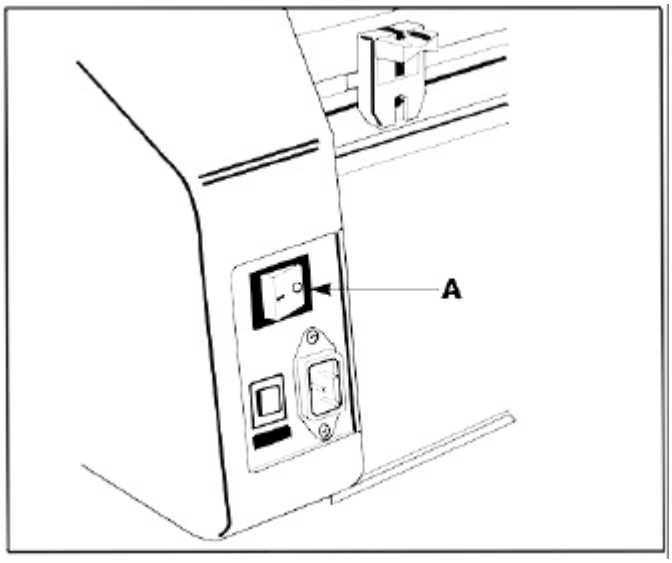


Fig. 1

B. CONTROL PANEL: Figure 2

Display

READY: Indicates when the laminator has sufficient heat for the film gauge selected. Flashes when the temperature is close to the set point.

SPEED: Indicates the speed setting of the motor.

TEMPERATURE: Displays the programmed temperature setting in either Fahrenheit or Celsius.

Function

PRESET FUNCTIONS: (1.5,3,5,10)

When pushed, these buttons automatically set the speed and temperature for NAP LAM II film, 20 lb. paper (copier paper). Refer to the 4200 Series Lamination Guide for preset conditions.

COLD: Turns power to the heaters off for cold lamination.

C/F: Causes the temperature to display in either Celsius or Fahrenheit.

TEMP (▲): Overrides the preset temperature, increasing to the desired setting.

TEMP (▼): Override s the preset temperature, decreasing to the desired setting.

SPEED(▲): When pressed, this button increases the speed of the laminator, overriding the preset condition

SPEED(▼): When pressed, this button decreases the speed of the laminator, overriding the preset condition.

MEASURE: Used to read the current temperature of the rollers.

REVERSE: Reverses roller movement to clear jams and wrap-ups.

RUN: Activates rollers for normal operation.

STOP: Pushing the STOP button stops the rotation of the rollers.

C. FEED TABLE: The Feed Table, Figure 3, is used to position items for lamination. **The laminator will operate only when the Feed Table and Feed Table**

Latch are properly installed.

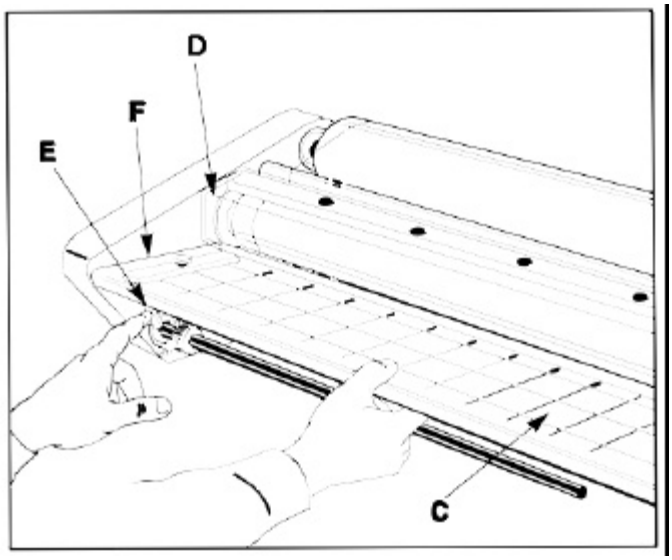


Fig. 3

D. SAFETY SHIELD: Prevents entanglement, entrapment and inadvertent contact with the heat rollers. **The laminator will operate only when the Safety Shield is located in the fully down position. Power to the motor is removed when the shield is raised.**
E. TABLE INTERLOCK LATCH: Used to lock the Feed Table into position and activate an interlock switch. The interlock latch is located on the left underside of the Feed Table. The table cannot be removed without retracting the latch to the right while lifting the table upwards and away from the laminator. **The laminator will not operate when the table is removed and/or the interlock latch is retracted**.
F. FEED GUIDE: The Feed Guide, Figure 3, permits alignment of the item(s) to be laminated. To position the adjustable guide, loosen the knob on the top of the guide, slide it to the desired position and tighten the knob to secure the Feed Guide in place. The Feed Guide is used to keep longer items straight. The Feed Guide may also be used to feed smaller items side by side by positioning the guide towards the center of the Feed Table and placing smaller items against each side of the Feed Guide as they are being introduced into the nip point of the heat rollers.
G. HEAT ROLLERS: Silicone rubber coated steel tubes, heat the laminating film and compress the heated film to the items being laminated. Heat is provided by an internal heating element. The heat rollers are motor driven for ease of loading new film.
H. IDLER BAR: The idler bars, located near each supply roll, are used to direct the film to the heat rollers. The bottom Idler Bar is movable to ease film loading.
I. PULL ROLLERS: The pull rollers, located at the back of the laminator, are motor driven. They simultaneously pull the film and improve the quality of the laminated item.

J. CIRCUIT BREAKER: Electrical safety device, located on the back of the laminator near the power cord, can be reset by the operator if tripped (Figure 4).

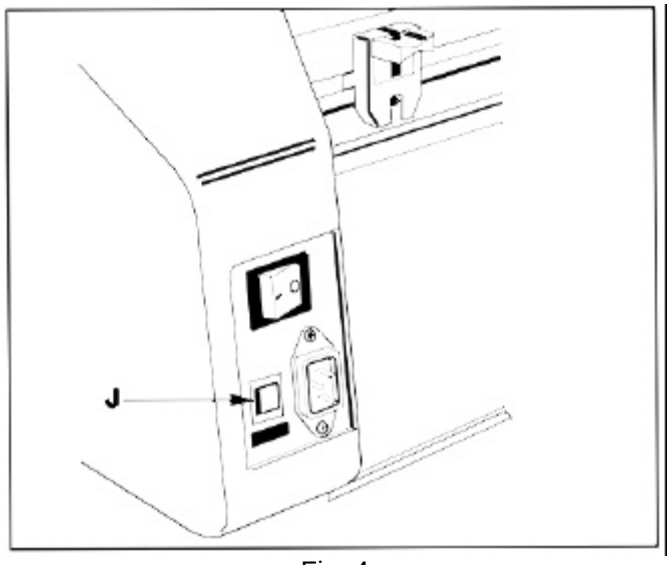


Fig. 4

WARNING: If the breaker trips a second time after being reset, contact your local THINK & TINKER, LTD. Technical Representative or dealer/distributor for assistance.

K. FILM SHAFT & CORE ADAPTERS: The film shaft holds the film supply and the core adapters hold the rolls of film on the shaft, (Figure 5).

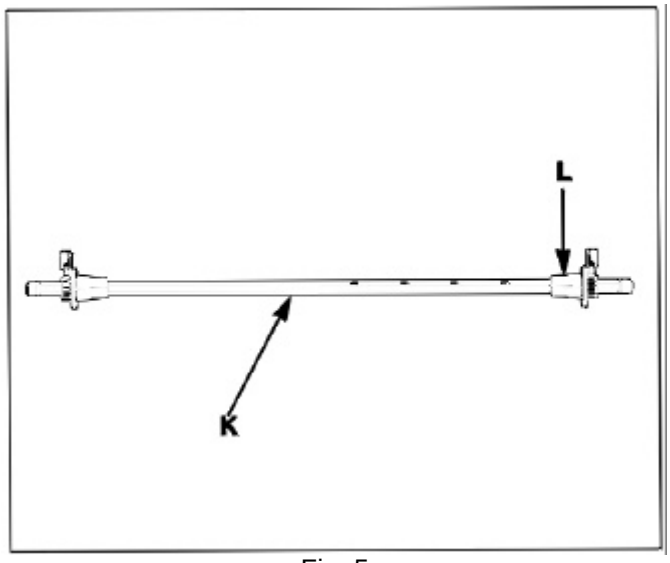


Fig. 5

L. LOCKING COLLARS: Used on the film roll shafts to prevent the rolls of film from shifting side to side.
M. FILM WEB: Laminating film loaded into the machine.
N. NIP POINT: The point at which the top and bottom rollers come into contact. The Nip Point of the heat rollers is the place at which the items for lamination are introduced into the laminator.
O. ROLLER PRESSURE HANDLE: Adjusts the amount of roller pressure needed for various laminating and mounting applications, (Figure 6).
Laminating: adhere in multiple layers.
Mounting: bond to a frame or support.
Heavy Gauge: laminating films thicker than 1.5 mil / 38 mic

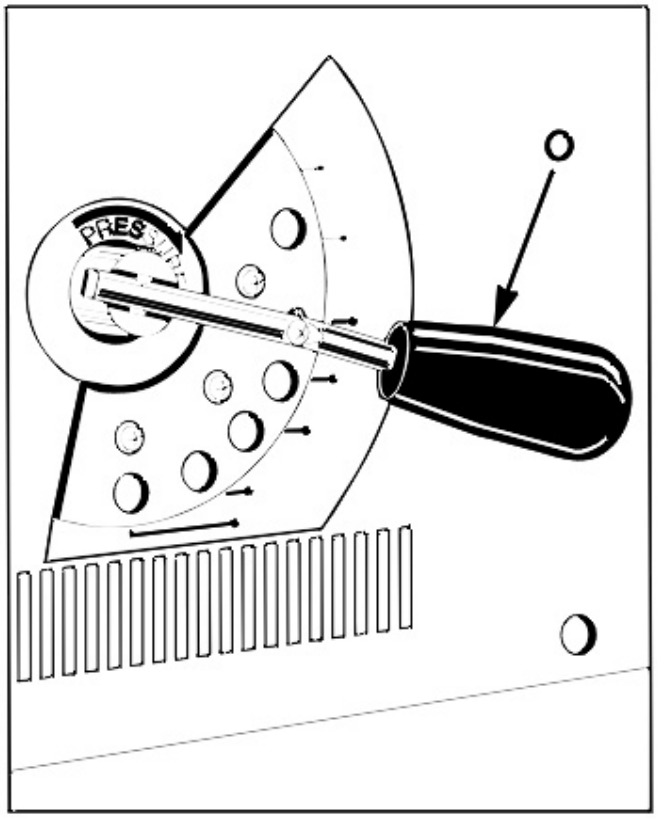


Fig. 6

P. REAR SLITTER: Used to cut off the laminated web, (Figure 7).

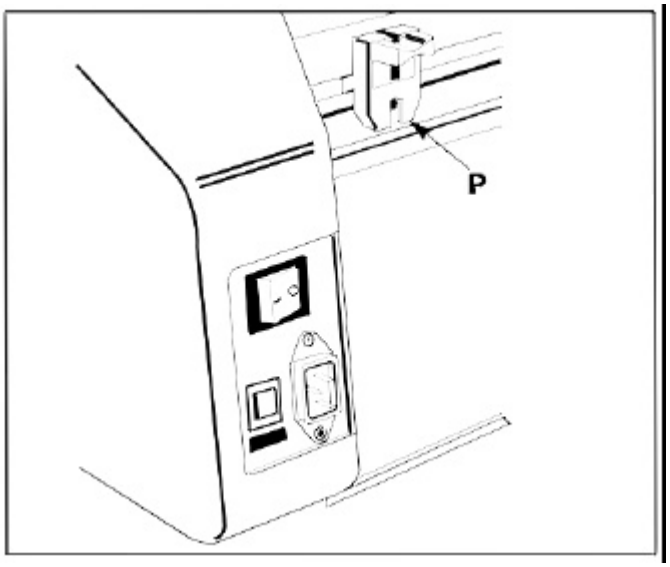


Fig. 7

Q. FILM TENSION ADJUSTMENT: Allows the operator to increase or decrease film web tension as needed to reduce curl and wrinkles, (Figure 8).

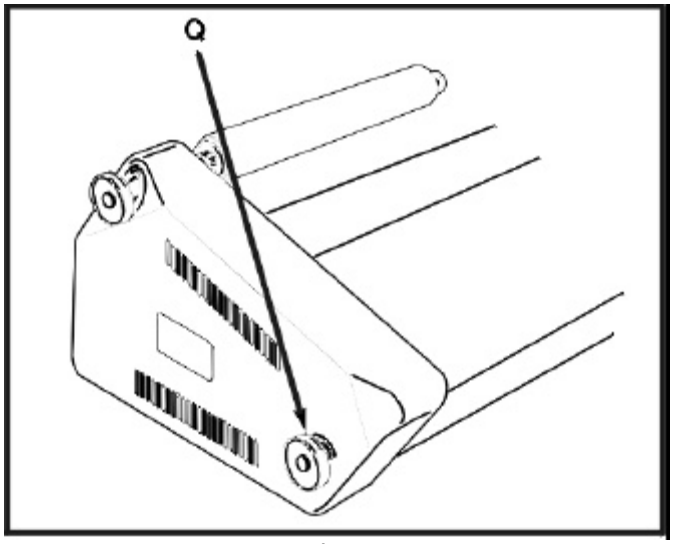


Fig. 8

R. TAKE UP ASSEMBLY: Rewinds the release liner of the pressure sensitive films, mounting films and used foil. Comes standard on the Model 8200 and is optional for the Model 4200/Model 5200 models.

Is the start position of the take up assembly switch.

Is the stop position of the take up assembly switch.

OPERATING INSTRUCTIONS

1. Turn the laminator on (I) at the main power switch located at the back of the machine (Figure 9).

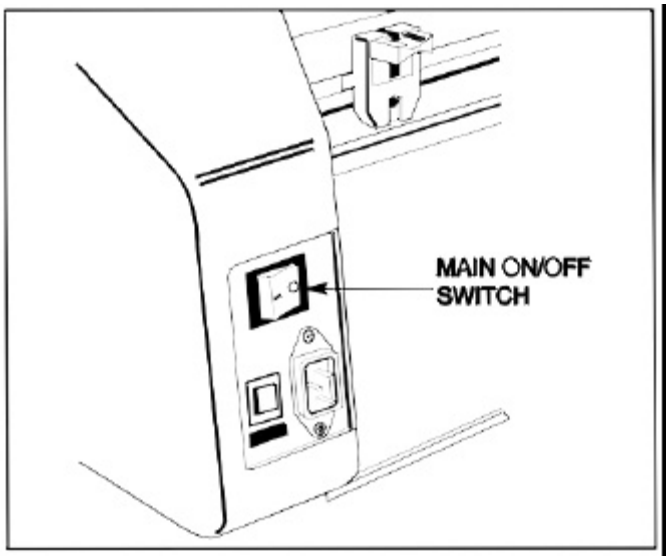


Fig. 9

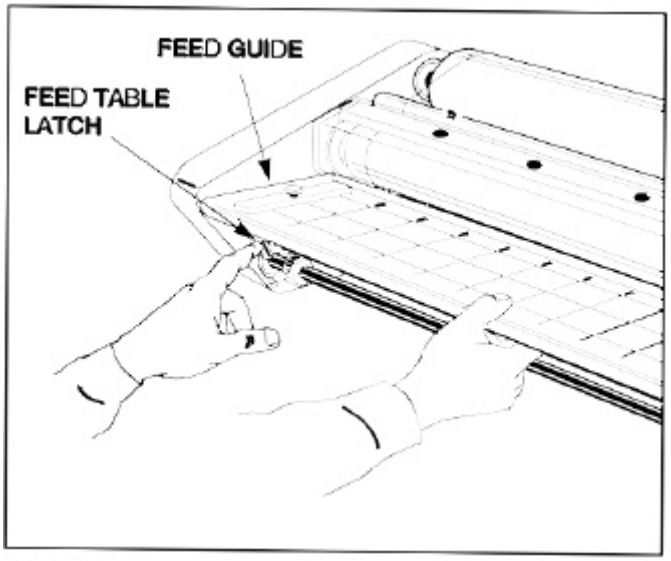
2. **CAUTION:** Make sure the safety shield and feed tray are in their proper positions.

3. The laminator will automatically default to the **COLD** setting which is used for PSA (pressure sensitive adhesive) film. For thermal film press the button that corresponds to 1.5, 3, 5, or 10 MIL film. **The**

laminator will automatically set the speed and temperature for the respective NAP II film and 20 lb. bond paper (copier paper). If you are using NAP I film the heat and speed settings will be different. Refer to the Lamination Guide chart in section LAMINATION GUIDE AND THE ART OF LAMINATING for these settings. The settings in the guide are suggested starting points and will vary with different types of items to be laminated.

4. **Do not begin laminating until the READY LCD illuminates.** The normal warm-up time is approximately 10 minutes.
5. Position the item(s) to be laminated on the Feed Table.
6. Press the **RUN** button. The rollers will begin to turn. Wait for the heat line to disappear, then push the item(s) into the nip point of the heat rollers. Additional items can be laminated without stopping and starting the laminator.
7. Should a jam occur (wrap-up), press the **STOP** button. Refer to the section CLEARING A FILM JAM for specific instructions.
8. Stop the laminator when all of the items have completely exited the rear of the machine.

fig. 10



9. Allow the laminator to remain powered if it is anticipated that it will be used within a short period of time.

FEED TABLE REMOVAL

Refer to Figure 10 and follow the procedures to remove the feed table:

1. Lift the safety shield to its full upright position.

2. Slide the Feed Table latch to the right.

3. Lift the table' upwards and away from the laminator.

FILM LOADING & THREADING

Refer to Figure 11 or the film treading diagram on the feed table of the laminator for illustrations of properly loaded film.

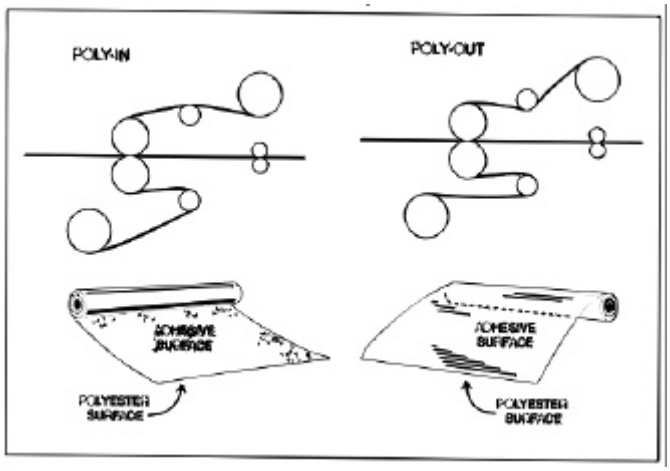


Fig. 11

The 4200 uses Poty-In film on 1" cores. Poly-In means the adhesive side of the film is on the inside of the web (Figure 6). The shiny side of clear film must contact the heat rollers. The dull side of the film contains the adhesive. Use extreme caution when loading de-lustered (matte) film as both sides appear dull.

The top and bottom rolls of laminating film must be of the same width and be present simultaneously. A small amount of adhesive will "squeeze out" during lamination. Hardened adhesive deposits can damage the heat rollers. To avoid any damage, rotate the rollers at slowest speed if the READY LCD is not illuminated. Refer to the section entitled CARING FOR THE Model 4200/5200 LAMINATOR for instructions regarding removal of the accumulated adhesive.

Adhesive will deposit on the rollers if:

-Only one roll is used.
-Different widths of rolls are loaded together.
-Either roll is loaded adhesive side against a heat roller.
-One or both rolls of film are allowed to run completely off its core.

Always change the top and bottom supply rolls at the same time. Near the end of each roll of THINK & TINKER, LTD. laminating film is a label stating "Warning-End of Roll". The appearance of this label on either the top or bottom roll requires that new rolls of film be installed as soon as the item presently being laminated completely exits the rear of the laminator. Do not introduce any additional items into the laminator when the warning label is visible.

Method Using Film Threading Card

The following procedure uses the film threading card provided with new rolls of THINK & TINKER, LTD. film.

The laminator should be cool to the touch before proceeding.

1. Turn the main power switch on (I). Remove feed table.

2. Cut remaining top and bottom film webs between supply rolls and heat rollers. Be careful not to cut the heat rollers.

3. Raise the safety shield to upright position, and pull the top piece of film down.

4. Do not allow remaining film to pass through the laminator if there is any exposed liquefied or tacky adhesive. **Liquefied or tacky adhesive will deposit on the heat rollers if the following procedure is not observed.** Grab hold of the web, (top and bottom film), and install feed table under the web. Lower the safety shield and press the SPEED (➘) button to indicate 3 or less on the display panel. Hold down the **RUN** and **REVERSE** buttons together and guide the web out the front of the laminator. Make certain no exposed adhesive contacts the heat rollers and the film completely exits the laminator.

5. Release the buttons and press **STOP** after the web has cleared the heat rollers.

6. Lift safety shield to the full upright position.

7. Remove the feed table.

8. Lower the bottom idler bar, (Figure 12).

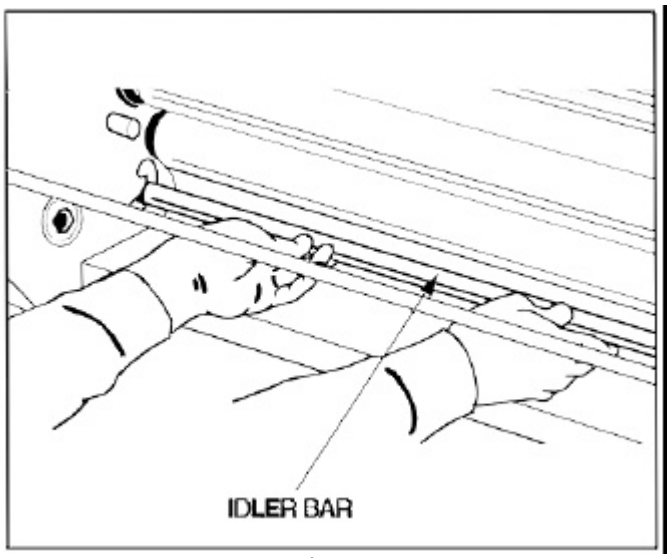


Fig. 12

9. Remove the bottom film shaft by sliding the shaft to the right until the left side of the shaft clears the hex shaped brake hub. Loosen locking screw on left retaining collar of film supply shaft, and slide collar off. Pull shaft partially out of film tube, then push back in to knock out left core adapter. Pull shaft all the way out and rotate tube 180 degrees. Use shaft to knock out remaining core adapter.

10. Slide one core adapter into right side of new roll of film ensuring that the film will unroll from the bottom on Poly-In film and from the top for Poly-Out film. Slide the film shaft into the core adapter and tube from the right side. Place the other core adapter on the shaft protruding from the left side then replace retaining collar. Tighten locking screw

11. Unroll 2 ft. (61 cm) of film. Push the leading edge under and around bottom film guide. Slide film guide back into place and drape film over the front support for the feed table, (Figure 13).

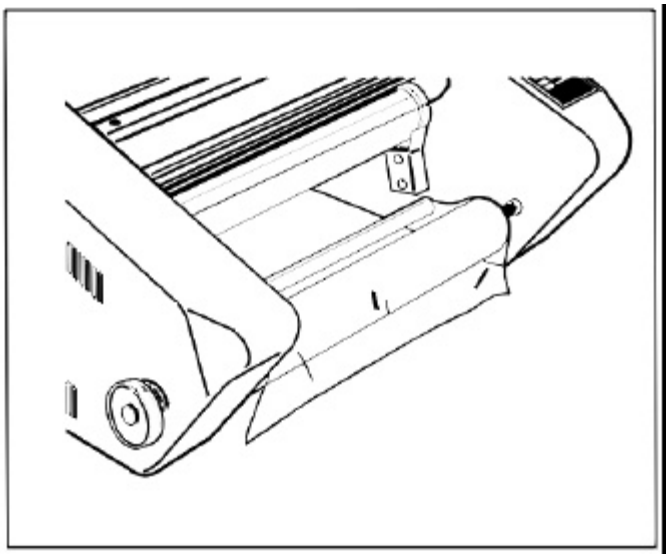


Fig. 13

12. Remove top film supply roll from laminator. Repeat steps 9 and 10 from above ensuring the film will unroll from the bottom after the film supply shaft is placed back on the laminator.

13. Unroll 2 ft. (61 cm) of film. Drape the film over the top idler bar and completely cover both heat rollers, (Figure 14).

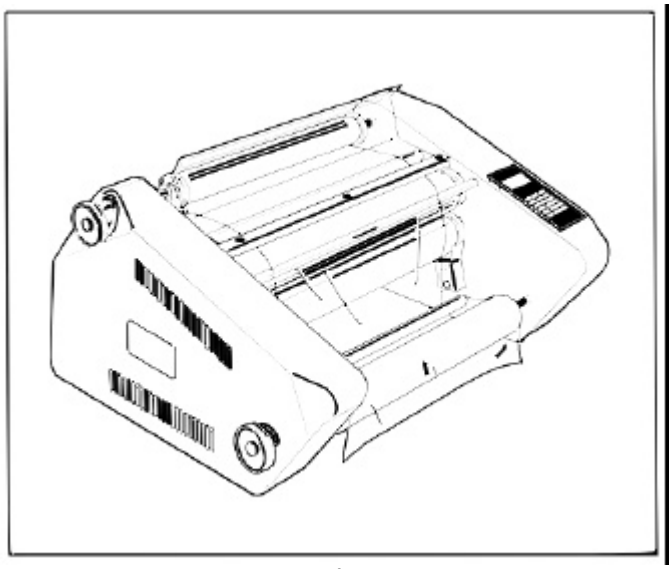


Fig. 14

14. Slide the feed tray under the piece of film that is draped over the bottom roll. Reinstall the feed table so that the bottom roll of film is resting on the tray.

15. Slide the threading card between the feed tray and the film web lying on the tray, and gently push into the nip area of the heat rollers (Figure 15).

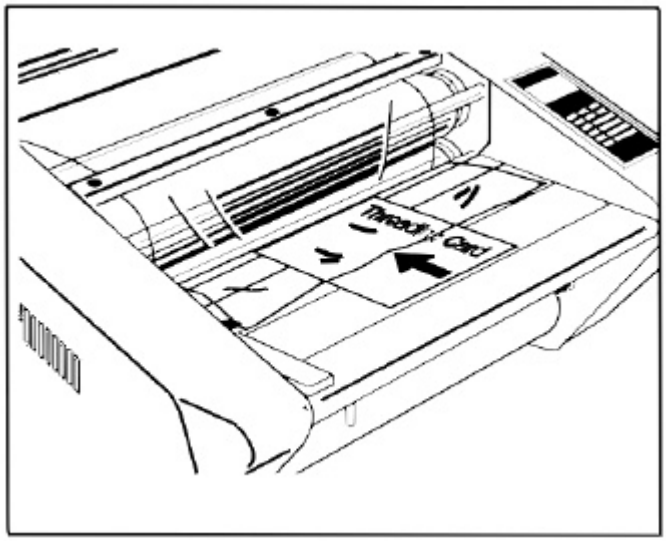


Fig. 15

16. Lower safety shield then push the RUN button. Watch the leading edge of the threading card to ensure that it enters the nip area of the heat rollers and is being pulled into the laminator. The card will guide the web of both film rolls into the heat rollers. Push the STOP button once the threading card has exited the rear of the laminator.

17. Check film alignment. See section entitled FILM ALIGNMENT PROCEDURE for instructions if installed film needs alignment.

CAUTION THE FOLLOWING PROCEDURE IS PERFORMED WHILE THE LAMINATOR IS

USE EXTREME CAUTION. AVOID CONTACT WITH THE HEAT ROLLERS.

Method For Tacking New Film to Existing Film

The following describes a method for loading film whereby the existing film present on the heat rollers may be used in place of the threading card to draw the new film through the laminator. The adhesive of the existing film must be tacky or liquefied. Leading edges of the new film will be overlapped onto the tacky adhesive of the old film. The existing film and the new film will be pulled through the laminator together.

1. Preheat the laminator. Remove the feed tray.

2. Cut remaining top and bottom film webs between the supply rolls and heat rollers.

3. Raise safety shield to full upright position.

4. Do not allow the adhesive side of the film to contact the heat or pull rollers. Liquefied or tacky adhesive deposited on heat rollers will require the rollers to be cleaned per the section entitled CARING FOR THE THINK & TINKER DRY-FILM LAMINATORS.

5. Remove bottom film supply roll from laminator and lower bottom film guide.

6. To load new film on film supply shafts repeat steps 9 and 10 in subsection Method Using Film Threading Card.

7. Unroll enough film from the bottom roll of film to slide under the bottom idler bar and tack to the existing film. Slide the bottom idler bar back into place and replace supply roll shaft.

8. Replace the top supply roll shaft and unroll enough film to tack to the existing top roll of film.

9. Install feed table and lower safety shield.

10. Press **SLOW** button for slowest speed setting and press the **RUN** button.

11. Observe the film being pulled through the laminator to assure that the remaining existing film and the new film are advancing concurrently. Any separation between the films will require stopping the motor immediately and the situation corrected.

12. Press the **STOP** button once the newly threaded film is completely exiting the laminator.

MOUNTING

Tips For Threading Pressure Sensitive Film

1. Use Kraft paper whenever the items to be laminated are narrower than the film you are using or you can not consistently feed the items without a gap.

2. Thread the film completely through the machine before you cut the release liner and connect it to the take up roller.

3. Whenever possible, pull the remaining web of film out the front of the laminator after the finished item has been removed.

Pre Treating Mounting Boards
You may wish to pre coat mounting boards ahead of time with pressure sensitive mounting film.

1. Load the laminator as shown in Figure 16.

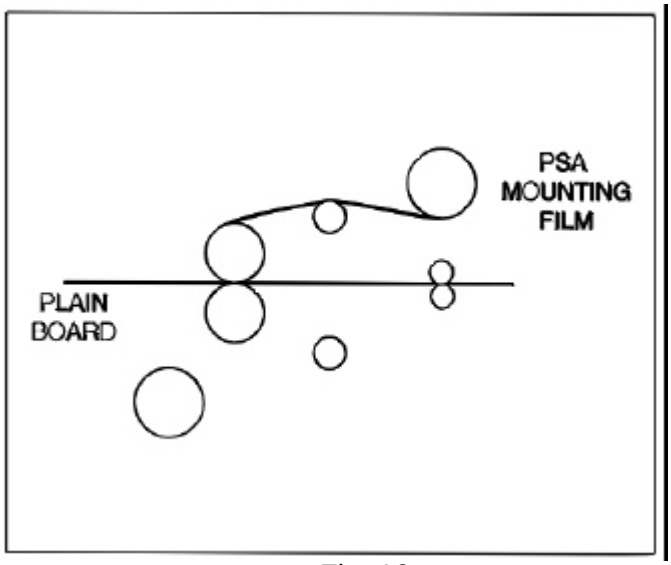


Fig. 16

2. If the boards are the same width as the pre coat film or you can consistently feed the boards butted together, no special precautions are necessary. If not, Kraft paper must be loaded on the bottom film supply shaft to protect the heat rollers.

3. Adjust the Roller Pressure Handle to the proper mounting setting. No heat required.

4. Start a leader board into the rollers. Stop the motor before it clears the rollers. Butt the leading edge of the next board against he trailing edge of the leader board and press **RUN**. Continue feeding one board after another keeping pressure on them to prevent gaps from forming. If you have loaded Kraft paper, it is not necessary to use a leader board or worry about gaps.

Mounting and Over-lamination
This process requires a previously laminated item and a PSA pre treated mounting board. Refer to Figure 17.

1. Fold back the first inch of release liner on the board and attach the leading of the print to the exposed adhesive.

2. Adjust the Roller Pressure handle to the proper setting.

3. Place the leading edge of the board and print on the feed table, press the **RUN** button.

4. Guide the board into the rollers as squarely as possible.

5. Once the board has cleared the back of the machine, press the **STOP** button and cut the web.

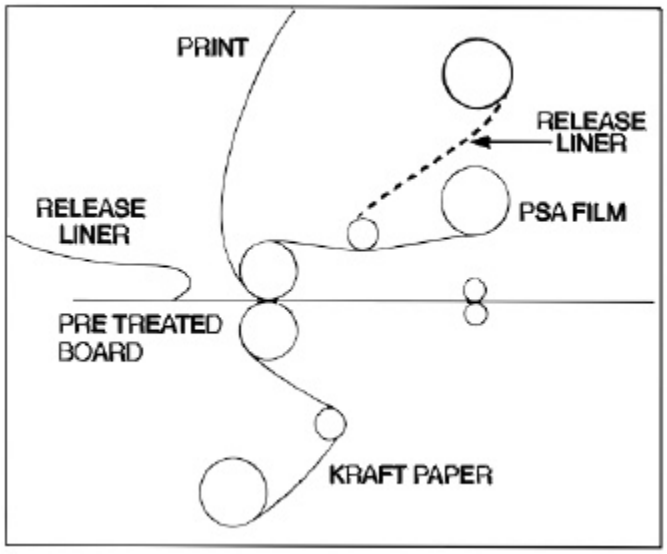


Fig. 17

Decaling; PSA or Thermal film
Two Passes This two pass operation requires pressure sensitive laminating film on the top supply shaft and pressure sensitive mounting film on the bottom supply shaft or thermal laminating film on the top and thermal mounting film on the bottom.

First Pass

1. Load the laminator as shown in Figure 18.

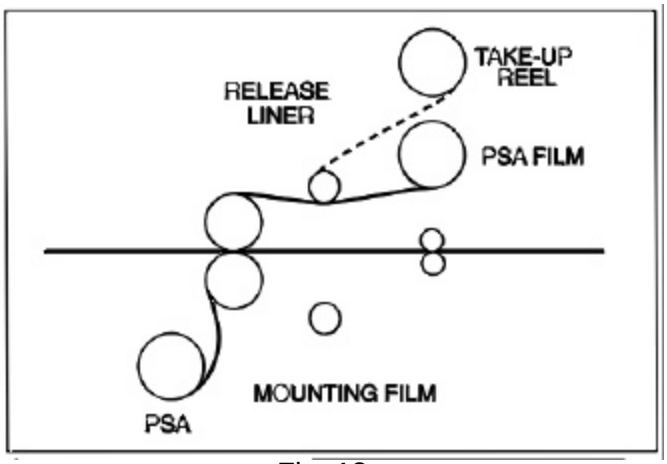


Fig. 18a

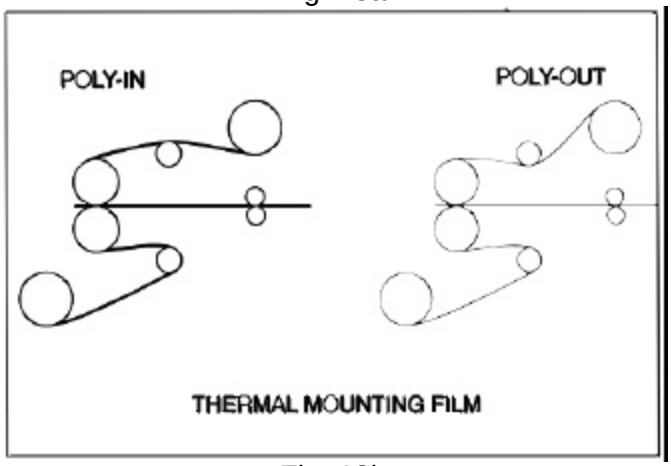


Fig. 18b

2. Adjust the Roller Pressure handle to the proper laminating setting.

3. Place the item to be laminated on the feed table, then press the **RUN** button.

4. Guide the item into the heat rollers.

5. Once the item has cleared the back of the machine, press the **STOP** button. Remove the web and trim out the encapsulated product.

Second Pass

Refer to Figure 19 for the second pass process.

1. Adjust the roller pressure handle to the proper Mounting setting and set the motor speed to 3.

2. Peel back the leading edge of .the release liner of the laminated item approximately 4 inches.

3. Place the item on the mount board. Tack the exposed edge of the item, from the center out, to the leading edge of the board.

4. Butt the leading edge of the board up against the heat rollers.

5. Drape the encapsulated item over the heat shield and top roll of film.

6. Press the **RUN** button and immediately grasp the release liner for separation as the board is pulled into the rollers. **Do not allow the release liner to be pull into the rollers**.

7. After the board has cleared the rollers press the **STOP** button and, cut the web.

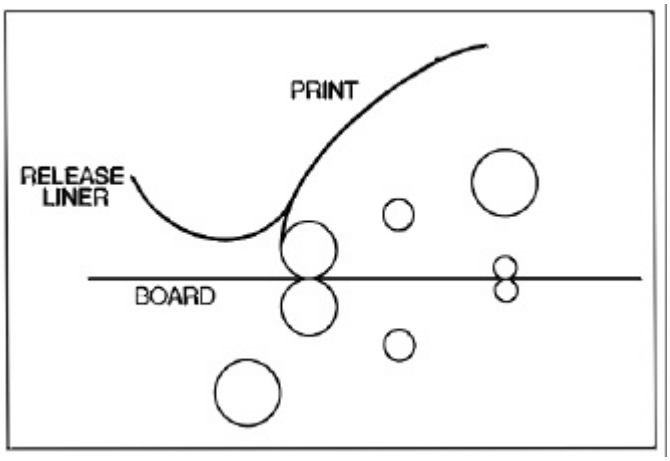


Fig. 19

Mounting Only

This process requires a PSA pre treated board only. **Refer to Over-lamination and Mounting,** (Figure 20).

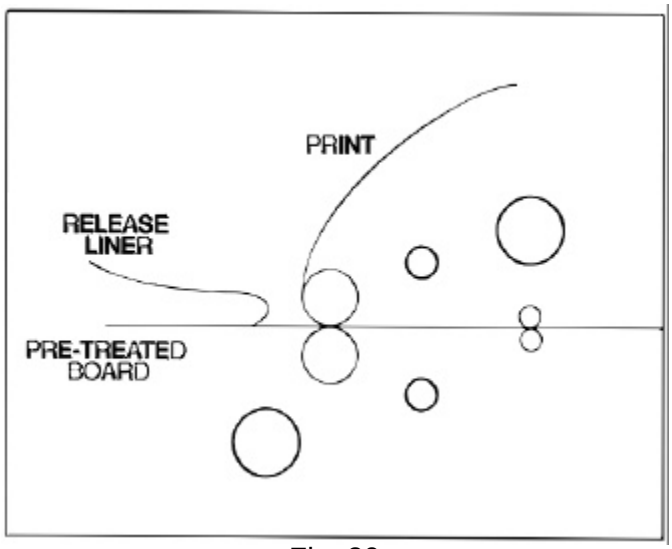


Fig. 20

Running Foil

Please consult you local THINK & TINKER, LTD. sales representative or your dealer/distributor before attempting to run foil through the laminator.

FILM ALIGNMENT PROCEDURE
The film supply shafts of the 4200 come with pre-drilled holes on the right side, (Figure 21). The 4200 is drilled for 9" (21 cm) and 12" (31 cm) film widths. Loosen the locking screw on the right side retaining collar and move to the corresponding hole to match the width of your roll of film. Tighten the locking screw in the pre-drilled hole.

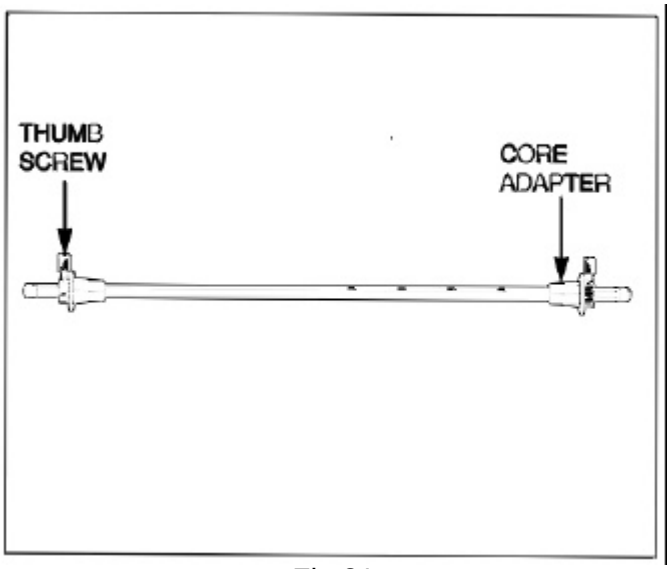


Fig.21

FILM TENSION ADJUSTMENT
Proper film tension, known as brake tension, is the minimum amount required to eliminate wrinkles in the finished item. The film tension is set at the factory. Tension adjustments are not necessary if you are using 1.5 or 3 mil THINK & TINKER, LTD. film unless the lamination is curling up or down. Generally, 5 and 10 mil film require more tension; and, as the film roll becomes smaller, tension increases, requiring more adjustments. Film tension should be checked occasionally to assure that the adjustment is correct.
The film should be taut. A properly adjusted roll of film should not require excessive force to turn by hand. Film tension should be enough to introduce a miner amount of drag as the film unrolls. Insufficient tension causes wrinkles, while too much tension causes stretching (necking). Uneven tension between the top and bottom rolls creates curl. Too much upper tension creates upward curl. Too much tension on the bottom causes downward curl.

1. The machine is equipped with external tension knobs located on the left side, (Figure 22). Turning the knobs clockwise increases the tension while counterclockwise decrease the tension.

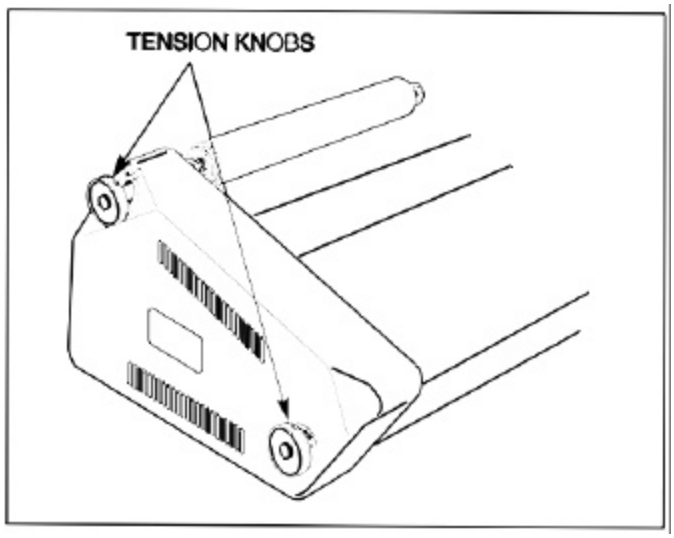


Fig. 22

2. Laminate some test samples to check for proper tension. Further adjust if necessary.

CLEARING A FILM JAM (Wrap-up)
Film jams (wrap-ups) may occur if the film is loaded backwards or if the area at which film exits the equipment is blocked. The film, when jammed, wraps around heat or pull rollers. To clear a jam it is necessary to rotate the rollers in the reverse direction. When pressed, the REVERSE button on the control panel will cause the rollers to reverse. To clear a jam:

1. Immediately stop the laminator by pressing the **STOP** button.
2. Set the speed indicator to 2.
3. Raise the safety shield and remove the feed tray.
4. Cut the top and bottom film webs.
5. Grasp the loose ends of the web, pull straight and install the feed tray so the web is on top of the tray. Lower the safety shield. Press and hold down the **RUN** and **REVERSE** buttons together; guide the film out of the heat rollers.
6. Once the jam has cleared the heat rollers, press the **STOP** button.
7. Thread the film per section FILM LOADING & THREADING.

SPEED/TEMPERATURE GUIDE AND THE ART OF LAMINATION

Do not attempt to laminate abrasive or metal objects such as staples, paper clips and glitter, as they may damage the heat or pull rollers.

Do not force items into the nip area of the heat rollers. An item that is not easily drawn into the laminator by the heat rollers is probably too thick to laminate.

Wrinkles may result if an attempt is made to reposition an item once it has been grasped by the heat rollers.

Do not stop the laminator before an item has completely exited the pull rollers. Even a momentary stop will cause a mark (heat line) on the laminated item.

Good, consistent lamination is a result of combining proper heat, tension and dwell time. Dwell time is controlled by the speed of the motor and is defined as the amount of time the material to be laminated is compressed between the heat rollers. When one of the film gauge buttons is selected the laminator automatically sets the speed and temperature for that film and 20 lb. paper (copier paper).

CAUTION: THE FOLLOWING PROCEDURE IS PERFORMED WHILE THE LAMINATOR IS HOT. USE EXTREME CAUTION.

As a general rule, thicker items and film need to run at slower speeds because they extract more heat from the rollers at a quicker rate. Setting the speed control at slower settings gives the laminator longer dwell time thus allowing proper lamination of thick items. Thinner items, such as standard copier paper (20 lb. bond) and tissue paper, extract less heat from the rollers and can be run at faster speeds.

The **WAIT** LCD may illuminate if the speed is set too fast for the material being laminated. Either lower the speed setting or press the **STOP** button and wait until the **READY** LCD illuminates.

Operation of the laminator for more than thirty minutes at a time may necessitate a lower speed setting. It is recommended that, during periods of long runs, the items being laminated are alternated between thick and thin. **Do not combine thick and thin items at the same time, as this will result in a poor edge seal around the thinner material.** If you are unsure that the laminator is set at the proper speed for the item to be laminated, run a test piece (scrap) of the same or similar material through the laminator. This procedure is recommend because rotating the heat prior to lamination will more evenly distribute the heat. Make speed adjustments if necessary.

The Model 4200/5200 Lamination guide provides general guidelines for suggested heat and speed settings to use with certain material and laminating film combinations. A guide is located on the left side cover of the unit and in the front of this manual. **This is only a general reference guide. Different settings may be suitable as the warm up time, lamination time and materials change.**

CARING FOR THE THINK & TINKER MODEL 4200/5200 LAMINATOR

THINK & TINKER, LTD. offers Cleaning kits as well as Extended Maintenance Agreements. Contact your local THINK & TINKER, LTD. Service Representative or your dealer/distributor for additional information.

The only maintenance required is to periodically clean the heat rollers. The following procedure will help keep the heat rollers free of adhesive that has been deposited along the edge of the laminating film. Proper alignment of the rolls of film reduces the amount of “squeeze out”.

Do not attempt to laminate adhesives marked ‘Flammable”.

Do not laminate glitter and/or metallic items. Damage to the rollers may result.

Cleaning The Heat Rollers

WARNING: Do not apply any cleaning fluids or solvents to the rollers. Some solvents and fluids could ignite on heated rollers.

WARNING: Do not apply any cleaning fluids or solvents to the rollers. Some solvents and fluids could ignite on heated rollers .

- Never clean rollers with sharp or pointed objects.
- Hardened adhesive deposits on the rollers can cause damage to the rollers. Rotate the rollers at the lowest speed setting on the control panel.

1. Remove the film from the laminator following the procedure outlined in steps 1 through 5 of the section FILM LOADING AND THREADING, Method Using Film Treading Card.
2. Press the **STOP** button.
3. Preheat the laminator until the **READY** LCD illuminates.
4. Rub the top and bottom heat rollers with a 3MTM ScotchBrite™ pad.
5. Install the feed table and lower the safety shield.

6. Press the **RUN** button to rotate the heat rollers to an unclean portion. Press the **STOP** button. Continue this process until the complete surface of both rollers are clean.

7. Follow the procedure in section FILM LOADING AND THREADING, Method Using Film Threading Card to reload the laminator.

***NOTE:** Do not use metal scouring pads to clean the rollers.

APPENDIX

Loading Dry-film Photopolymers

Think & Tinker laminators have been designed to be compatible with dry-film photopolymers from all major manufacturers. All of these products are configured to have a photoimageable adhesive on the inside surface protected by a removable liner (peel sheet) made of polyester or polyolefin. When you are laminating one of these films, it is necessary to strip away the peel sheet just prior to pressing the adhesive to the surface of your substrate (usually copperclad). The following instructions specifically address laminating Think & Tinker photoresist and soldermask, but are applicable to any dry-film photopolymer. Before you start you will need to remove the feed tray and heat shield from the laminator. Set them in a safe place. They will have to be remounted before you can begin laminating.

We might as well get started.

Insert the appropriate adapters into the plastic core of the photopolymer roll. To insure accurate tracking, orient the core adapters so that the set-screws engage the same face of the hex shaft. If you are laminating with film on 3" cores, position the adapters inside the roll about 1" from each end. It is usually easier to mount the adapters to the shaft before inserting into the film roll. Mount the adapters on the shaft so the you can get to the set screws in the hubs after the dry-film is mounted.

If you are using larger rolls of film wound about 6" cores, position the black core adapters (core spiders) so that the set screw in each hub is facing the rib that runs down the inside of the plastic film core. This will insure that set screws bite into the same face of the hex shaft.

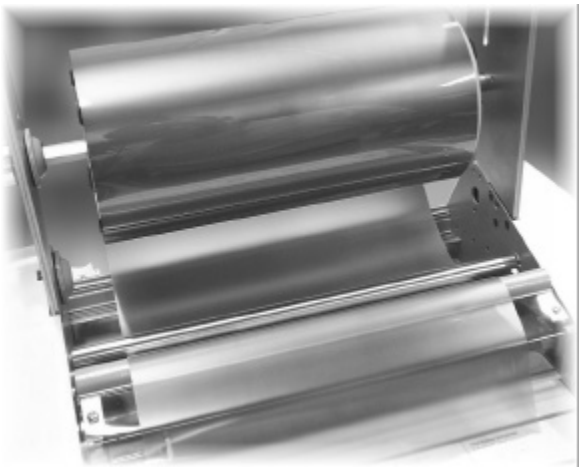
Insert the hex shaft through the hubs of the core adapters and center the roll before tightening the set screws. When you are holding the shaft horizontally, with the brass shaft bushing on the right side, the photoresist should hang down off of the BACK of the roll. This orientation will assure that the proper side (adhesive side) of the photoresist is pressed against the copperclad when it is fed through the lamination rollers.

Mount the roll of sacrificial backing material (polyester film, or lint free Kraft paper) onto the bottom hex shaft so that, as above, the film hangs down off the BACK of the roll when the brass shaft bushing on the right side. Position the roll in the center of the shaft. Mount the shaft into the laminator by pushing the brass bushing end into the spring loaded shaft seat and the hex end into the hexagonal receptacle of the film tensioner. As above, make sure that the thumb screws in the core adapters grip on the same face of the hex shaft.

Feed the backing film under the bottom idler and pull up enough film so that you can lay the end over the top orange roller. Leave the idler in the lower position.

Move the pressure handle to the second notch (5 mm) to engage the rollers. Turn on the laminator, push the COLD and RUN buttons to start the drive motor without applying heat to the fusion rollers. Using a feed board (thick piece of cardstock or scrap copperclad), push the backing film into the first set of rollers until the rollers grab the feed board. Let the laminator draw the board all the way through the two sets of rollers.

Mount the dry-film into the laminator by pushing the brass bushing end into the spring loaded shaft seat and the hex end into the hexagonal receptacle of the film tensioner. Reach under the film roll and pull a small amount of film (12“) to the front of the laminator. Pass it under (back to front) the stripping idler shaft. This shaft will assist in automatically peeling off the polyolefin release liner to expose the adhesive prior to lamination.



Use two small tabs of tape to separate a short length (about 12”) of release liner from the dry-film. This sounds harder to do than it is. With a little practice, this becomes quite easy.

Peel the release liner all the way back to the stripping idler and lay it onto the top of the roll of dry-film.

Mount the take-up shaft into the frame extenders and set onto the top of the stripped release liner

Fold the liner forward around the take-up shaft and tuck it into the “pinch” region between the shaft and the roll of film. As the film feed off of the roll, the rotation of the film roll will cause the take-up shaft to rotate in the opposite direction, winding up the release liner as it is automatically stripped off of the dry-film. By coupling the stripping action to the feed rate of the dry-film, wrinkling and excessive film advance is eliminated.

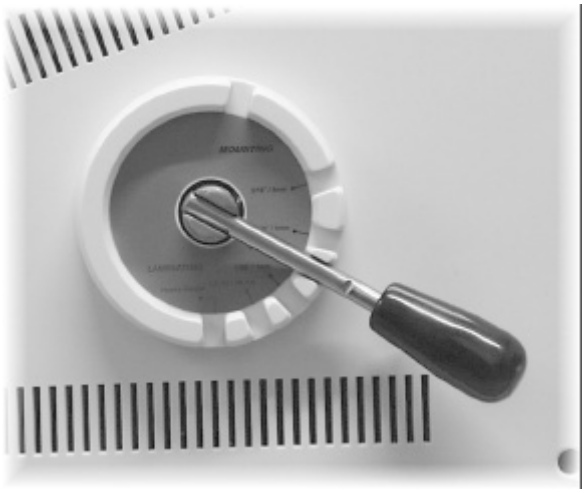
Using a stiff card (or piece of scrap copperclad), push the dry-film into the pinch region between the two orange rollers. Turn on the laminator and press the COLD and RUN buttons. This will engage the drive motor and cause the card, dry-film, and backing film to be pulled through the two sets of rollers. Run film through until the card falls out the back of the laminator. While this is going on, observe the take-up shaft. If all is well, the release liner will be stripping away from the dry-film and dutifully winding up on the shaft. Also watch to make sure that the backing film is feeding properly and is lined up edge to edge with the dry-film. Turn off the drive motor by pressing

STOP.

If there is any misalignment between the backing film and the dry-film, you will need to move the backing film roll to achieve proper alignment. Otherwise, during operation, hot photopolymer may transfer onto the lower (unprotected) lamination roller and gum up the whole works.

Rotate the heat shield into the open position and remove the feed tray, Loosen the thumb-screws securing the backing film and slide the roll to the side that the dry-film is hanging off of the backing film. Rotate the lamination pressure handle UP to the full vertical position. This will lift the top rollers off of the bottom rollers and allow the film to slide freely. Reach around the back of the laminator and pull about 12" of film through. You should see the two films line up with each other. You may have to tweak the position of the backing film roll a couple of times to achieve perfect side-to-side alignment, but, once it is set, it will not shift. Once alignment is achieved, tighten the thumb screws, replace the feed tray and lower the heat shield.

Dry--film photoresist and soldermask should be laminated at 100°C with a speed ranging from 2 ft./min. to 5 ft./min.. The **5** button on the control panel has been preprogrammed for 110°C @ 2 ft./min. This is a good starting point but you may find that the speed can be increased as you gain more experience with the process.



Set the pressure handle to the thickness of the substrate that you are laminating. If you are making a printed circuit using conventional 0.0625 material, you will set the handle to the 4th notch (marked $^{1}/_{16}$" / 2mm). This setting will allow the board to feed easily and will exert the optimum pressure to insure reliable lamination.

Your laminator is now ready to use.

TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
• POWER lamp does not illuminate when ON/OFF switch is in the ON I position.	Laminator not connected to electrical supply.	Insert attachment plug into receptacle.
	Circuit breaker open.	Reset circuit breaker.
• Heat rollers do not turn.	Safety shield in upright position.	Lower safety shield.
	Feed tray interlock pin not in place.	Slide interlock lever all the way into the left side frame.
• Laminated items exhibit curling.	Tension between the top and bottom film roll is unequal.	Adjust tension per section FILM TENSION ADJUSTMENT.
	Tension on top or bottom roll of film is too loose.	Adjust tension per section FILM TENSION ADJUSTMENT.
	Speed setting too slow.	Slightly speed up laminator.
	Bottom film roll may be improperly loaded.	Make sure bottom toll of film is around idler bar.
• Adhesive deposited on heat rollers.	Top and bottom film webs not aligned.	Align film webs per section FILM ALIGNMENT PROCEDURE.
	Laminate improperly loaded.	Adhesive (matte) side of laminate film may be against the heat rollers. Load film per procedure outlined in section FILM LOADED & THREADING.
• Unsatisfactory adhesion of laminate.	Speed setting too fast for type of material being laminated.	Lower speed setting by pressing SLOW button to slower speed.
	Insufficient heat.	READY LCD lamp must be illuminated.
	Laminate improperly loaded.	Adhesive side of film must be facing away from the heat rollers. Bottom roll of film not threaded behind the idle bar.
	Heat rollers require cleaning.	Clean heat rollers per procedure in section CARING FOR THE THINK & TINKER MODEL 4200/5200 LAMINATOR.
	Laminated item unsuitable for adhesion.	Item may be dirty or may have non-porous surface that is extremely difficult to laminate.

SPECIFICATIONS

Model	**Model 4200**	**Model 5200**	**Model 6200**	
Operating Speed:	1.5 fpm (45.6 cm) to 5 fpm (1.6 m)	1.5 fpm (45.6 cm) to 5 fpm (1.6 m)	1.5 fpm (45.6 cm) to 5 fpm (1.6 m)	
Dimensions:			Without Stand	With Stand
Width:	24” (62 cm)	35” (84 cm)	51” (125 cm)	
Height:	12” (31 cm)	12” (31 cm)	17" (41 cm)	48” (115 cm)
Depth:	21” (53 cm)	21” (53 cm)	21” (53 cm)	
Weight:	55 lb. (25 kg.)	84 lb. (38 kg.)	154 lb. (70 kg.)	
Electrical Requirements:				
Voltage:	120V ~ 60 Hz	120V ~ 60 Hz	220V ~ 50-60 Hz	
Current:	9 Amps	14 Amps	10.5 Amps	
Power:	1080 W	1700 W	2310 W	
U.S. Receptacle Requirement	NEMA 5-15R	NEMA 5-15R	NEMA 6-15R	

STOCK	FILM GAUGE	NAP-LAM II		NAP-LAM I			
		PRESET POSITIONS		MANUAL SETTINGS			
		TEMP	SPEED	TEMP	SPEED	TEMP	SPEED
2OIb. BOND	1.5 mil (38 mc)	248 F (120 C)	8	290 F (143 C)	7		
	3 mil (75 mc)	239 F (115 C)	6	270 F (132 C)	5		
	5 mil (125 mc)	230 F (110 C)	5	230 F (110 C)	4		
	10 mil (250 mc)	221 F (105 C)	3	221 F (105 C)	2		
8OLb. BOND	1.5 mil (38 mc)	248 F (120 C)	6	295 F (146 C)	7		
	3 mil (75 mc)	239 F (115 C)	5	275 F (135 C)	5		
	5 mil (125 mc)	230 F (110 C)	3	235 F (113 C)	4		
	10mil (250mc)	221 F (105 C)	2	226F (108 C)	2		
1O pt.	1.5 mil (38 mc)	248 F (120 C)	5	300 F (149 C)	6		
	3 mil (75 mc)	239 F (115 C)	4	275 F (135 C)	4		
	5 mil (125 mc)	230 F (110 C)	2	235 F (113 C)	3		
	10 mil (250 mc)	221 F (105 C)	2	226 F (108 C)	2		