CHAPTER IX

Collar and Dress-Shirt Processing

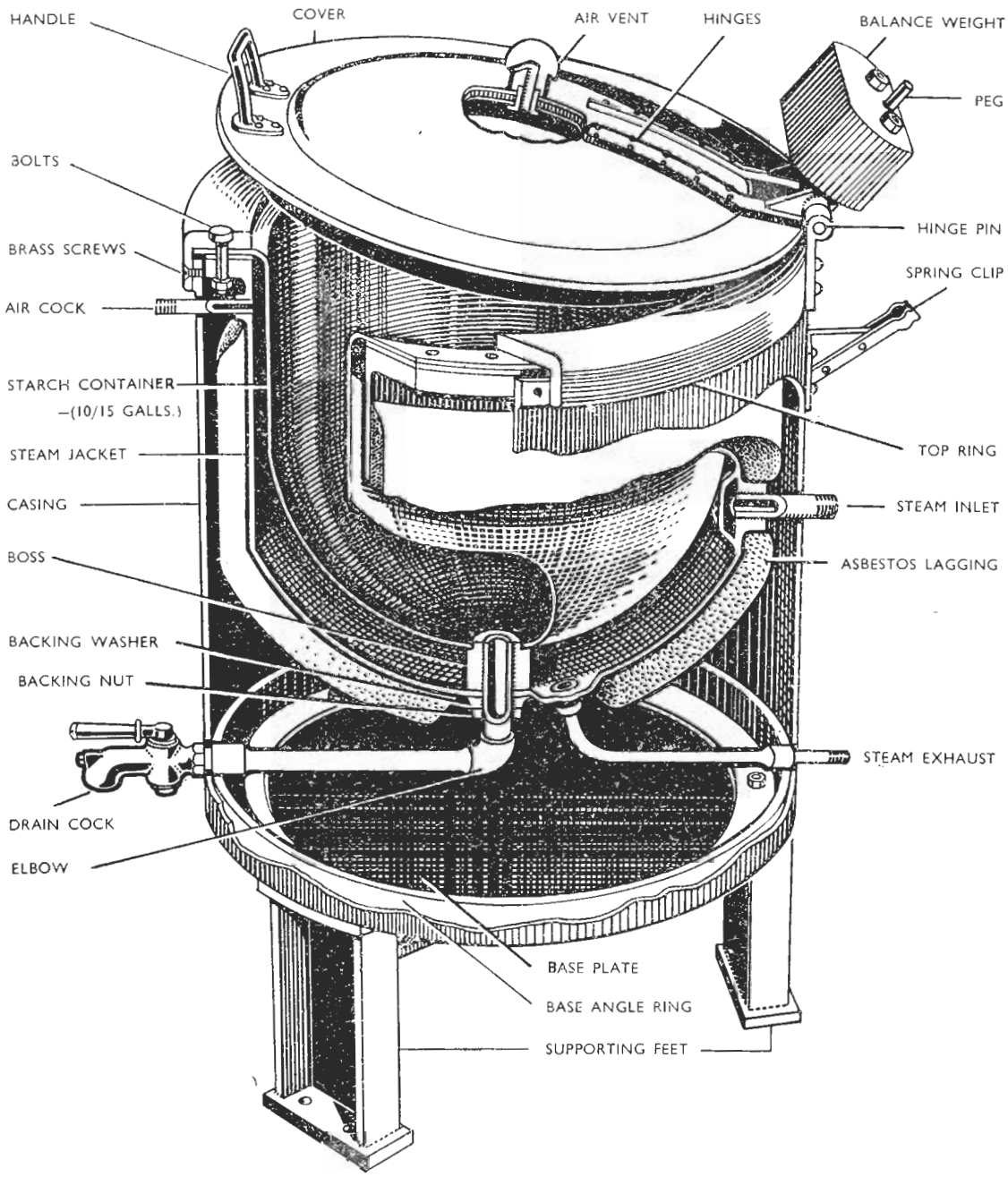

Fig. 87.—Starch cooker.

THE COLLAR UNIT

1. Collar processing is a highly specialized branch of laundry work, and particular care must be exercised throughout each individual operation if good results are to be obtained.

The complete collar unit is built up from the following items of equipment:

Starch cooker.
Starching machine.
Hydro extractor.
Collar ironing and polishing machine.
Collar seam damper.
Collar edge ironing machine.
Collar hot tube.

2. Starch cooker

This item, Fig. 87, is supplied to enable the starch stock solution to be conveniently prepared. Cookers recently installed are of 15 gal. capacity, and consist of an inner monel-metal starch-container, fitted with a steam heating jacket, suitable for a working steam pressure of 100 lb. per sq. in. The hinged cover is suitably counterbalanced and the cooker is provided with a large draw-off cock fitted with a cleaning plug.

Maintenance.—The starch cooker should be cleaned immediately after use, care being taken to ensure that the internal pipe leading to the draw-off cock and the orifice of the cock itself is clear.

3. Starching machine

A typical machine is illustrated in Fig. 88. The collars to be processed are placed in the tub of the machine, which also contains the starch solution.

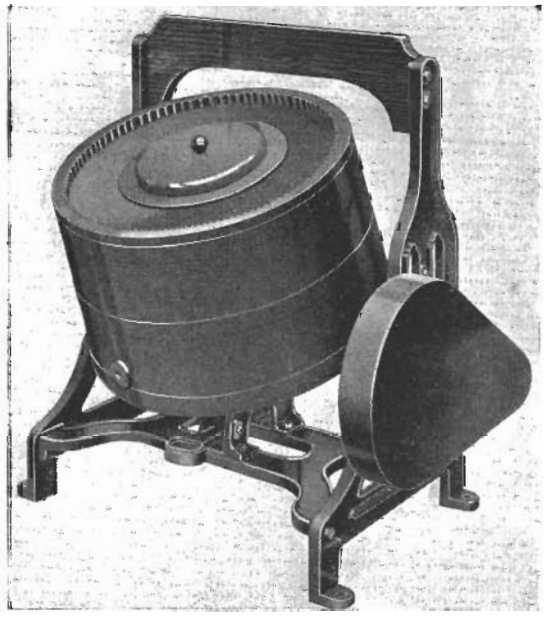

Fig. 88.—Starching machine.

The tub is provided with three internal beaters, and when the tub revolves, mechanical agitation causes the collars to become impregnated with starch.

The tub is mounted on a central spindle which carries a large crown wheel rigidly secured to its underside; the crownwheel meshes with a pinion wheel fixed to the driving spindle. Drive from the motor to the driving spindle is arranged through vee belting.

A foot treadle is provided by means of which the tub can be tilted to run in any of three position, *i.e.*, with the spindle in the vertical plane or approximately 20° and 40° respectively from the vertical. The forward tilt causes a tumbling effect, thus ensuring the thorough penetration of the starch liquor into the collars, and assists in the easy removal of the collars by the operator when the machine is running, (*see para.* 9 (5).

The tub in machines installed at present is manufactured from pitch pine, but in future models it will be of metal.

Maintenance:

(*a*) The inside of the tub should be kept free from starch deposits.

(*b*) All bearings should be regularly lubricated and the teeth of the driving wheels should be smeared occasionally with grease.

4. Hydro-extractor

In the case of large collar units installed in shore establishment laundries, an 18 or 21 in. hydro-extractor is supplied as a component part of the collar unit. Provision of a separate machine for collar work is not justified in H.M. Ships; the collars are therefore dealt with in the general purpose machines installed. In these, care must be taken before dealing with collars to ensure that the extractor basket is thoroughly cleaned.

5. Collar ironing and polishing machines

In its essential features, the collar ironing and polishing machine consists of a padded table on which the work to be processed is placed; the table is given a forward and backward motion beneath a heated rotating roller. Machines are manufactured with either gas or electrically-heated rollers, but electric heating of the roller is most commonly used for machines in Admiralty service. The size of the machine is determined by the length of the roller, 18 and 24 in. machines being in general use in H.M. Ships. Machines having a roller length up to 40 ins. are installed in Fleet Shore Establishments.

In large commercial laundries which deal with many thousands of collars per week, separate machines are provided

(*a*) for the initial steaming or blocking of the collars—this process can be satisfactorily effected by a machine arranged for automatic movement of the tables;

(*b*) for final polishing—it is an accepted fact that best results can be obtained by manual control of the table movement.

Space restrictions in H.M. ships preclude the possibility of fitting separate machines for these operations, and both processes are done on the one combined ironing and polishing machine installed. While blocking can be satisfactorily effected by the automatic motion of the table, the final polish, necessitating heavier roller pressure, is best accomplished by manual control.

In manually-operated machines, while the movement of the table is power-assisted, the stroke of the table is controlled by the operator, action being necessary to limit by hand control the extent of travel of the table in a forward and backward direction. Operators usually experience difficulty in synchronising the foot treadle movement, which determines the direction of movement of the table, with the hand control

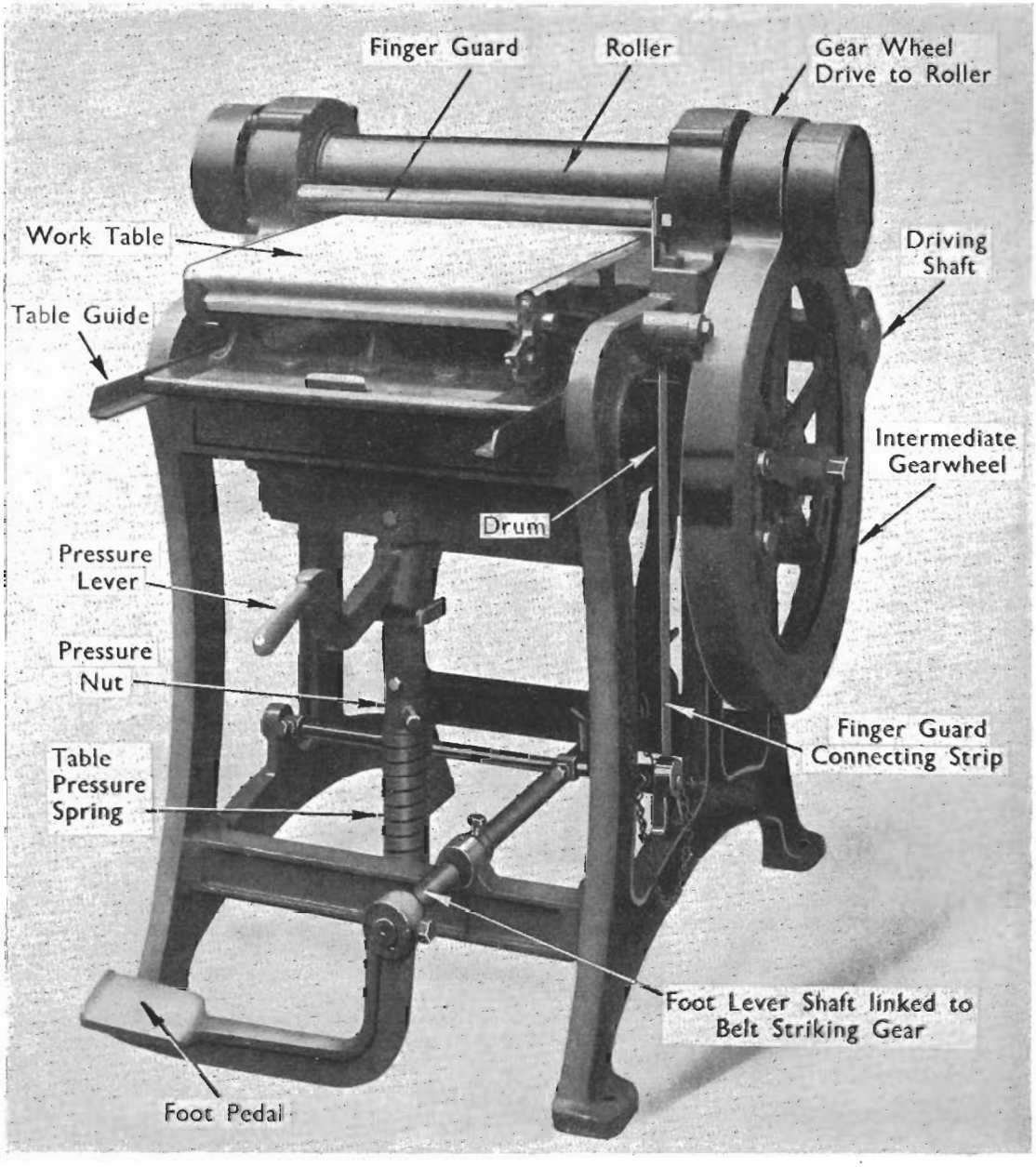

Fig. 89.—Collar and dress-shirt ironing and polishing machine.

necessary to limit the travel of the table in a given direction. A modified design of machine capable of both automatic and manual control is therefore being installed in future in H.M. ships. These machines are provided with a clutch which, when engaged, enables the initial collar blocking to be done automatically, thus relieving the operator of the tedious arm movement necessary to control the table stroke. When the clutch is disengaged the final polishing can be undertaken by manual operation.

Two tables are provided with all machines installed in naval laundries, one for collar work and one for processing dress shirt cuffs and fronts.

Description

A typical machine as installed in H.M. ships is illustrated in Fig. 89. The machine is driven through countershafting, reversal being arranged by the alternate engagement of the open and crossed belting with the fixed driving pulley which is mounted on the machine driving shaft. Rotary motion to the heated roller is arranged through a train of spur gearing.

The shaft carrying the intermediate gear-wheel also carries a drum of large diameter, the periphery of which is in surface contact with the underside of the work-table. Thus rotary motion of the drum causes the table to travel horizontally and, according to the direction of rotation of the drum, the table moves towards or away from the operator. The limit of travel of the table is controlled by the operator.

The cradle carrying the work-table is independently supported from the main framework of the machine, and is so arranged that pressure between the table and the roller is not transmitted to the gearing. The gearing is carried on fixed centres, and therefore always remains in correct mesh. The independent suspension of the table permits varying thicknesses of padding to be used on the table without adversely affecting the working of the machine.

Reciprocating action of table—*Fig.* 90

The forward and return motion of the table is operated through the medium of a treadle placed at the front of the machine, and the initial arrangement of the belt drive is such that when the treadle is depressed, the table moves inward towards the roller (*i.e.*, away from the operator). The belt-striking gear-rod or horizontal sliding strap-bar is linked to a vertical strap-bar which is freely mounted on the treadle-shaft. A bracket carrying a kicking lever is keyed to the treadle shaft. The lever is free to turn or lift, and is held in its normal working position by a spring-loaded pin and location stop on the bracket.

When the treadle is depressed, corresponding movement is also imparted to the kicking lever, and the motion is transmitted through the vertical strap-bar to the belt-striking gear-rod. When the treadle is released, the spring on the striking gear-rod returns the lever mechanism to its original position.

Safety finger-guard device (*Fig.* 90)

A safety finger-guard extending the full length of the roller is provided to prevent the operator's fingers being caught between the heated roller and the work table. Vertical connecting links are fitted at each end of the guard-plate, the lower ends of the links being coupled to the cross-shaft levers. The tripscrew lever fitted to the centre of the cross-shaft carries a safety tripscrew which disconnects the drive when the guard is lifted. The kicking-lever is extended to pass over the tripscrew. When the machine is in its normal working position, the clearance between the bottom of the guard and the table is ¼ in. and the tripscrew is set to just clear the bottom of the kicking-lever.

When the finger-guard is operated, the action of lifting the guard-plate rotates the cross-shaft and presses the trip against the underside of the tripping lever. This action raises the lever clear of its location, and completely releases the pressure previously exerted by the kicking-lever against the vertical strap-bar. When the pressure is released, the spring on the belt-striking gear-arm returns the vertical strap-bar to the vertical position, with the associated immediate reversal of drive.

It should be noted that possible danger to the fingers can only occur when the table is moving away from the operator, and therefore reversal of the drive automatically prevents the accident materialising.

Trouble experienced by the constant tripping of the treadle gear may be due to one or more of the following causes:

(*a*) Insufficient pressure on the compression-spring fixing of kicking-lever.

(*b*) Wear, or rounded edges, of the location stop, and the corresponding edge of the kicking-lever.

(*c*) The finger-guard trip screw being set too high, thus fouling the kicking-lever when the treadle is operated.

Operation

A starting lever is situated on the left-hand side of the machine, and when in the off position locates the driving belts on their associated loose pulleys. In this position no motion of the table is possible.

To start the machine, pull the starting lever forward; this allows the spring-loaded belt-striking gear-rod to move the belt on to the driving pulley, thus traversing the table towards the operator.

To reverse the motion of the table, depress the treadle.

To increase the pressure between table and roller, turn the pressure nut to the left. To reduce the pressure, insert the brass fork provided for this purpose above the top of the boss of the lever and lift the lever to grip the fork. This lighter pressure is required for blocking and/or steaming collars; the fork must be removed and the lever pressed downwards to the full extent for polishing.

For polishing, remove the steaming pad and push the pressure-lever downward to the full extent. This gives the correct pressure for polishing on the harder surface.

Roller

The roller should be cleaned each morning with paraffin wax after heating, due care being taken to ensure that no fouling of the table occurs.

Alternatively paraffin wax should be applied to the roller at the end of each day's work while the roller is still hot. This will keep the roller clean and polished The wax should be wiped off during the preliminary heating of the roller and before commencing the collar work of the day.

Accumulations of starch on the roller may be removed by scouring with a hot soda solution. The roller should always be finally polished with a soft cloth.

TABLES

(*a*) *Collar table.*—For the steaming or blocking of the collars and cuffs, a movable steaming pad (composed of 2 thicknesses of flannel and a piece of calico on the top, basted together) should be provided. This covering should be long enough to overhang 3 in. or 4 in. at each end of the table. When a number of articles have been blocked, remove the steaming pad, press down the lever, and proceed to polish on the hard-faced coverings on the table. Dry the coverings before polishing.

(*b*) *Shirt table.*—The coverings on the shirt table should be kept soft and pliable, and frequently washed or replaced by new paddings. This padding must be of the fixed type, *i.e.*, not a movable steaming pad as for collars.

MAINTENANCE

(*a*) The machine should be frequently lubricated, particular attention being directed to the moving parts of the table-reversing mechanism and the finger-guard actuating gear.

(*b*) The finger-guard safety gear is to be maintained constantly in an efficient working condition.

(*c*) The bearings of the heated roller should be fed with a mixture of tallow and yellow sulphur.

(*d*) Belts should be maintained constantly at the correct tension.

(*e*) The faces of the driving gears should be thinly smeared with grease once weekly.

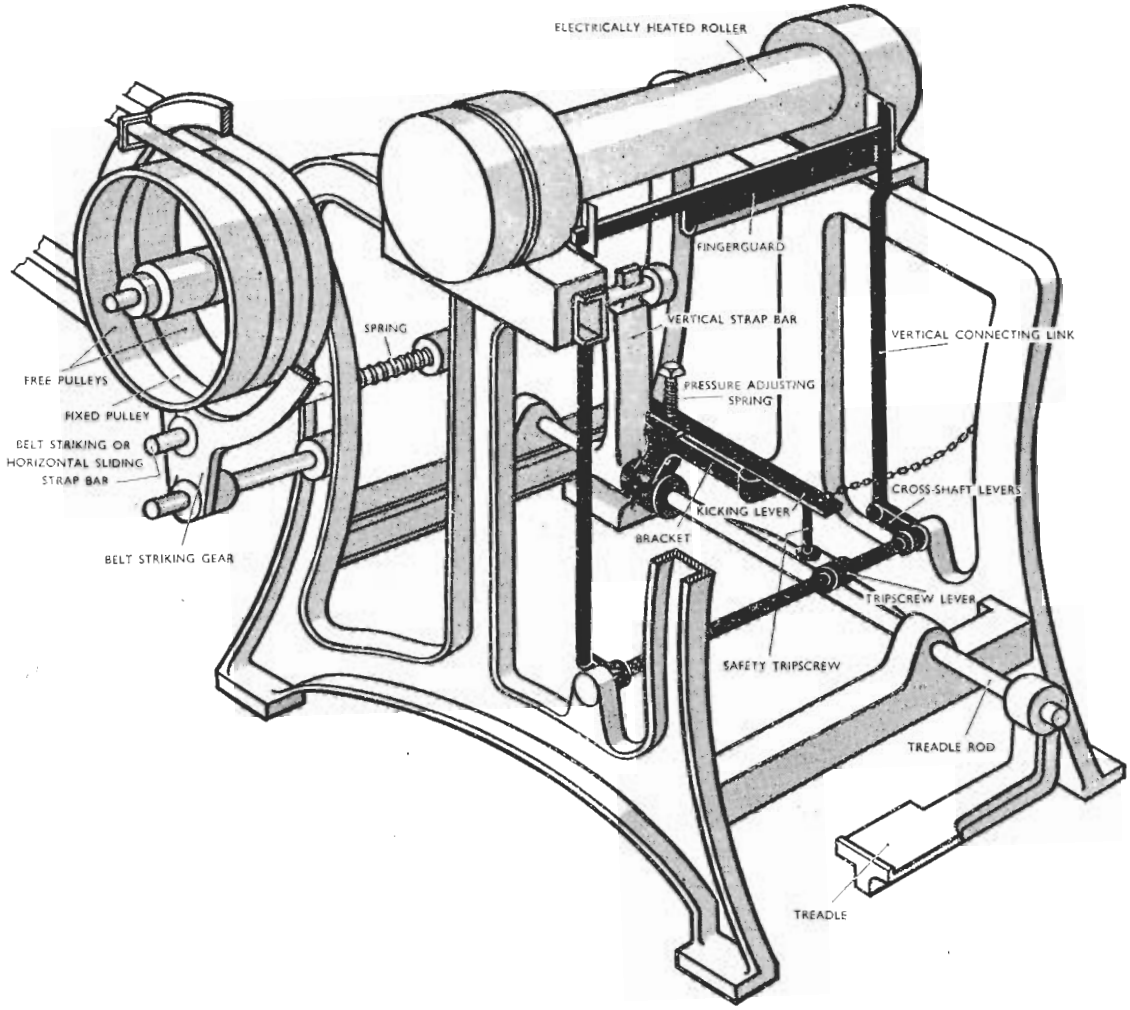

Fig. 90.—Fingerguard safety device for collar ironing machine.

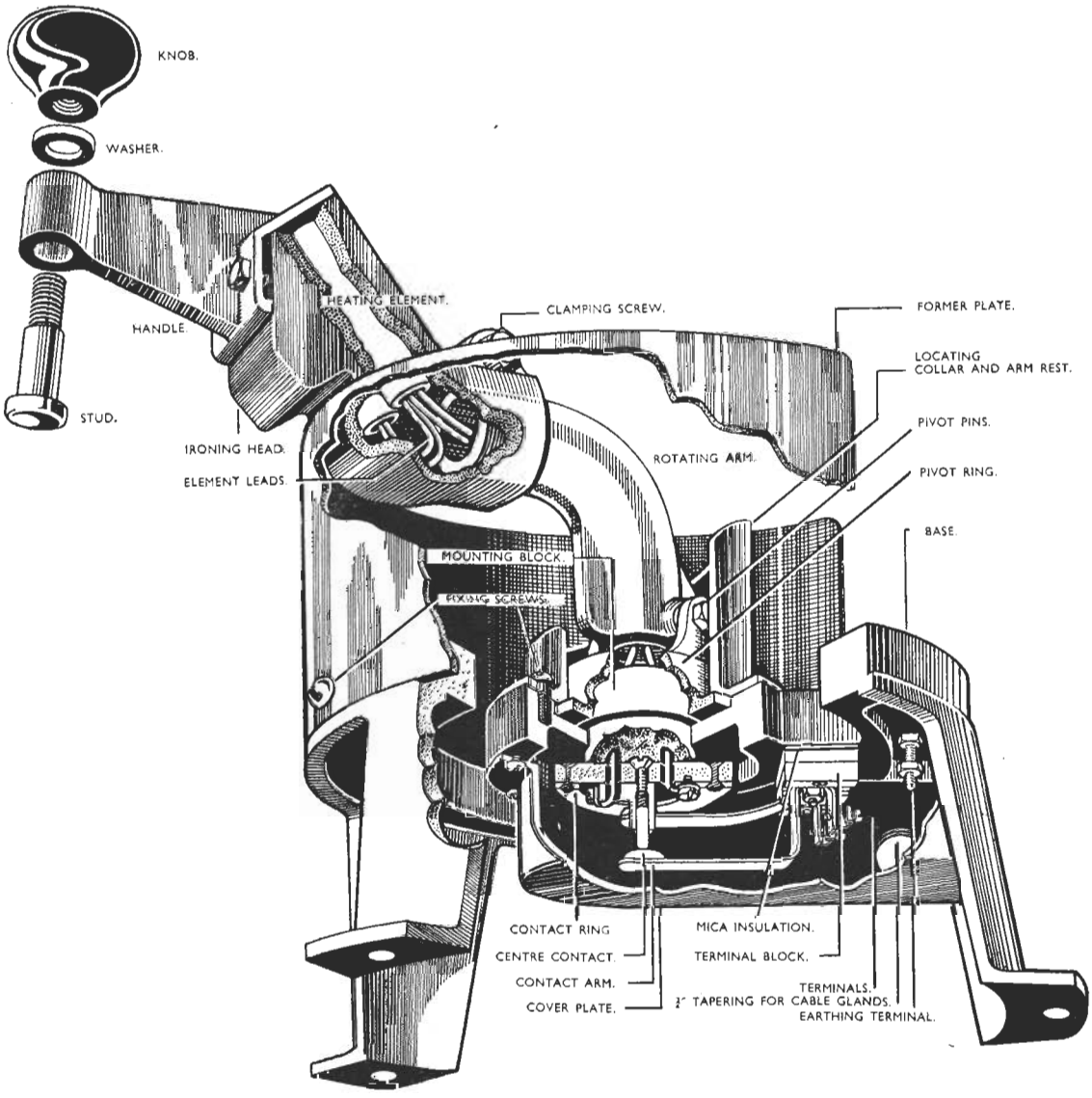

Fig. 91.—Sectional arrangement of collar edge ironer.

6. Collar-edge ironing machine

This fulfils the following duties:

(*a*) It irons and dries the folded edge.

(*b*) It provides a tie space inside the collar.

(*c*) It produces an initial shaping or curved set to the collar.

A typical collar-edge ironer is illustrated in Figs. 91 and 92. The machine consists of an electrically-heated ironing head attached to an arm which is capable of being rotated on a collar "former" plate.

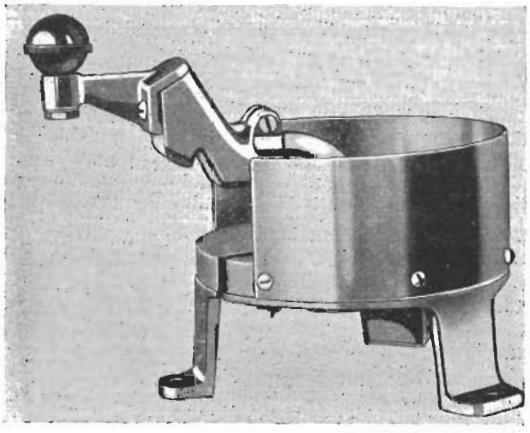

Fig. 92.—External view of collar edge ironer.

7. Collar-seam damper

A typical damper is shown in Fig. 93, and consists of a perforated fish-tail steam nozzle which emits a small jet of low-pressure steam.

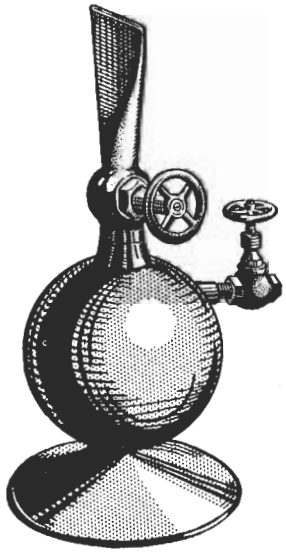

Fig. 93.—Collar seam damper.

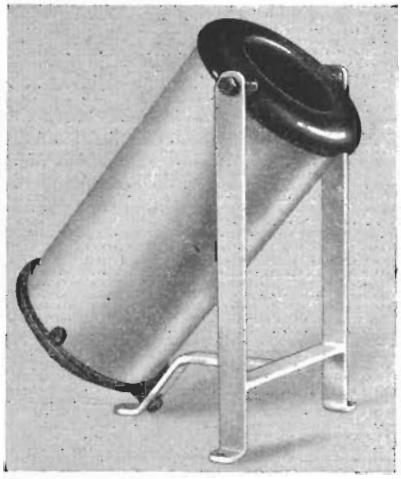

Fig. 94.—External view of collar hot tube.

8. Collar hot tube

A typical collar hot tube is illustrated in Figs. 94 and 95. It comprises a porcelain cylinder, around the outside of which is fitted a steam-heated coil.

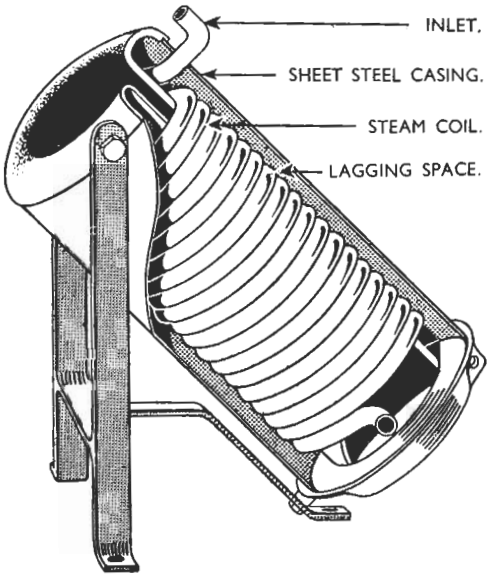

Fig. 95.—Sectional arrangement of collar hot tube

THE COLLAR PROCESS

9. Washing and Starching

(1) Wash the collars in accordance with washing formula I (Ch. V, para. 7).

(2) After washing, thoroughly hydro the collars.

(3) Load the starching machine with collars and add starch stock solution in sufficient quantity just to cover the collars. For effective starching the machine

must be run with the tub in the inclined position. The stock solution must be added carefully, therefore, to ensure that no overflow of starch occurs when the tub is tilted.

The final production of a good finish is largely dependent on the efficacy of the starching process. The senior rating should make certain, therefore, that all operators are familiar with the approved method of preparation of the stock solution. (*See* Ch. IV, Paras. 25, 28 and 29).

Note.—The same charge of starch can be used repeatedly in the starching machine. It is *not necessary* to change the solution until it becomes clouded or loses its correct density, *viz.*, Twaddell 5° to 7°.

(4) After loading the machine, replace the cover, adjust the tub to the inclined position and process the collars for 30 minutes.

(5) The collars should be removed, if possible while the tub is revolving, about 6 at a time and the surplus starch squeezed back into the machine by hand. Such action reduces the risk of deposition of starch on the surfaces of the collars, which may occur if they are allowed to settle in the starch solution, *i.e.*, with the machine stopped.

(6) Rinse the collars by dipping them into a clear starch rinsing solution, prepared in the proportion of 1 part starch stock solution to 2 parts water.

Note.—The clearing rinse is necessary to effect the complete removal of surface deposition from the collars, and must on no account be omitted.

(7) Remove the collars, squeeze out the surplus rinse solution by hand, and hydro for 10 to 15 minutes.

(8) After hydro extraction, each collar should be brushed lightly on each side with a soft scrubbing brush to remove loose surface starch.

This action is necessary to minimise the possibility of loose starch sticking to the roller of the collar ironing machine. If loose starch does contact the hot roller it scorches and becomes brown and is liable to mark collars being subsequently processed. Loose starch also causes the collars to stick to the roller, thus upsetting the arrangement of collars on the machine table.

10. Faults in starching and remedies

(*a*) LIMP COLLARS.—Limpness may be due to the insufficient penetration of the starch into the collars. This condition may also arise if the starch solution is too weak or if it contains too large a quantity of wax or glycerine.

(*b*) TOP-STARCH MARKS OR "SNAILS TRAILS."—These are caused mainly by the use of a starch stock solution of too high a density (Twaddell reading). A further cause is the overloading of the starching machine. These marks are usually remedied during the clearing rinse.

(*c*) CRINKLES IN THE COLLAR FOLDS.—These do not normally become apparent until after the edge ironing process. The principle cause is the presence of old starch in the collar seam. Crinkles may also be caused if too much borax is used in the starch stock solution. When excessive crinkling occurs, the collars should be rewashed in water at a temperature of 200°F. for at least 20 minutes.

11. Finishing

(*a*) BLOCKING OR STEAMING

Before commencing the blocking process it is essential to ensure that the roller, padding and top sheeting is clean and taut. During the blocking process the moisture content in the collar is largely removed, and provided that the temperature of the rollers is high enough (about 350° to 400°F.) the starch granules become baked into a stiff cement.

NOTE.—Stiff collars are made with two fine pieces of linen in the centre. These centre layers retain the starch granules which stiffen when heat is applied.

The steaming pad should be placed on the surface of the table and the table pressure adjusted to about half maximum pressure. The collars should be arranged horizontally on it, *i.e.*, with the length of the collar parallel to the roller and with the outside of the collar downwards.

The collars should be passed under the roller 3 or 4 times and then reversed on the steaming pad so that the outside is uppermost. They should then be given a further 3 or 4 passes under the roller, after which they should be removed and allowed to stand until the vapour generated in them by the hot roller has evaporated, leaving them almost dry.

To speed production, it is advisable to block a reasonable number of collars, say 50, before proceeding with the next operation.

(*b*) POLISHING

The steaming pad should be removed and the collars polished on the hard covering face of the table. The table face must be thoroughly dried and the table adjusted to maximum pressure. When polishing, a smaller number of collars should be dealt with at each time, and the speed of oscillation of the table under the roller should be higher than that used for blocking. The collars should be placed in position in a single row at right angles to the roller. This enables a shorter stroke of table, with consequent greater speed of surface contact to be employed.

Note on semi-stiff collars.—In dealing with semi-stiff collars the blocking process is unnecessary; they can be processed in one stage on the collar machine. Alternatively, they can be dealt with on the flatwork ironing machine; if this method is used the collar should be given 3 or 4 passes through the machine, making sure that the collar is arranged with its outside surface in contact with the machine bed on the last "pass."

(*c*) FOLDING

After polishing, both stiff and semi-stiff type collars require to be folded on the seam. At the stage now reached in the collar process, the article is dry and the linen fibres are firmly held by the starch.

If collars are folded dry, the fibres, being brittle, have a tendency to break at the seam, thus reducing the life of the collar. Breaking of the fibres is also accompanied by the destruction of the starch film, leaving a rough edge which causes discomfort to the wearer.

The seam of the collar should, therefore, be softened before folding. This is done by passing the seam over a collar-seam damper. (*See* para. 7.) Once the seam is damped, the collar can be folded easily by hand and without damage. When folding care should be taken to follow the seam; the seam of a well-cut collar is not straight but slightly curved.

(*d*) COLLAR-EDGE IRONING

Having folded the collar it is now necessary to dry and shape it, which is done on the collar-edge ironing machine (*see* para. 6). The seam is placed over the " former " plate and the heated head is passed over it, thus ironing and drying the edge. The tie space, also set, is equal in width to the thickness of the " former " plate.

(*e*) CURLING AND SETTING

This is the final process, and all stiff collars need to be curled and set. This is done by first curling the collar round the hand and then placing it in the collar " hot " or " airing " tube. The collars are placed in the tube one at a time and, as additional ones are inserted, they are gardually pushed down until each passes completely through the tube. A basket should be placed at the outlet to collect the collars.

Note.—Semi-stiff collars do not need curling, but after folding at the seam should again be folded point to point.

PROCESSING DRESS SHIRTS

12. Starching

When possible, dependent upon the capacity of the laundry to undertake such work, dress shirts should be washed as a separate load and thoroughly boiled to ensure that all traces of old starch are removed. Washing Formula I may be used.

Slight starching, as for normal white shirts, should be applied during the washing process to starch the body of the shirt, but the cuffs, neckband and front need separate intensified starching treatment as detailed below. After hydro-extraction the cuffs, neck-band and front should be steeped in the starch stock solution.

The solution should be prepared in the same manner as the collar starch solution, with the exception that borax should be omitted and the glycerine content slightly increased to give added flexibility.

Gather up the dress shirt by the sleeve edges of the cuffs and bosom and thoroughly impregnate the starch into these parts by dipping them into the starch bowl some twelve times. The starch should be ingrained into the fabric by squeezing during each dip and the surplus starch liquor removed by squeezing and wringing after each dip. The starched surfaces should then be lightly brushed off with a slightly damp brush.

The shirt is now ready for ironing on the collar and dress shirt ironing machine.

13. Ironing

The shirt body should be gathered at the front of the table, below the level of the ironing surface, and the cuffs laid out for ironing one on each side of the table. The cuffs should be ironed on the wrong side (inside) first by passing them three or four times under the roller, then turned right side up and given a further seven or eight passes under the roller. This process is repeated on the wrong and right side of the cuff.

The shirt should then be draped carefully over the table. The neckband should be placed in the recess provided, the back of the shirt carefully drawn under the table body and the shirt bosom smoothed flat on the table surface. The shirt front should then be blocked and polished in one continuous operation. Commence ironing at the top of the shirt front and gradually work downward. The front should be lifted occasionally during the operation to ventilate and cool the fabric. Continue polishing until dry.

Note.—Dress shirts with piqué or pleated fronts should not be machine processed, but should be hand ironed, due care being taken in the touching up of the pleated front.

14. Ironing when no shirt and collar ironing machine is installed

If no polishing machine is installed, dress shirt fronts and cuffs may be finished on the shirt bosom press.

Special care is necessary when setting the shirt on the buck to avoid creasing. It is recommended that the press head be lowered for a very short period only, say two seconds, in the first instance, then raised to ensure the absence of creases. If the front is free of creases pressing can be continued for a sufficient period to set the starch.

If creases do appear at the preliminary pressing stage they can be removed by damping the front of the shirt with a clean cloth and warm water. After pressing, the shirt should be removed and finally polished by hand ironing.

IMPORTANT.—It is essential at all times to ensure that no loose surface starch is present on the shirt front, etc. Loose starch tends to stick to the polishing surface and when scorched imparts brown marks to the work being subsequently ironed or pressed.

It cannot be too strongly emphasised that the basic requirement for the production of high quality stiff collar and dress shirt work is the use of good quality starch. The cold starch method using a high grade starch, as detailed in Chapter IV, paragraph 29, is recommended, rather than a preparation necessitating the separate addition of various ingredients to obtain a starch solution of the correct texture.