

Extraneous Objects in Gray Cotton Goods. A Source of Trouble for Weaver and Finisher Alike

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The condition in which cotton goods at times are received by a finishing plant, has been the cause of much dispute and controversy as well as losses to both the finisher and gray mill. Close co-operation between the weaving mills and finishers in the questions of foreign objects in cotton goods is very desirable. It is all the more justifiable as modern chemical analyses will find out the most secretly guarded size formula used for cotton goods, but it cannot be expected to remove foreign matter in solid form such as iron, wire, wood and other foreign substances, which are detrimental to finishing operation and machinery, as well as cloth.

The writer has in the past two years, collected samples of foreign or extraneous material in cotton goods discovered by employees of his finishing plant. These were carefully dated, listed, and pasted into a large book, set aside for this purpose. In this valuable collection, a great variety of foreign objects are found, such as harness hooks, heddle wires, needles, pins, tangled wires, as well as pieces of wood, iron and steel.

Because of the fact that a weaving mill will invariably refuse to shoulder or share any losses sustained by the finishing plant in finishing such goods, the writer has made it a point to investigate and learn whether these foreign substances could not be traced more definitely to the weaving mill.

In a great many cases, the foreign bodies were woven into the fabric in such a manner that they were completely hidden by the warp and filling yarns and in the majority of instances escaped the gray goods examination after weaving. It must not be overlooked that gray goods are not generally perched on arrival at the finishing plant, but before being shipped by the weaving mill. Hence, a great many of these extraneous, solid bodies really should be detected by the gray mill inspector.

The greatest number of defects and extraneous solids were found in fancy cotton cloths woven on Jacquard looms. The complicated mechanism, and the necessity of

repeated changing and repairing the same, seems to favor the dropping of foreign metallic particles on and in to the cloth. Fabrics such as damask striped sateens and figured materials usually require nearly every operation and machine used in finishing. Therefore, considerable damage can ensue before the same possibly could be prevented.

The greatest source of damage was found to be in the calender, through which cloths many times must pass more than once. The rolls of these machines are of cast steel, pressed cotton, paper, etc. If a nearly invisible foreign body passes between a pair of such rolls, exerting several thousand pounds pressure, it is pressed by the harder roll into the softer one, cutting certain warp or filling yarns, or both, and eventually is lodged in the softer of the two rolls.

The foreign body, pressed in the surface of the softer roll, then stencils the cloth at each revolution. One would think that by paying some attention to the calenders—this mistake is quite prevalent—that such damage readily might be discovered. Unfortunately, the possibility of detecting the damage, in spite of all precautions and safeguards, is very unlikely. The small punched holes and cuts—usually the case when many pieces are damaged—are as a rule, closed up by the hard rolls so that no signs of holes or cuts are visible. In addition, the operator sees the cloth only in rapid motion when it passes through the machine.

It is, therefore, impossible to detect any slight imperfections. The damage is discovered generally when the goods are on the tenter. The holes, or cuts, which previously were closed by pressure, are opened and become plainly visible. When it is considered that such goods, due to their fine finish, or for other technical reasons, have to rest for some time between the two operations, it is clear that many pieces are spoiled before the damage is detected.

When the foreign bodies are iron, if the cloth, before it reaches the calendar has been partially or wholly bleached—luckily for the finisher and owner—rust spots will

be clearly visible. Sometimes the marks are so small that they escape the notice of the best workman.

This subject has been discussed theoretically and practically by many prominent finishing concerns. However, weavers as



Fig. 1

well as finishers, should be interested in avoiding these annoying difficulties.

A thorough inspection of the gray goods, piece by piece, is commercially impractical in a finishing plant, and therefore cannot be considered. In view of the tremendous yardage finished by the medium and large sized finishing plants, the chance of detecting foreign bodies woven into cloth is very small as compared to that in the weaving mills, where the examiners handle fewer pieces, and where the work is done at a slower speed. The question of removing iron electro-magnetically or electrically signalling the presence of these bodies, has been tested by competent experts and discarded as commercially valueless. The fact remains that this evil cannot be avoided entirely, due to the fact that metallic bodies which are not magnetically affected, often are found in goods.

It, therefore, remains the duty of the person in charge of the finishing plant to assure, as far as it is humanly possible, that

all possible precautions are taken to prevent any damage and to insist on constant supervision. To reduce such damages to a minimum, he should have the confidence and cooperation of the weaving mills.

It is most gratifying to the writer that he has found a friendly understanding in the last few months among a large number of large weaving concerns. A mutual exchange of ideas has brought about an elimination of faults, which otherwise still might exist had they not been pointed out by the finishing plant.

There are many reputable weaving concerns whose managers declare categorically that the presence of foreign bodies in their goods is a technical impossibility. Furthermore, they declare that inspection of their goods is so well organized that no foreign bodies, even the smallest one, can leave the mill without being detected. That such statements which ignore the possibility of human error are valueless, is less regrettable than the fact that even today there are some mill men who never will admit mistakes made in their own establishments, and, what is still more astonishing, do not want to admit mistakes even when pointed out by a third unbiased person.

The accompanying illustrations show the various foreign substances found in different cloths. The writer hopes that superintendents and foremen in weaving mills will realize the danger of these extraneous substances, and assure their removal by thor-

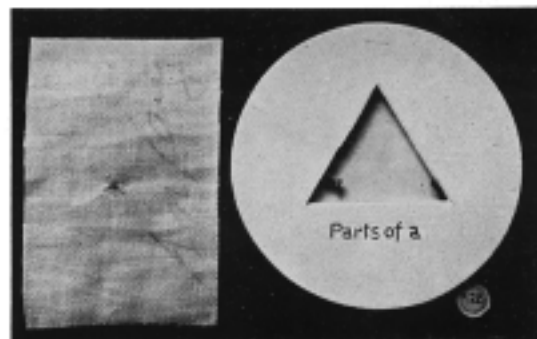


Fig. 2

ough inspection, as well as to instruct their employees to take measures to safeguard the goods in respect to these avoidable sources of trouble.

Figure No. 1 shows both ends of the narrow sides of a raw-hide loom picker. The small tack "a" is the same as that shown in the cloth of Figure No. 2. Both substances were found thoroughly imbedded in

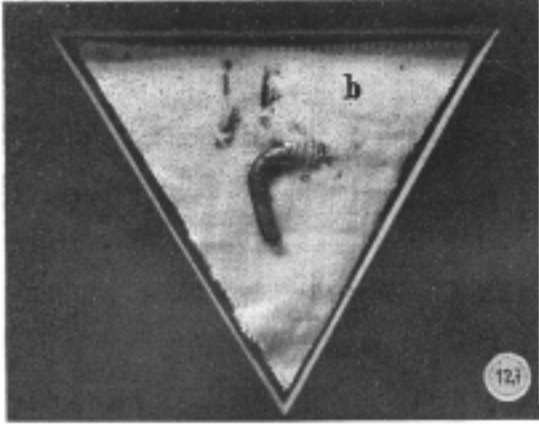


Fig. 3

a piece of warp sateen. The heavy rivet in the picker, marked "b" in Figure No. 1, which holds together the two sides of the picker, was found in a much distorted and broken condition in a cloth shown in Figure No. 3. Small nails have been found lately in increasing numbers in goods. This is illustrated by Figure No. 4. Adjacent to the broken nail can be seen the hole which it caused.

In a great many instances, extraneous matter comes from worn out reeds. These reeds, through long usage or careless handling, split and, due to their weight, pieces fall into the fell of the cloth and are woven in. (See Figure No. 5.) Figures No. 6 and No. 7 show such particles placed on white paper, in order to show them up better. Figure No. 8 shows six pieces of wire woven into a piece of cotton damask. These were caught by an unusually alert workman. Had any of them been allowed to pass on, they would have caused a great loss to the finisher.

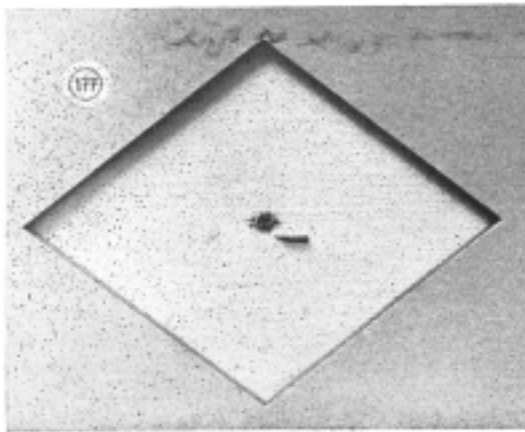


Fig. 4

When mail eyes in a Jacquard harness break or loosen, often they are woven in the cloth. This causes a particularly hazardous condition if allowed to go into certain finishing operation. (See Figure No. 9.)

In Figure No. 10, a piece of iron from an automatic loom is shown.

In Figure No. 11 a piece of iron or steel wire is shown, the origin of which could not be traced or explained by the superintendent in charge of the weaving mill, in spite of the fact that two analogous cases were observed in a short time.

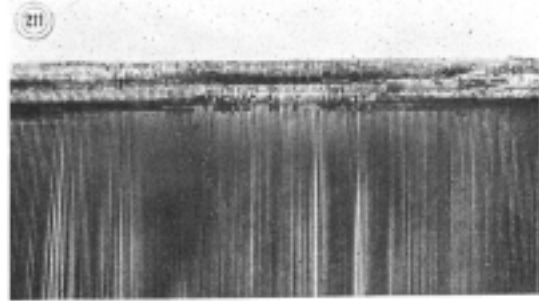


Fig. 5

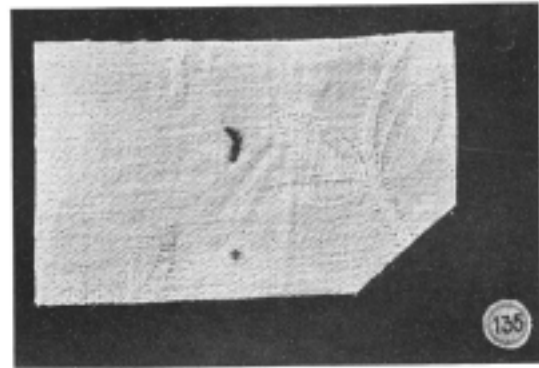


Fig. 6

Metallic objects no larger in size than a pin head, often are found in gray goods, as illustrated by Figure No. 12. Experts consulted in the matter invariably agreed that they get into the cloth during loom fixing. They are particularly treacherous because they escape detection on account of their small size. They seldom cause rust stains in bleaching, but are just big enough to play havoc in calendering.

Figure No. 13 shows a brass spring in a fabric made on a Jacquard loom. The round object, seen on the fabric, is part of a spring which had broken off and was imbedded in the cloth. It was not discovered until sev-

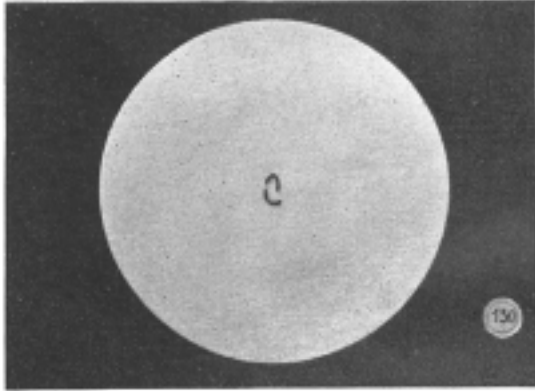


Fig. 7

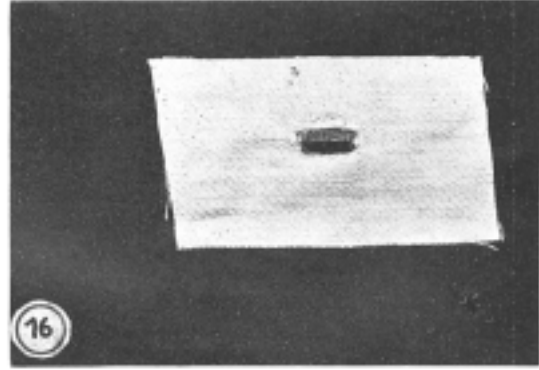


Fig. 10

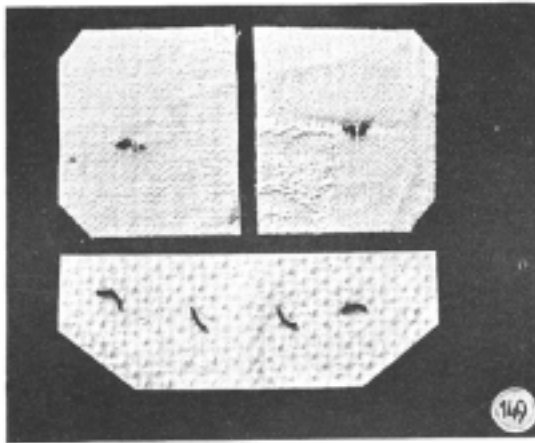


Fig. 8

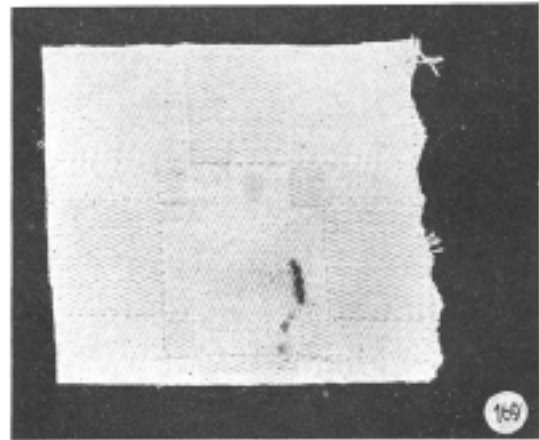


Fig. 11

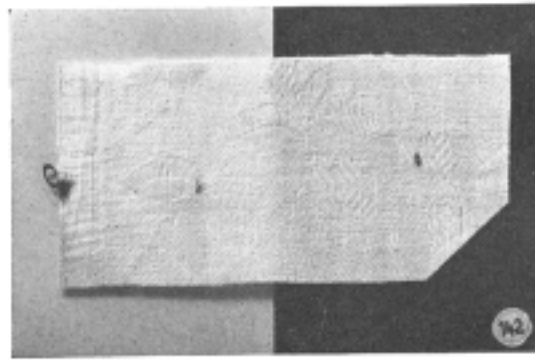


Fig. 9

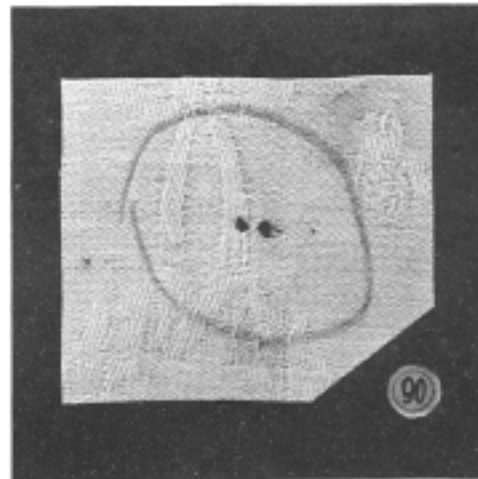


Fig. 12

eral pieces of the cloth had been damaged in calendering.

In Figure No. 14, a piece of a broken nail from a reed cover was woven into the selvage. The nail fell at the moment when the shed opened and was woven into the very edge of the selvage.

The defects illustrated in the cuts constitute only a small percentage of the many

metallic and other foreign matters woven into cloth and not detected until after finishing. The writer has collected in a comparatively short time, several hundred interesting examples.

Many other objects were found in gray

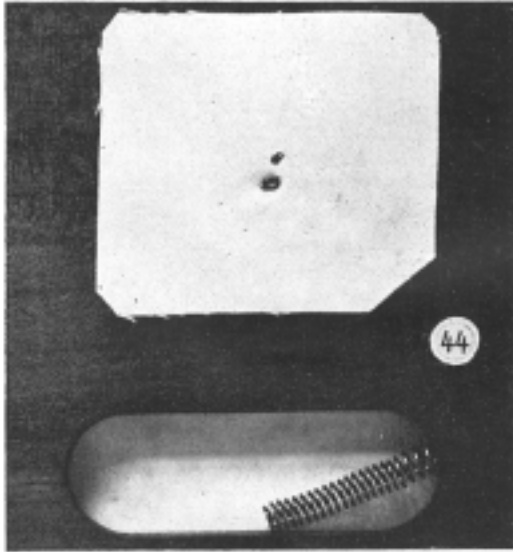


Fig. 13

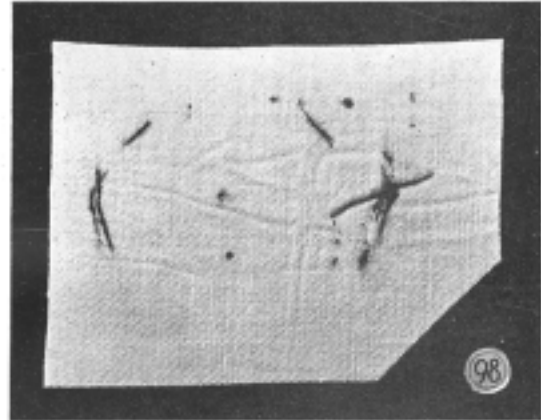


Fig. 16

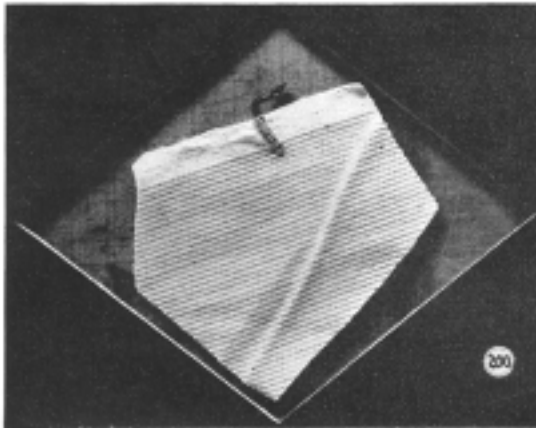


Fig. 14

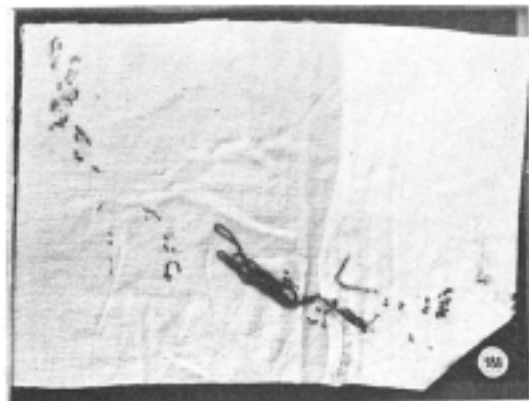


Fig. 17

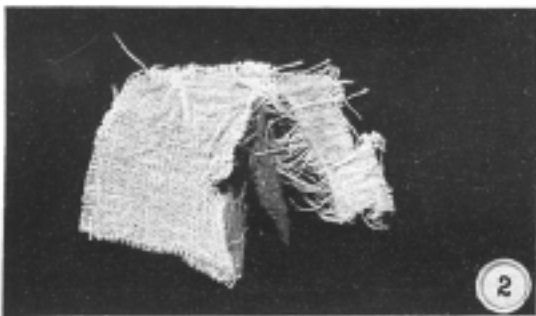


Fig. 15

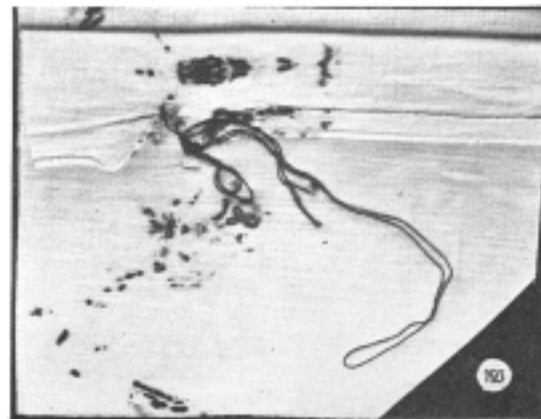


Fig. 18

cloths which originated in the loom. It would be very amusing to see the many strange objects if it did not shatter the often and much stressed "infallibility" of cloth inspection.

Figure No. 15 shows a piece of wood thoroughly woven into the cloth. Figure No. 16 shows a piece of wire in the cloth which caused rust spots in the fabric during bleaching. Figures No. 17 and No. 18 show fragments of wire, and No. 19 a weaving defect in conjunction with an oily piece of

waste. Closer inspection revealed a steel pin of unknown origin inside same. Many more pictures could be added to this chapter of woven-in objects, but it is considered sufficient examples have been illustrated.

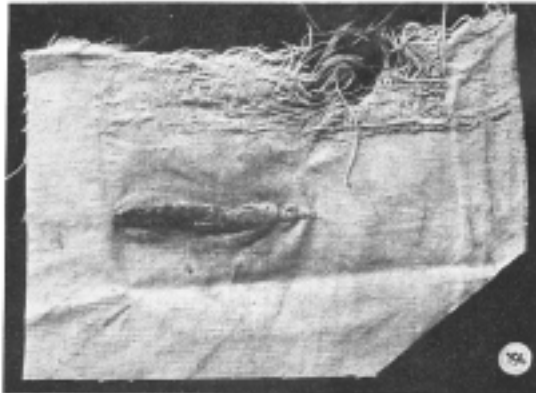


Fig. 19



Fig. 20

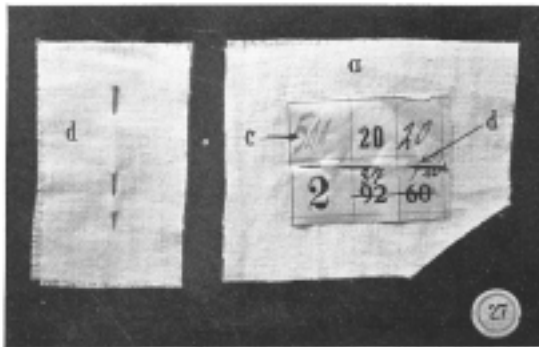


Fig. 21

For the sake of completeness, however, other sources of damage should be pointed out. One of them is the manner in which defects are marked on gray cloths by various weaving mills.

Figure No. 20 shows a lance-shaped darn-

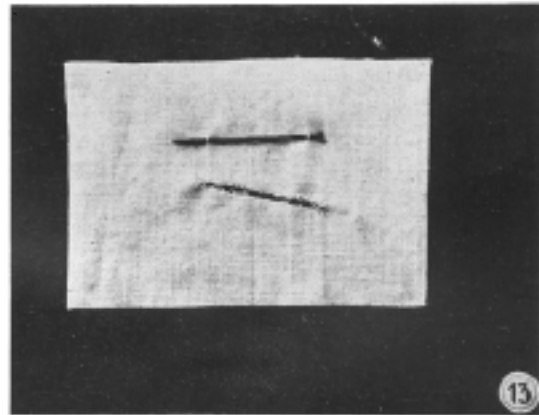


Fig. 22

ing needle for marking at the left (a), and a wire hook for the same purpose at the right (b).

In Figure No. 21, a pin was used to fasten a ticket. Mark (c) was made with a pencil. In the transfer of the goods from the weave room to the bleachery, the slip tore off, but the pin (d) remained in the cloth. A pin may easily be overlooked by a workman in a finishing plant, but does become a source of serious trouble.

Figure No. 22 shows a cloth cut by two rolls. No. 23 shows a defect in the cloth which the examiner had marked with a pin left in the cloth, instead of indicating the defect with a plainly visible tie thread at the selvage.

It is plainly seen that these methods of marking will cause a great deal of harm in finishing. The marking can be done effectively in a more harmless way.

Other defects are caused by foreign objects. They ought to arouse the interest of weavers and bleachers alike. These defects,

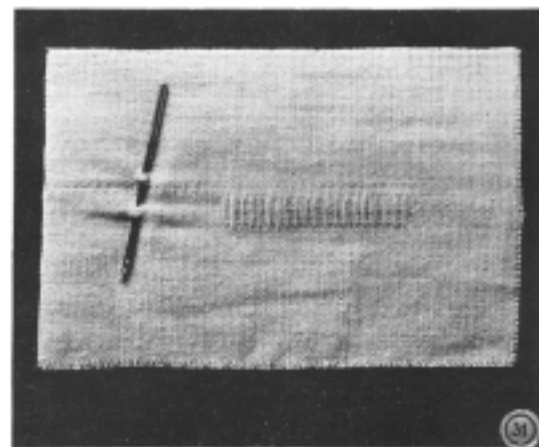


Fig. 23

when examined superficially, appear as if they originated in the finishing plant, because they are found mostly at regular, but sometimes irregular intervals, thus appear generally to be caused by calender rolls. If it is possible to prove that the damage did not originate in finishing, it is necessary to examine the gray goods from the same source.

Detection of such defects is often very hard because the observed trouble maker is seldom found in the whole lot, but only in individual pieces, and then again such faults will run from beginning to the end of a piece. Only under exceptionally accidental or favorable conditions is it possible to detect them in gray goods.

Another reason is that a great many times one loom only causes the mischief. One treatment, eventually develop holes. This is illustrated by Figure No. 24 (b).

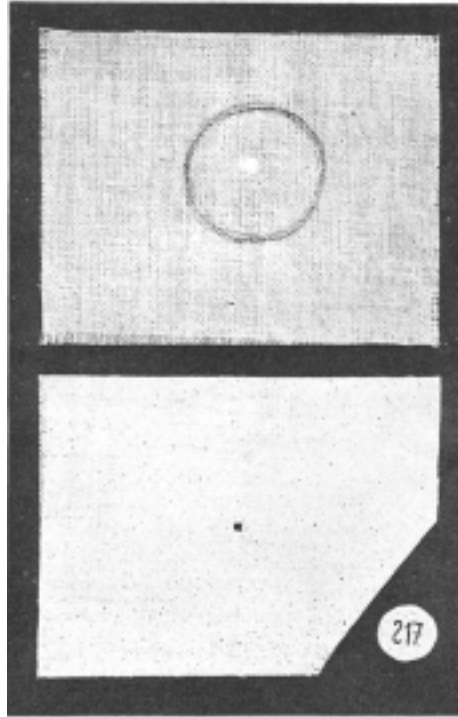


Fig. 24 a and b

particular case with dull looking places in the gray goods was caused by the sand roll of a loom. When the sand roll is very sharp, it is covered with a light piece of cloth to prevent injury to the fabric being woven. In the course of time, the covering wears out, and when the bare perforated tin of the sand roll presses against a hard cloth roll, it leaves impressions in the cloth and these are repeated with every revolution. Such impressions do not leave any visible holes at first, as Figure No. 24 (a) indicates. However, in the course of the finishing, beginning with the singeing and the subsequent processes, broken yarn appear which in the course of further