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BARBADOS

Technical report: Garment industry*

Prepared for the Government of Barbados
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of Adrian J. Foley
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United Nations Industrial Development Organization
Vienna

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I. ACKNOWLEDGEMENT

The writer would like to thank the Barbados Export Promotion Corporation (BEPC), the Government agency to which the writer was attached, and in particular Mr. Philip A. W. Williams, Executive Director, Ms. Peggy Griffith, Assistant Director Operations, Ms. Charmaine St John, Marketing Officer and indeed the staff of the BEPC for their unstinting help and friendliness.

The writer would also like to thank the Resident Representative, Mr. Rolf Stephanson and his UNDP staff, particularly Mr. D. McIntosh, Senior Program Officer, and Mrs. J. Russel, Mr. P. Ryan, SIDFA-UNIDO/Vienna.

II. INTRODUCTION

Background Information

The garment industry in Barbados comprises small and medium companies; which are generally family-run enterprises supplying the domestic market as well as some regional markets, and attempting to export to the USA. Currently, much of the export to the USA is done under the US PL 807 Scheme which permits re-import of garments from US made fabric and cut in the US but made-up in Barbados. This system, however, appears to offer only a short-term solution for Barbados since it depends on low cost for competitiveness, with labour cost in Barbados not being particularly cheap and becoming increasingly more expensive. Furthermore, with production and quality of production being low, there is thus an acute need for training and technical assistance.

The Project

The concept of the project was to assist six small garment manufacturers to:

- a) produce a sample collection of ladies' outerwear garments for the Puerto Rico market;
- b) secure orders for it;
- c) manufacture and deliver the orders.

In order to help achieve the above, the BEPC sought the help of the United Nations who then fielded three experts - A Garment Designer, a Garment Factory Manager and a Pattern Maker (the writer). The Designer commenced her duties in September 1985 and the Garment Factory Manager and the Pattern Maker their duties in January and February, 1987, respectively.

III. TERMS OF REFERENCE

- Post Title*** - Pattern Maker and Grader in the Garment Industry.
- Purpose of Project** - As a member of a team of three - a Garment Designer, a Production Manager and a Pattern Maker/ Grader attached to the BEPC, the Expert will assist a group of small garment manufacturers in Barbados, (6) who are attempting to gain access to the US and Puerto Rican markets - by advising the Designer, Production Manager and companies on methods by which productivity increases could be achieved through production engineering and assembly of garments, reducing material utilization by pattern engineering, improve quality by simplified handling procedures.
- Train factory counterpart in the basics of Pattern Making/Grading techniques.
- The Expert will also be expected to prepare a technical report setting out the findings of the Mission and recommendations to the BEPC on further action which might be taken.

* Duties changed after completion of project.

IV. THE PROJECT

The concept of the project was to assist six garment manufacturers to:

- a) produce a sample collection of high quality ladies' outerwear for the Puerto Rico market;
- b) secure orders;
- c) manufacture and deliver the orders.

The situation of the project when the Production Manager joined it in January 1987:

- a) four out of the six companies had dropped out for a variety of reasons;
- b) the designs were conceived and selling samples made and sent to Puerto Rico;
- c) the two remaining companies were Maxrone and Hooper Garment Factory.

The situation of the project when the writer joined it in February 1987 was:

- a) Maxrone Ltd. - 292 in 18 styles
Hooper Garment Factory - 61 in 14 styles
Total Worth - US\$8,111.00

With the orders needing to be completed and shipped from Barbados to arrive in store by 5th April, 1987;

- b) Due to the many styles as conceived and presented being more suited to haute couture, meaning they were complicated to make and required highly-skilled labour and lack of some specialist machinery and off-pressing equipment. These aspects should have been taken into consideration when designing the garments and were later to prove a handicap when producing the orders. The high number of difficult styles to grade, (32) and the very short time scale (one month) to do so, did not allow for any deviation towards simplification of design and manufacture by the Pattern Maker/Grader and the Garment Factory Manager;
- c) Most of the flimsy paper master patterns (usually the size 12) had been transferred onto pattern card prior to the writer's arrival by a Designer who was not connected with the project, without whose invaluable contribution, along with that of the BEPC who had set-up special working facilities within the BEPC as well as providing access to and from their outside normal working hours. Last, but not least, the writer's spouse who gave up a considerable amount of her time during the first month. It is doubtful whether the patterns could have been graded in time for the manufacturers to produce the garments for the deadline in April;
- d) All grading was completed by mid-March, according to specifications supplied by Designer and manufacturers, except for one style of Maxrone. Due to neither a pattern nor sample being available, a sample was made available on 26th March, which allowed the writer to make a pattern that would reproduce an exact replica of the sample garment sent to Puerto Rico;

- e) In addition to the grading, the writer gave technical assistance to the Garment Factory Manager in the completion of manufacturing specifications which were felt necessary for many of these styles, due to their complexity and limited time available to produce the garments. The specifications produced by the Factory Manager featured simple diagrams with notes recommending how the garments should be assembled and in what order the sequence of operations should take;
- f) By the end of January and the beginning of February 1987, the two manufacturers knew the extent of their orders. For some reason, the manufacturers delayed ordering the fabrics required for the above orders from the USA. By the time the fabrics were landed in Barbados and processed through Customs, the time had moved to the middle of March 1987. Maxrone started cutting orders on 16th March and Hooper Garment Factory on the 26th March. The orders were to have been delivered to Puerto Rico by the 5th April, but this was later extended to 15th April.

From the commencement of the cutting of the orders, the Garment Factory Manager concentrated his activities on - in the case of Maxrone, re-organizing the lay-out of the factory floor, and giving help, advice and support to the cutters and to the machinists. In the case of Hooper Garment Factory, the bulk of the orders (61 pieces) was made by one person to whom help, advice, etcetera was given.

Whilst the orders were being manufactured by Maxrone, the Garment Factory Manager liaised almost exclusively with the Floor Supervisor/Machinist whilst the two principals hardly ever made an appearance onto the factory floor. The garments were finally despatched on the 15th April, which meant they were still late despite the extended delivery date given. Had the fabrics been ordered on receipt of the orders, late

delivery would have probably been avoided. In the case of Hooper Garment Factory, the person who made the garments was Mrs. Hooper Senior. Not only is she knowledgeable but also keen to learn. The garments were despatched on the 12th April.

Unfortunately, there were further delays in the Puerto Rican Customs before the garments were delivered to the shops, as follows:

Hooper Garment Factory

Arrived Puerto Rico:	13-4-87
Invoice Released:	15-4-87
Cleared Customs:	28-4-87
Last Delivery to Shops:	8-5-87

Maxrone Ltd.

Arrived Puerto Rico:	16-4-87
Invoice Released:	23-4-87
Cleared Customs:	8-5-87
First Delivery to Shops:	19-5-87

It was inevitable because of the foregoing that garments were 3/4 weeks late into the shops, and so missed the start of the selling season. The writer understands that some of the shops were reluctant to receive goods arriving after the required delivery date which is hardly likely to inspire confidence in the future.

Due to the late delivery and other subsequent queries expressed by the Puerto Ricans, it was later felt necessary for the writer to visit Puerto Rico.

V. POST PROJECT ACTIVITIES

On the 4th May, a meeting was called by Mr. Philip A.W. Williams, Executive Director of the BEPC to discuss the future activities of the Garment Factory Manager and the Pattern Maker/Grader, now that the original project was completed. It was proposed to the writer and Mr. Bastow (the Garment Factory Manager) that help should be given to eight selected (by BEPC) companies which had export potential. The nature of the help would be to design a range of garments for each company in order that they may penetrate the Puerto Rican and other markets. It would be similar in concept to the project just finished except that the range of garments to be designed would be ladies' and gent's wear and not just high-fashion ladies' as previously.

With the introduction of the second phase, and the writer's appreciation for the need to broaden the technical assistance beyond that covered by his post title description, the writer proposed broadening of his involvement, which was readily accepted by the BEPC and the writer's Back Stopping Officer, Mr. A. Eraneva (Vienna). By mutual consent, the writer and Mr. Bastow divided the companies generally into ladies' wear and gent's wear, so that it would be easier to concentrate one's efforts. The writer gave assistance to all the companies involved in this phase of the project, although from the eight companies, two lost enthusiasm and dropped out.

A further decision was made to have samples ready for the Puerto Rican buying period of August/September '87 for delivery of finished goods around January/February '88.

The companies with which the writer was involved were:

- Colourtone Screen Printers
- Elias Industries Ltd.
- Glen Parker Manufacturing
- Hooper Garment Factory
- Juman's Garment Factory
- Maxrone Ltd.*
- Micky Garment Factory*
- Mico Garment Factory

* The two companies that dropped out in the early stage of the project.

Colourtone Screen Printers:

Month	No. of days	Activity
June	1	Collating with management on suitable style for Puerto Rican market.
July	3	Developing with trainee pattern maker fourteen (14) styles suited to interlock fabric (Jersey) and factory production.
August	1	Checking samples produced from previous months' pattern work.
Total No.	5	

Note - Company discontinued with project in August '87 due to potential order from the USA worth up to BDS\$380,000 per month.

Training - Mr. H. Naraine in Pattern making and Production Engineering.

Elias Industries Ltd.

Month	No. of Days	Activity
May	3	Developing new Men's and Youth dress shirt blocks for Puerto Rico.
June	1	Continued technical assistance with Production Manager - shirts produced from new blocks.
July	2	Working with Management on suitable fabrics and styling for Puerto Rico.
August	2	Continued technical assistance and collation on samples and literature to be sent to Puerto Rico.
October	1	Resolving problems encountered with new machinery purchased.
December	1	Working with Management on potential orders resulting from Puerto Rican trip.

Total No.

10

Note -

Company is negotiating Puerto Rico orders worth BDS\$1 million for Youth shirts with possible repeat orders. In addition, company is considering an order for new product, Men's underwear.

Training -

Mr. H. Naraine, Production Manager in Pattern making/Engineering.

Glen Parker Manufacturing

Month	No. of Days	Activity
May	10	Developing: (a) 14 Women's wear styles for Puerto Rico; (b) Men's shirt-jacket block - two (2) styles from block;
June	1	(c) Miami Vice jacket and 4-pleat trouser block for Mr. Bastow.
July	1	Grading both shirt-jacket styles.
August	2	Produce third shirt-jacket and grade the same.
Total No.	14	

Note -

There is a potential order of BDS\$250,000 for Men's shirt-jacket, Men's and Boys' 3-piece suits from Trinidad & Tobago, based on Mr. Bastow's and writer's work with this company.

Training -

Time spent showing the Designer, Mr. H. Smith, basic Pattern making/Grading shirt-jacket styles. Mr. Bastow continued this by showing how to grade Men's jackets.

Hooper Garment Factory

Month	No. of days	Activity
May	2	Collating with Management, styling for Puerto Rican Women's wear range.
June	9	Developing eight (8) styles selected the previous month.
July	1	Completion of the eight (8) first patterns.
Total No.	12	
	Training -	Mrs. Hooper Senior on specific garment assembly methods.

Juan's Garment Factory

Month	No. of days	Activity
June	7	Started development - High-fashion Denim Men's/Women's wear range for Puerto Rico.
July	9	Continued Pattern making for range.
August	12	Assistance now given in all aspects of range production including prices/marketing.
September	4	Developing new domestic product lines.
October	2	Grading styles for domestic market.
November	7	Continue development of Women's wear range for Puerto Rico.
December	1	Grading for domestic market.
Total No.	42	

*Note -

Potential order worth in the region of BDS\$38 million was put to this company as a result of the writer's work.

Training -

Mr. McLawrence and Mr. Simmons in basic Pattern Making/Grading - Production Methods - Costing - Marketing.

* See Company Profile.

Maxrone Ltd.

Month	No. of days	Activity
June	1	Working with Management on ten (10) styles selected to complement previous range sent to Puerto Rico.
July	1	Due to liquidity problems the writer spent time with the company considering the future.
October	1	Feasibility study on new 807 venture.
Total No.	3	
	Training -	Ad hoc Pattern making to Management.

Mico Garment Factory

Month	No. of days	Activity
June	1	Developing new shirt-jacket block to company's specification.
July	2	Developing range of shirt jackets from blocks - adjusting blocks to production methods.
September	10	Developed: (a) System based on (4) shirt-jacket shapes allowing company to infinitely vary styling; (b) Assisted Mr. Bastow in development of deep-pleated jacket; (c) Range of high-fashion denim skirts.
October	4	(a) Grading both shirt-jacket and skirt ranges to company specifications; (b) Assisted Mr. Bastow in fabric utilization costing for deep-pleated jacket.
Total No.	17	

Note -

A trial order of 30 dozen shirt jackets have been produced. 50 dozen fashion denim skirts have been produced and sold with further production planned.

Training -

Ad hoc to Mr. F. Juman (Partner) - Cutting Room Manager.

VI. NON-PROJECT COMPANIES

Apart from the seven post project companies, time was spent with five (5) other companies, as follows:

- Carol Cadogan (Cotton Days)
- Carib Island Designs Ltd.
- Pan Indiana Ltd.
- Winifred Enterprises Co. Ltd.
- Yankee Garments Ltd.

Carol Cadogan (Cotton Days)

Month	No. of days	Activity
October	1	Planning work program.
November	7	Producing blocks and technical assistance to Management.
December	5	Completed seventeen (17) blocks for Ms. Cadogan's new season's range.
Total No.	13	
	Note -	Recommendations to Management on potential for growth.
	Training -	Ad hoc to all members of staff.

Carib Island Designs Ltd.

Month	No. of days	Activity
October	1+	Assistance to Management on product lines.

Pan Indiana Ltd.

Month	No. of days	Activity
October	6	Training - Trainee Pattern-maker in Pattern & Grading Techniques.
November	2	Continued Mr. Bastow's project of advising on Management problems.
Total No.	8	

Winifred Enterprises Co. Ltd.

Month	No. of days	Activity
September	4	Developing Polo Shirt with Sir Gary Sobers.
October	3	Continued development of the above - recommendations for producing the same.
December	6	Developed new T-Shirt blocks and grading the same.
Total No.	13	
	Note -	Sir Gary Sobers and the company are planning a joint venture to be marketed under Sir Gary's name.
	Training -	Mr. D. Brathwaite and Ms. E. Grodine in Pattern Making and Grading techniques.

Yankee Garments Ltd.

Month	No. of days	Activity
November	2	Developed new dress shirt block.
December	3	Continued development and graded block.
Total No.	5	
	Training -	Management in Pattern-making and Production Engineering.

VII. TRAINING**THE PROJECT**

Due to the very short time available to the writer and Mr. Bastow between their arrival in Barbados and completion of the project, only a minimum amount of training was actually given during this period, with the writer concentrating on completing pattern and grading work without a counterpart so as to give the Garment Factory Manager the maximum available time for production, as we were both aware of the problems that were liable to occur during the production phase of the project. For the aforementioned reason, the Garment Factory Manager produced manufacturing specifications with technical assistance from the writer. This was done to assist in the often complicated method of assembly due to styling. Whilst patterns and specifications were being worked on, the writer frequently visited the two factories recommending changes to their management on many of the garment construction methods, that would be acceptable to the Puerto Rican customer and yet simplify production or improve quality of finished product. Between the completion of grading and end of project, the writer produced an additional six (6) patterns for Maxrone, as well as ad hoc technical assistance to Glen Parker.

Colourtone Screen Printers

The writer prepared, with the assistance of the company's Pattern maker, fourteen (14) patterns suitable for the Puerto Rican market and the company's current production methods. Samples were produced from most of the patterns prepared using existing fabric stock. The writer and the BEPC became aware that this company was negotiating an extremely large order from a USA company worth up to BDS\$380,000 per month. As a result, the company's principles decided to shelve the Puerto Rican project.

Elias Industries Ltd.

Here the writer produced for the company, Men's and Youth high-fashion shirt blocks, recommending modern production techniques that would assist the company to penetrate the lucrative Puerto Rico and US markets, working with the Managing Director, Mr. Elias, and the Production Manager, Mr. H. Naraine.

Glen Parker Manufacturing

The writer worked with the Production Supervisor, (who had a good working knowledge of manufacturing) introducing some up-dated and improved production techniques, for the Women's wear and Men's shirt-jacket ranges. In addition, the company's Designer was shown basic pattern making and grading of the shirt-jacket range, having been given training on the ladies' wear during the latter stages of the original UNDP project. Mr. Bastow continued training Mr. Smith in the grading of men's jackets.

Hooper Garment Factory Co. Ltd.

Having created eight (8) new patterns for this company's second stage of the Puerto Rican project, the writer discontinued the project with this company after consultation with the BEPC, due to the unfortunate hospitalization of Mrs. Hooper, which in turn put an excessive burden on Mrs. Hooper Senior, making it extremely unlikely that the company would have been able to produce the necessary samples in time for the Puerto Rican selling period, as these would be solely produced by Mrs. Hooper, who at the time needed to take care of the day-to-day running of the business in her daughter's absence.

Juman's Garment Factory

Here the writer spent his time producing a range, introducing all the features required in the production and marketing of a high-fashion denim product, to enable it to be successfully introduced into a sophisticated market such as Puerto Rico. The writer worked with two counterparts, Mr. McLawrence and Mr. Simmonds, both having a good working knowledge of the production aspect of the company. Therefore, the writer concentrated on other aspects of range collation as follows:

DESIGNING

Range of thirty-five (35) high-fashion denim garments, with recommendations for future trends including fabric type and colour coordination.

PATTERN MAKING

Puerto Rico and domestic ranges.

SAMPLES

Cutting and monitoring sample making.

PATTERN ENGINEERING

To reduce material and handling cost.

PRODUCTION ENGINEERING

To reduce labour cost.

QUALITY CONTROL

System on probability principle.

GRADING

Both theory and practice.

PRICING

Through cost analysis - Producing a priced balanced range.

MARKETING

Company image through promotional folder for agents and retailers - Projecting product image to retailers and customers through point of sales promotional advertising both on and off the garments.

In addition, the writer recommended the expansion of the company's product range, a recommendation that management is taking up, requesting the writer's assistance in the setting-up of a new factory for this purpose, as well as an expansion program to enable the company to cope with the volume, an order such as that put to the company in Puerto Rico, would create one hundred thousand dozen - BDS\$38 million, but at present finds it is unable to cope with.

Due to the company's inability to cope with the above order, it has engaged an agent who expects to obtain orders worth in the region of BDS\$250,000. Both the company and the writer are aware of Puert Rican Law 75 regarding agents.

Maxrone Ltd.

Ad hoc technical assistance Mr. & Mrs. Fox Directors. (Mrs. Fox having a working knowledge of elementary Pattern making). Unfortunately, due to liquidity problems the company was experiencing at the time, by mutual consent of the company and the BEPC, the company withdrew from the second stage of the project. Although the writer, when requested, did continue to give technical assistance.

Mico Garment Factory Ltd.

With regard to the shirt-jacket blocks, these were produced as the company felt, along with the writer, the need to improve the general fit and to up-date production techniques, for this type of product. Once this was done, the writer went on to produce a system of inter-changeable pattern components, allowing the company to vary styling features to suit customer requirements, along with fashion changes. At this stage, the writer ran through the system with company Directors and the Cutting Room Manager to ensure their ability to use the system. Having accomplished this, the writer went on to grade the system. In addition the company approached the writer regarding producing a range of fashion denim skirts, which he did, having completed the range of six (6). The writer went on to grade the same.

As this company did not provide a permanent counterpart, the writer spent time explaining the work that he had carried out to Directors or Cutting Room Manager.

NON-PROJECT COMPANIES**Carol Cadogan (Cotton Days)**

This company differed from the others the writer had been involved with whilst in Barbados, being a cottage industry creating highly marketable couture ladies' wear, already successful in attracting orders from the top Barbadian boutiques, as well as supplying much of the Barbadian society.

The problem this company is experiencing is not unusual in the small business sector the world over, with the proprietor starting a venture that grows beyond their ability to handle alone, mainly due to lack of management - administrative skills. With the aforementioned overcome, this company has in the writer's opinion, an extremely good growth potential in overseas markets not yet exploited, selling to exclusive departmental stores and boutiques in the USA and Europe. Subject to correct marketing, with the advantages of low turn-over and high profit margins. Of course, this cannot be achieved without change within the company and the introduction of semi-production methods for its basic lines, which need not take away the feeling of individualism Ms. Cadogan's garments evoke. What's more, this could be achieved without any dramatic increase in staff.

Due to time available, the writer could only outline his feelings on the possible future direction the company could take. Requiring the appointment multi-talented person, capable of running the company and implementing the necessary changes, along with marketing and sales ability for such an exclusive product.

Winifred Enterprises Co. Ltd.

The writer was approached by the company through the BEPC to assist in what turned out to be a proposed commercial venture between the company and Sir Gary Sobers, the company aiming to produce a product quite different to that currently being produced in styling and quality. After discussions with Sir Gary and the company, the writer along with Mr. C. Tate, (independent Consultant) set about formulating a program to produce the first samples, recommending changes within the company to up-grade the operative skill levels required to launch the envisaged product. It was appreciated by the writer and Mr. Tate, the company's ability to invest in machinery that would assist with production cost, and improved quality was limited, therefore recommendations were made accordingly.

The Sir Gary Sobers venture would appear to be a good one, if handled and marketed correctly. Winifred is aware of the need to improve quality standards.

Whilst working with this company, the writer became aware of the need to up-grade its current products, making recommendations to management and starting a program through the two counterparts the company had assigned to the writer, producing a new T-shirt range for both adults and children, grading the same.

Yankee Garments Ltd.

This company was looking to up-grade its market image in styling and product finish. The writer therefore set about the following:

- (a) Constructing engineered Men's dress shirt pattern with improved body and collar fit;
- (b) Introduction of new production techniques to improve productivity and quality (already high);
- (c) Re-design garment presentation package to improve point of sales image of garment;
- (d) Design factory lay-out, in preparation for company's move to new premises early 1988.

VIII. PUERTO RICO TRIP**Reasons for Trip:**

It was decided at the BEPC meeting on 7th July 1987, that a technical person should visit Puerto Rico due to the apparent dissatisfaction being expressed by the Puerto Ricans with the first shipment of garments from the Barbadian manufacturing companies, Maxrone and Hooper Garments, April/May 87. The writer visited Puerto Rico between the 19th - 22nd July 87, with the object of establishing the validity of comments being made, as follows:

- (a) garments received after specified date;
- (b)* sizing larger than garment label indicated;
- (c) some deliveries different to that ordered;
- (d) garment finish differed from that ordered on some styles;
- (e) customers invoiced for one quality, receiving another;
- (f) colour transfer from fabric to trim on some styles;
- (g) garments mis-matching;
- (h) quality.

Findings:

- (a) due to late despatch from Barbados and Puerto Rico Customs' delay, this claim was justified;
- (b)* no evidence of UNDP garments not meeting specifications, although some NON-PROJECT garments were found to be over-sized.
- (c) delivery of some styles were found to be different from original Puerto Rico samples - mainly the use of different trimmings;
- (d) pre-wash finish requested on orders for some styles was not carried out;
- (e) no evidence of invoicing different from that delivered was made available;
- (f) colour transfer from denim to lace trim had taken place;
- (g) evidence of mis-matching garments was made available, mainly denim styles;
- (h) no evidence of general workmanship differing from that of the original samples was made evident.

Whilst in Puerto Rico, the writer was given to understand that sizing and fit was one of the major stumbling blocks in the introduction of fashion products into the Puerto Rican market. In this respect, the writer was fortunate in visiting Carlota Alfaro Ltd., meeting Ms. C. Alfaro, being Puerto Rico's most prestigious dress house, as well as running their own fashion college. Whilst there, the writer was furnished with a copy of the company's size specification chart, which

differed from the original specifications the writer had been given to understand met with Puerto Rican standards, supplied by the Designer and manufacturers involved in the project. The writer would therefore advise any companies wishing to export women's wear to Puerto Rico to use the size chart

(Annex I).

IX RECOMMENDATIONS FOR THE FUTURE

Regarding the future, both the writer and Mr. Bastow are in total agreement of the need for management (including senior management) to be taught skills of management. The writer has included section VII of Mr. Bastow's report recommending that experts should be brought to Barbados to give lectures and seminars on the following:

- (a) quality control;
- (b) costing - i.e. labour, cloth and trimmings and how to monitor same;
- (c) time study, motion study and line balancing;
- (d) material handling in the sewing room and sewing room lay out.

In addition to the above, the writer would like to add marketing and its related skills, because no matter how good a product is, the market place needs to be exposed to the product correctly, for without this exposure the Barbadian garment industry will remain largely unknown. In this respect, the BEPC does an excellent job, but companies should realize it is their responsibility, not that of government or their agencies, to promote companies and their products. Having said that, good marketing can do little for poor quality or late deliveries.

It is appreciated that the above recommendations will take some time to implement, therefore the writer has left with the BEPC, a Management Manual produced by Kurt Salmon Associates, Inc. (KSA) which accompanied a seminar. Due to the size - some 600 pages, it is not possible to include it

with this report, so to give the reader an indication of the completeness (See Annex II). KSA being one of the world's leading management consultants, are able to draw from a wealth of experience. For those companies that could afford such a seminar, it would be worth the investment. The writer does not have current cost, but appreciates they will be rather high for many companies.

X. COMPLETION OF PROJECT

The writer would like to thank UNIDO (Vienna), UNDP/ Bridgetown and the BEPC for their assistance. Having been approached by two project companies to continue technical assistance beyond the writer's assignment. The writer understands this is the first occasion an expert has been requested to continue technical assistance, being paid for by the companies concerned. Whilst it is appreciated, this is not possible for many of the garment manufacturers in Barbados. The writer feels that a contribution towards future technical assistance would probably result in a greater transfer of technology.

ANNEX I

MEASUREMENT CHART CARLOTA ALFARO INTERNATIONAL, INC.

	4	6	8	10	12	14	16	18	20
1. Waist	25-1/2	26-1/2	27-1/2	28-1/2	30	31-1/2	32-1/4	34	36
2. Bust	34	35	36	37	38-1/2	40	41-3/4	43-1/2	45-1/2
3. Widest part of the hip	37-1/2	38-1/2	39-1/2	40-1/2	42	43-1/2	45	47	49
4. From highest part of the shoulder across the bust to the waistline	17-1/2	17-3/4	18	18-1/4	18-3/8	18-5/8	18-7/8	19-1/8	19-3/8
5. From highest part of the shoulder to waistline	16-1/2	16-3/4	17	17-1/4	17-3/8	17-5/8	17-7/8	18-1/8	18-3/8
6. From shoulder to shoulder	14-1/2	14-3/4	15	15-1/4	15-1/2	15-3/4	16	16-1/4	16-1/2
7. From highest part of the shoulder to the center of the bust	9	9-1/2	10	10-1/2	11-3/8	11-1/2	11-5/8	12	12-1/8
8. Bust separation from the center of each bust	7-1/4	7-3/8	7-1/2	7-5/8	7-3/4	8	8-1/4	8-3/4	9
9. Length of sleeve	26	26-1/2	27	27-1/2	28	28-1/2	29	29-1/2	30

ANNEX II

SECTION I: INDUSTRY OBJECTIVES AND OUTLINE

A. OUTLINE
APPAREL FACTORY MANAGEMENT COURSE

- I. TRAINING OBJECTIVES AND OUTLINE
- II. INDUSTRY OVERVIEW
 - A. Characteristics, Trends
 - B. Trade Associations
 - C. Unions
- III. RUNNING THE PLANT
 - A. Production Systems
 - B. Production Control/In-Process Inventories
 - C. Layout
 - D. Quality Control
- IV. HUMAN RESOURCES
 - A. Employee Selection and Placement
 - B. Induction Orientation
 - C. Operator Training
 - D. Supervisory Selection & Development, Goal Setting, Supporting, Conducting Meetings
 - E. Maximizing Use of Manpower
 - 1. Incentive Systems
 - 2. Rate Installations
 - 3. Operator Motivation
- V. COSTS, SAVINGS AND RETURN ON INVESTED CAPITAL
 - A. Proper Use of Equipment/Methods
 - B. An Appreciation of Work Measurement
 - C. Manufacturing Analysis - Labor Content - Standard Costs
 - D. Savings Calculations
 - E. Payback Calculations

- VI. CUTTING ROOM
 - A. Equipment/Methods
 - B. Incentives
 - C. Material Utilization

- VII. WAREHOUSING & SHIPPING

- VIII. WASTE CONTROL
 - A. Piece Goods
 - B. Thread & Other Trim
 - C. Supplies
 - D. Heat, Light & Power

- IX. WRAP-UP

B. TABLE OF CONTENTS

- I. TRAINING OBJECTIVES AND OUTLINE**
 - A. Outline of Course
 - B. Table of Contents

- II. INDUSTRY OVERVIEW**
 - A. Apparel Industry Segments
 - B. Some Comments on the U.S. Garment Industry
 - C. Conditions in the Women's Garment Industry
 - D. Productivity in the United States
 - E. Trade Associations
 - F. How to Attend Trade Shows
 - G. Unions

- III. RUNNING THE PLANT**
 - A. Production Systems
 - B. Running a Progressive Bundle Unit
 - C. Determining the Optimum Size of a Progressive Bundle Unit
 - D. Production Control
 - E. Effective Operator Analysis
 - F. KSA Balance Problem
 - G. Five Blank Forms - Daily Production Balance
 - H. KSA Balance Problem Answers
 - I. Layout Instructions
 - J. Guidelines on Square Footage Requirements
 - K. The Human Side of Quality Control
 - L. Using Quality Control to Increase Productivity
 - M. Quality Specifications and Reports

- IV. HUMAN RESOURCES
- A. Employee Selection and Placement
 - B. Induction/Orientation Program
 - C. The KSA Personnel Installation
 - D. The Advanced Analytical Method of Training
 - E. Operator Training Program for Supervisors and Job Trainers
 - F. Scientific Operator Training Revisited
 - G. Why are Some Training Programs Effective?
 - H. Labor Turnover Problem: One Solution
 - I. Benefits of an AAMT Program
 - J. Supervisor Selection, Training and Development
 - K. Duties and Responsibilities of a Supervisor
 - L. Incentive Systems
 - M. Incentive Systems Problems
 - N. Incentive Systems Answers
 - O. Rate Installations
 - P. Capacity Study Procedures
 - Q. Operator Motivation
 - R. History of Behavioral Sciences in Business and Industry
 - S. Characteristics of a Good Manager (Engineers, Too!)
 - T. A Good Job
 - U. A Credo
 - V. Follow-Up Philosophy
 - W. Capacity Study Problem
 - X. Capacity Study Answer
 - Y. The Blackboard
 - Z. The Kardex Record

- V. COSTS, SAVINGS AND RETURN ON INVESTED CAPITAL
 - A. Stitches
 - B. Seams
 - C. Equipment
 - D. Equipment Codes
 - E. List of Exhibitors at Bobbin Show
 - F. Machine Trouble Check List
 - G. Methods and Workplace Design
 - H. The Calf Path
 - I. Decades of Improving Productivity
 - Trousers
 - Women's Wear
 - Men's Dress Shirts
 - J. KSA Time Study Procedure
 - K. Predetermined Times
 - L. Kurt Salmon Data
 - M. Regression Analysis
 - N. Multiple Regression Analysis for Rate Determination
 - O. Definitions and Derivations of Cost and Measurement Terms
 - P. Gunned Sheet for Procedure for Supervisory Personnel
 - Q. Manufacturing Analysis - Labor Content
 - R. Operator Performance Problem
 - S. Operator Performance Answer Sheet
 - T. Payback Problem
 - U. Payback Answer Sheet

- VI. CUTTING ROOM
 - A. Cutting and Material Utilization
 - B. Material and Cutting Labor Costs in Perspectives
 - C. Material Utilization Performance Audit Outline
 - D. Sources of Material Losses
 - E. Basic Section Theory
 - F. Labor Utilization
 - G. Cutting Room Incentives

- VII. WAREHOUSING AND SHIPPING
 - A. Introduction
 - B. Warehouse Management
 - C. Quality
 - D. Housekeeping
 - E. Capacity
 - F. Incentives
 - G. Warehousing Incentive Installation

- VIII. WASTE CONTROL
 - A. Thread
 - B. Other Trim Items
 - C. Supplies
 - D. Energy - Heat, Light and Power
 - E. Boiler

- IX. WRAP-UP

ANNEX III

GRADING

The writer decided to write the following paper in an attempt to assist those manufacturers he was unable to spend time with, as well as acting as a permanent reminder to those he did during his year of assistance to the Barbados Garment Industry, through the UNDP/BEPC programme.

RADIAL GRADING: this method is based on a form of drafting, having remarked the master block pattern pieces out on sheets of pattern card, then by the method to be explained later, a nest or grid of the various pattern sizes are produced, from which patterns are spiked off into fresh sheets of pattern paper for each size.

STACK RADIAL is as above only having produced the graded nest. The appropriate number of sheets of pattern card are stapled together, laying the nest on top, then by cutting around the various sizes one at a time, starting with the bottom sheet first working upwards until all sizes are produced.

STACK TRACK is a method by which all the various sizes are created simultaneously, based on the track system. This system requires the use of some specialist equipment. Once mastered, this is the fastest method of grading. Having said that, it requires a considerable degree of training and does not lend itself to explanation in simplistic terms.

TRACK GRADING: this term applies when grading increments are applied to individual pieces of pattern by moving the base pattern (master) pieces, along pre-determined track lines around the pattern, section by section, thereby creating the various sizes required.

It must be appreciated that in a document of this size, specialist areas cannot be covered, the writer therefore suggests, should the reader require specialist information, he or she should refer to a book covering their needs, as it is the writer's intention to keep the information within as simple as possible, so as to be understood by as many as possible. Furthermore, the systems prescribed for the various types of garments shown should more than adequately cover most of the needs of the Barbadian garment industry, which is based on internationally accepted standards, for increasing sizes. However, some experts and grading manuals

may suggest slight variations on the precise amounts and positioning of some grading increments. The writer does not intend to make any further reference on this subject, other than to say the methods contained within this paper, if carried out correctly, will produce a well-fitting garment within the average size differences produced by the great majority of the Barbadian garment industry.

The methods explained in the following pages cover the following systems:

- (a) Radial Grading
- (b) Radial Stack Grading

GRADING INCREMENTS

The positioning of grading increments correctly is the first thing one has to understand if grading is to be carried out correctly. This involves the correct positioning, along with applying the correct amounts, to the various sections of a pattern, which in turn maintains the correct balance and fit of the master-size pattern, throughout the size range to be offered to the customer and public.

As Barbadian garment manufacturers still work to imperial standards, ALL MEASUREMENTS REFERRED TO WILL BE TO IMPERIAL STANDARDS WITH A TWO INCH DIFFERENCE BETWEEN EACH SIZE.

All measurements given in Section 2 and the rest of this paper are shown in unit values of a 1/16 inch, i.e.

1 = 1/16"	8 = 1/2"
2 = 1/8"	16 = 1"
4 = 1/4"	20 = 1-1/4"
6 = 3/8"	

GRADING INCREMENTS REFERENCE POINTS

THIS SECTION is a reference for Grading Increments, covering all basic block types. The increments are based on a 2" increase and decrease between sizes, which is generally accepted as being the correct difference between sizing.

THE REFERENCE INCREMENT data is presented in two forms, in order to make it as clear as possible, exactly where the increases take place:

- (a) Split Diagram
- (b) Grading Plan

THE SPLIT DIAGRAM visually represents the distribution points, showing the precise areas of the patterns, where increments are distributed.

GRADING PLAN shows how the right angle movements used in grading relate to the split image diagram. (See Starting Point)

GENERAL NOTES

- (a) Each pattern piece must have a zero/starting point. In this paper, grade direction as well as the amounts will be indicated from these points.
- (b) The points at which grading is applied are referred to as 'Cardinal Points'. Grading commences from each of these cardinal points.
- (c) Grading directions and increments from each cardinal points are indicated in the plan diagrams (section 2) using the zero point indicated. If different zero points are used, figure 7A and B, different increment values will have to be applied to the various cardinal points.

GRADING INCREMENTS REFERENCE POINTS

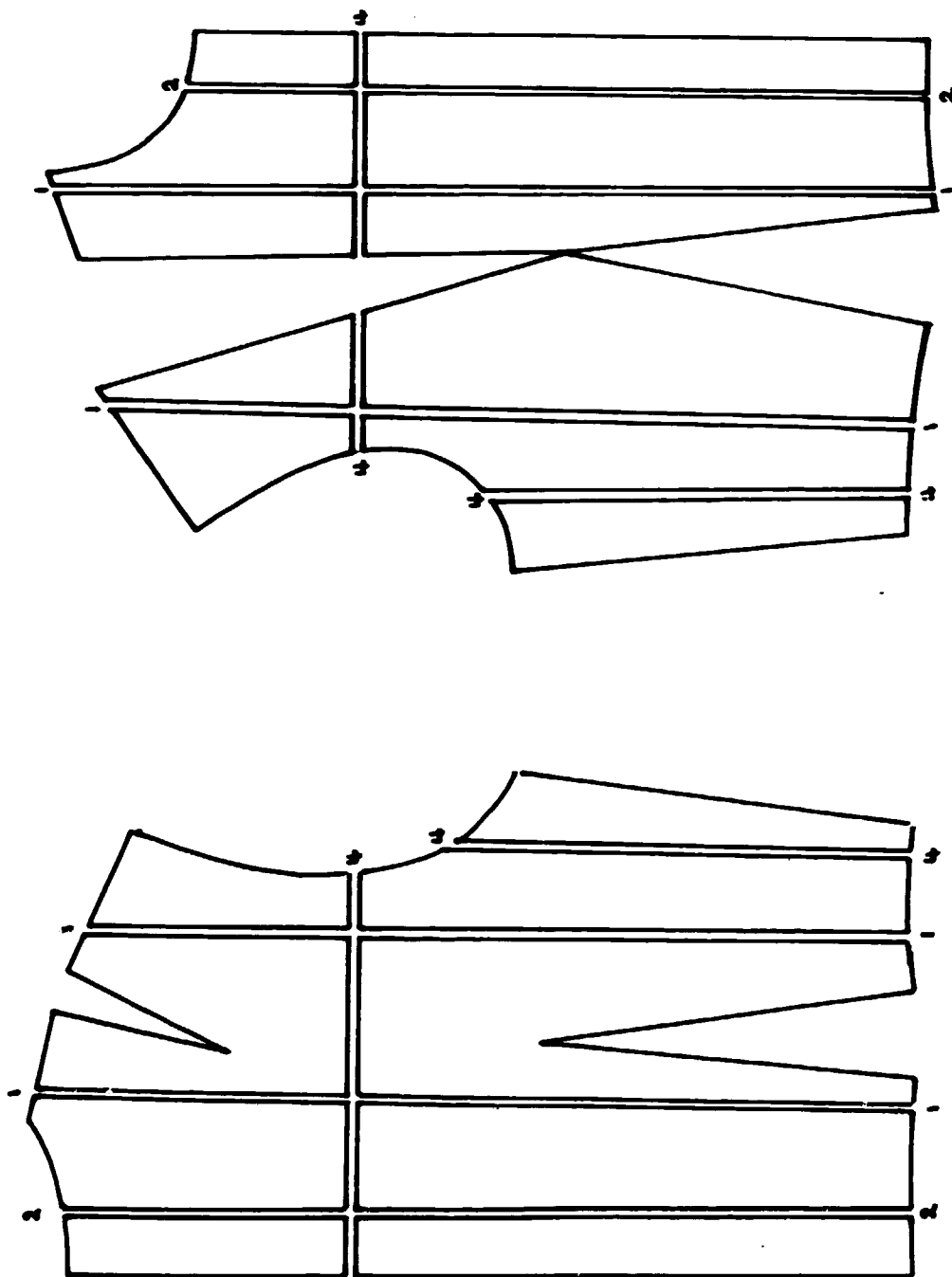
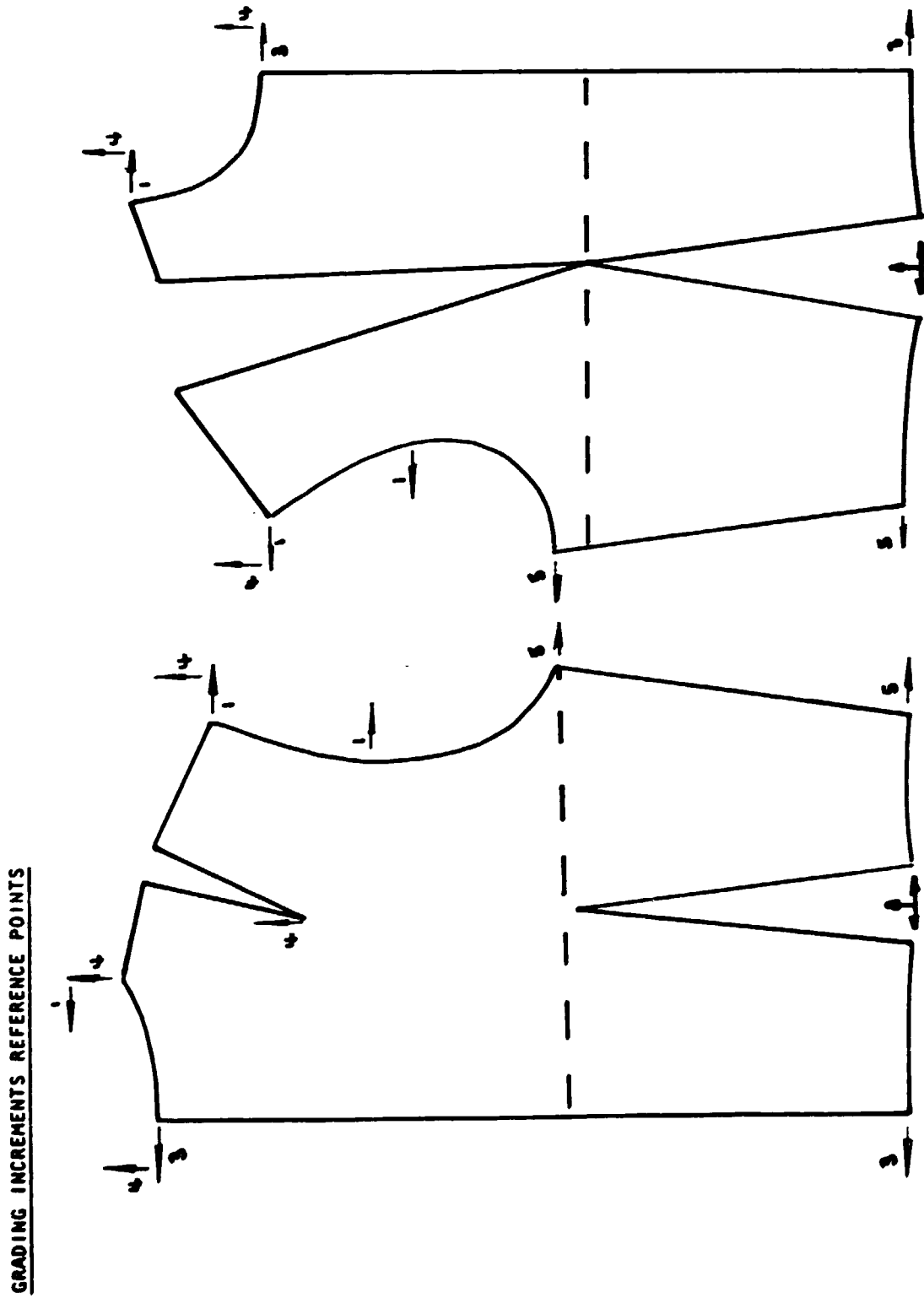


Figure 1 (A) Bodice Block Split Diagram



GRADING INCREMENTS REFERENCE POINTS

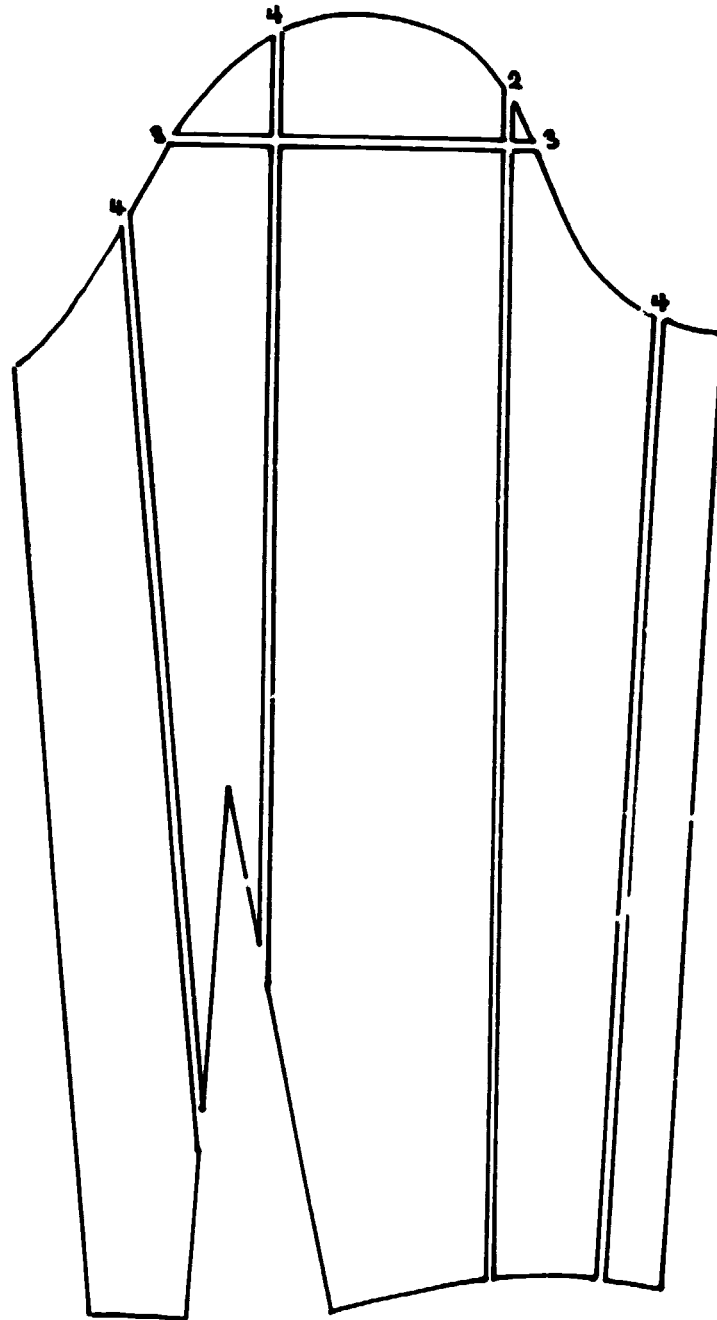


Figure 2 (A) Split Diagram One-Piece Sleeve

GRADING INCREMENTS REFERENCE POINTS

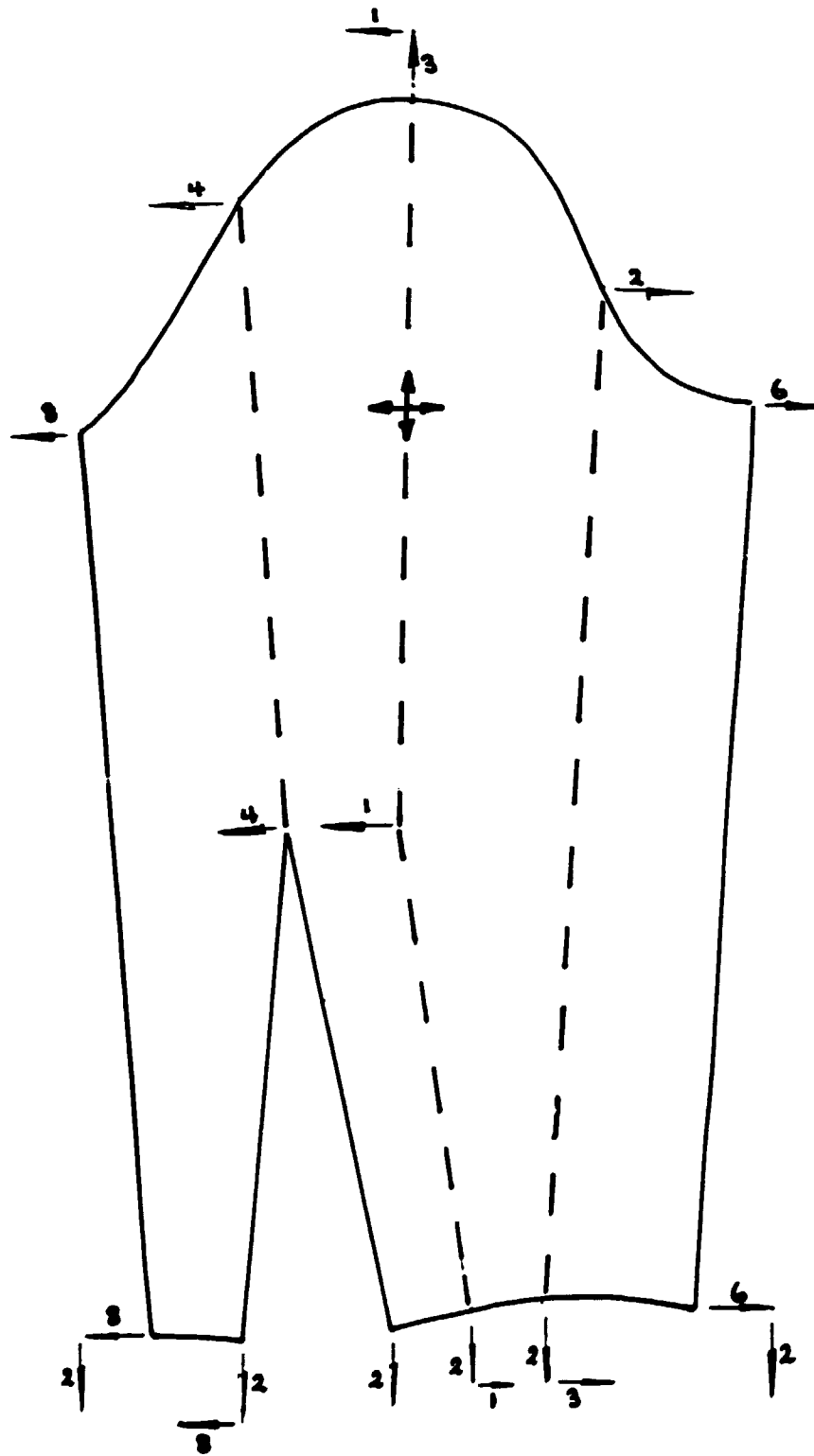


Figure 2 (B) Grade Plan One-Piece Sleeve

GRADING INCREMENTS REFERENCE POINTS

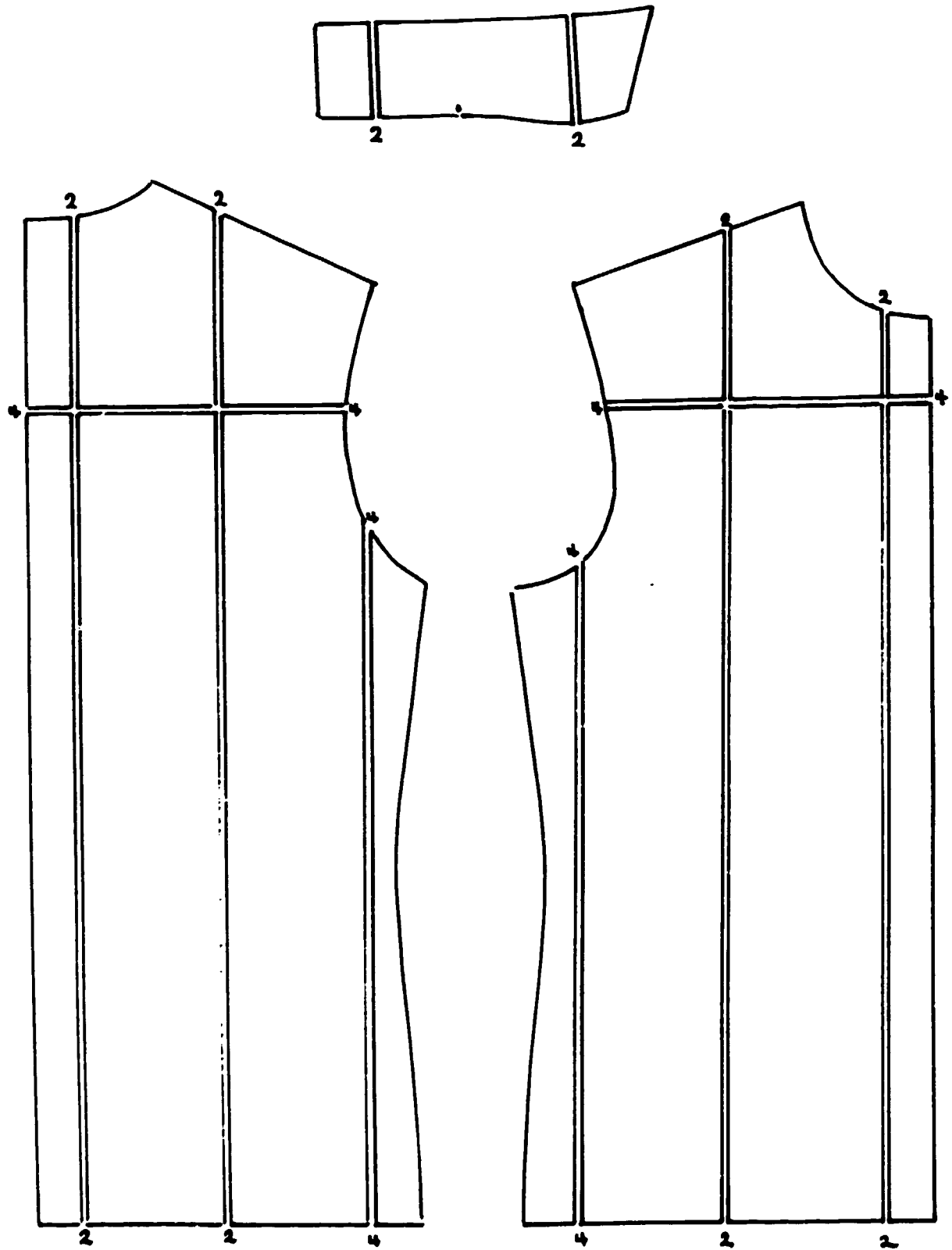


Figure 3 (A) Shirt or Bust-less Blouse Split Diagram

GRADING INCREMENTS REFERENCE POINTS

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ANNEX III (cont'd)

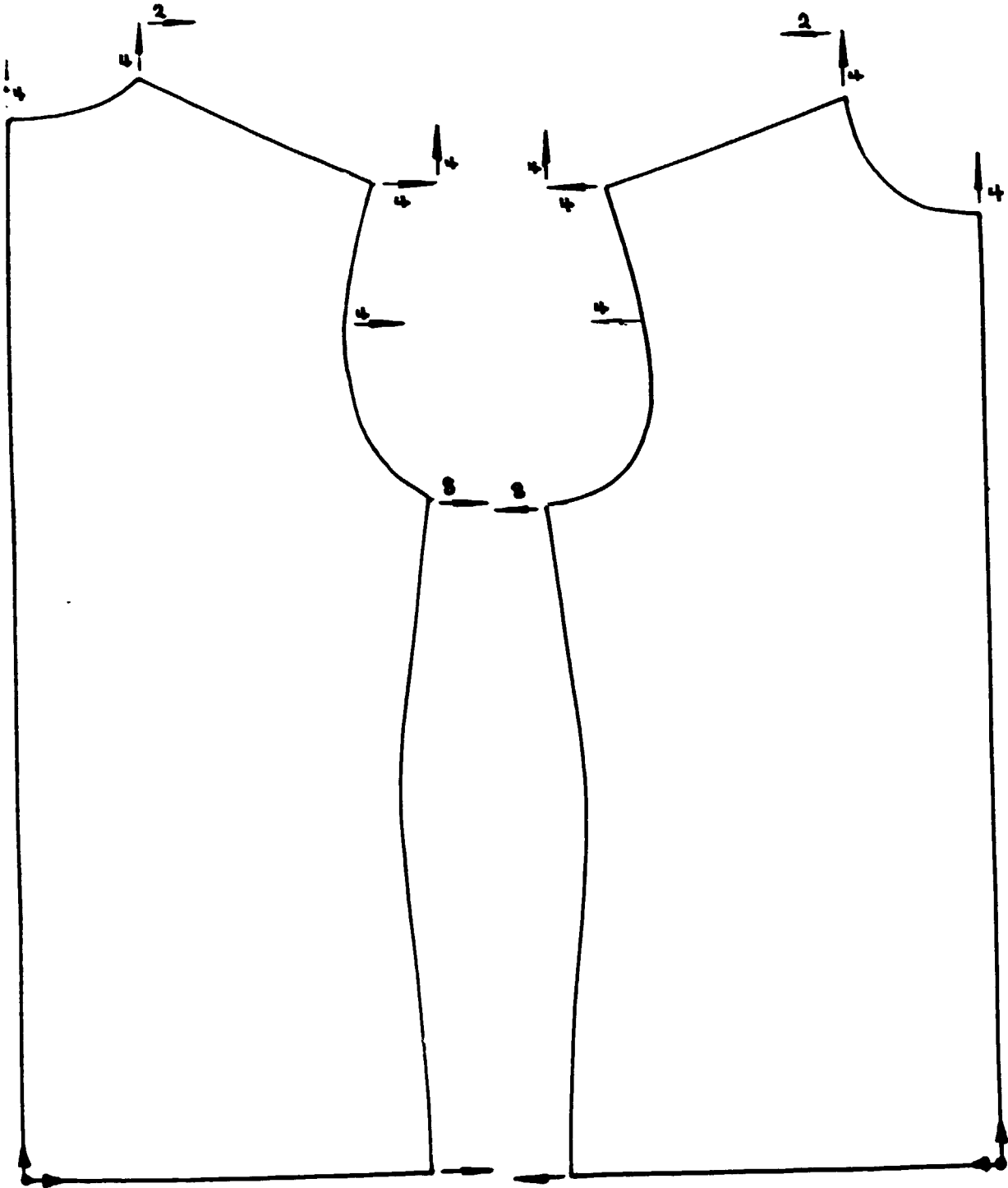
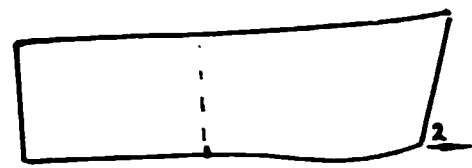
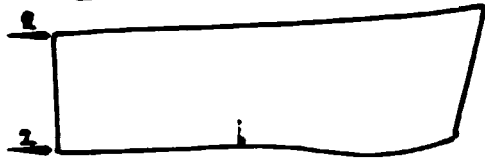


Figure 3 (B) Shirt or Bust-less Blouse Grade Plan

GRADING INCREMENTS REFERENCE POINTS

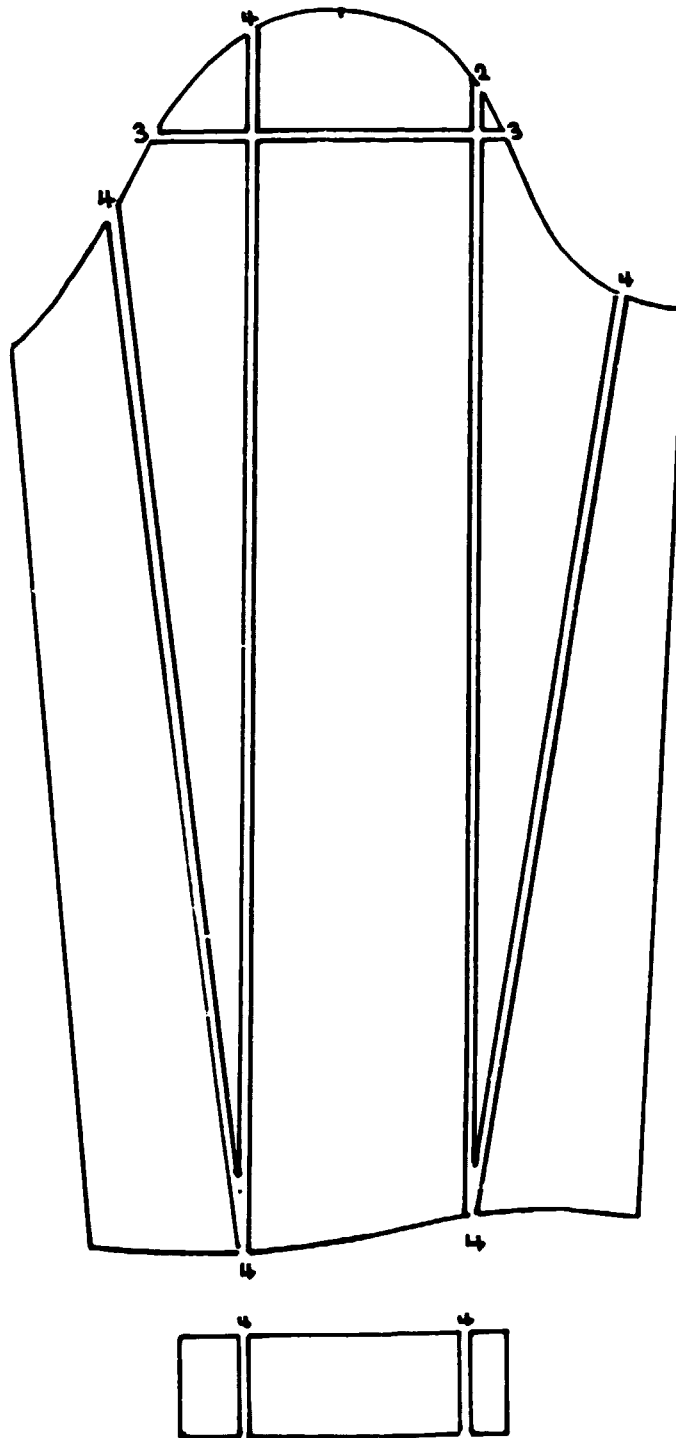


Figure 4 (A) SHIRT OR Shirt Blouse Split Diagram

GRADING INCREMENTS REFERENCE POINTS

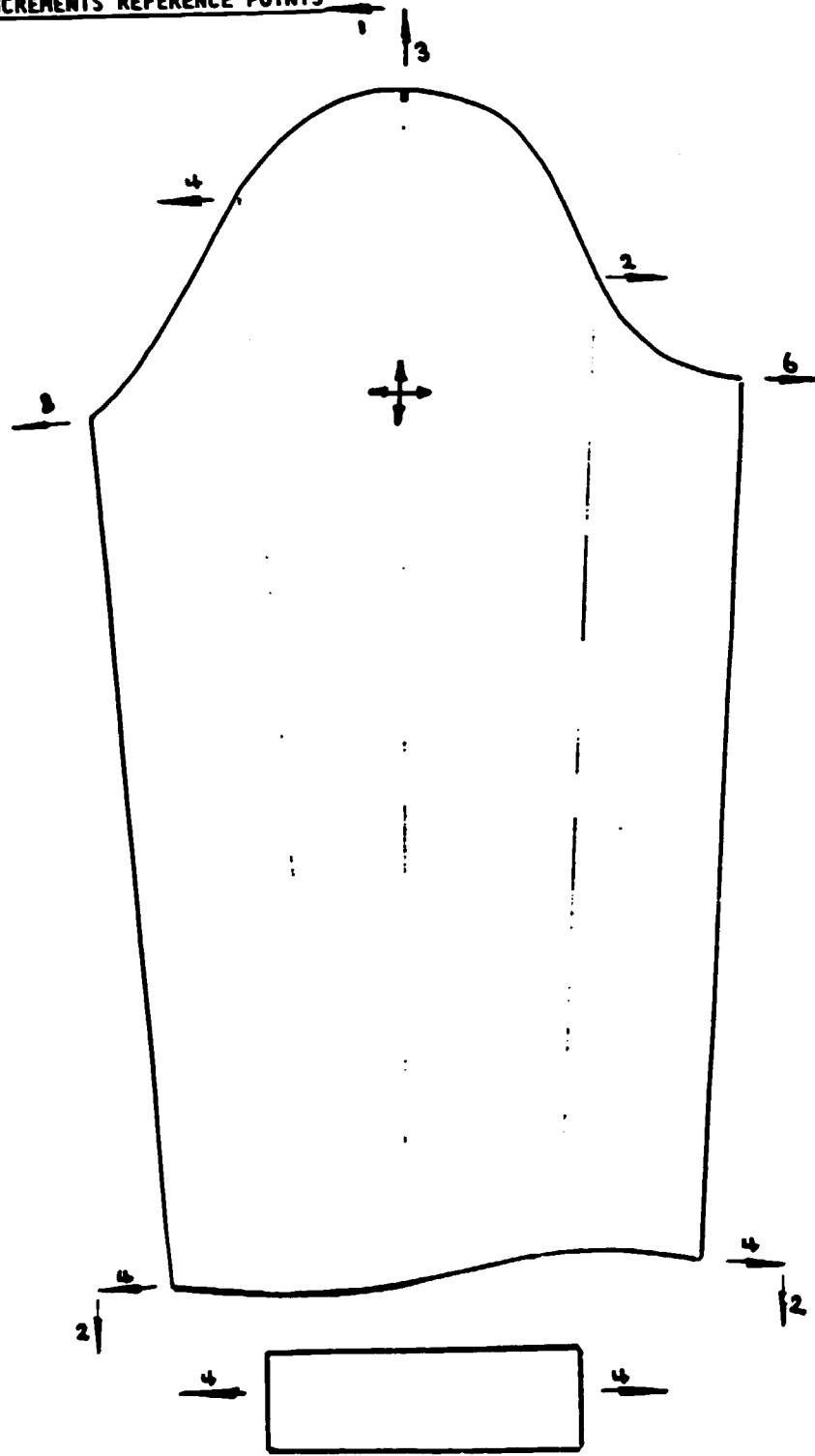


Figure 4 (B) Shirt or Shirt Blouse Sleeve Grade Plan

GRADING INCREMENTS REFERENCE POINTS

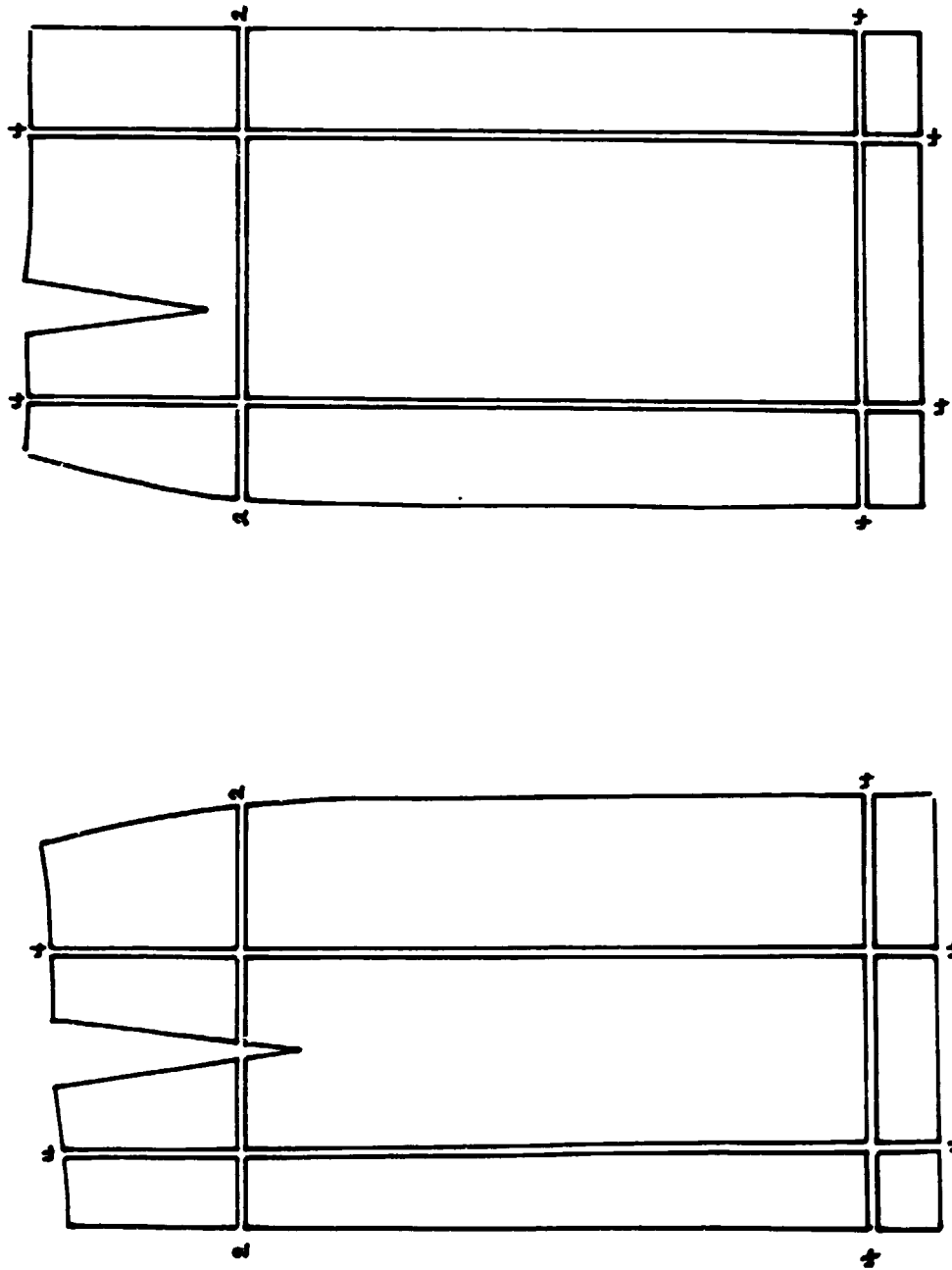


Figure 5 (A) Skirt Split Diagram

GRADING INCREMENTS REFERENCE POINTS

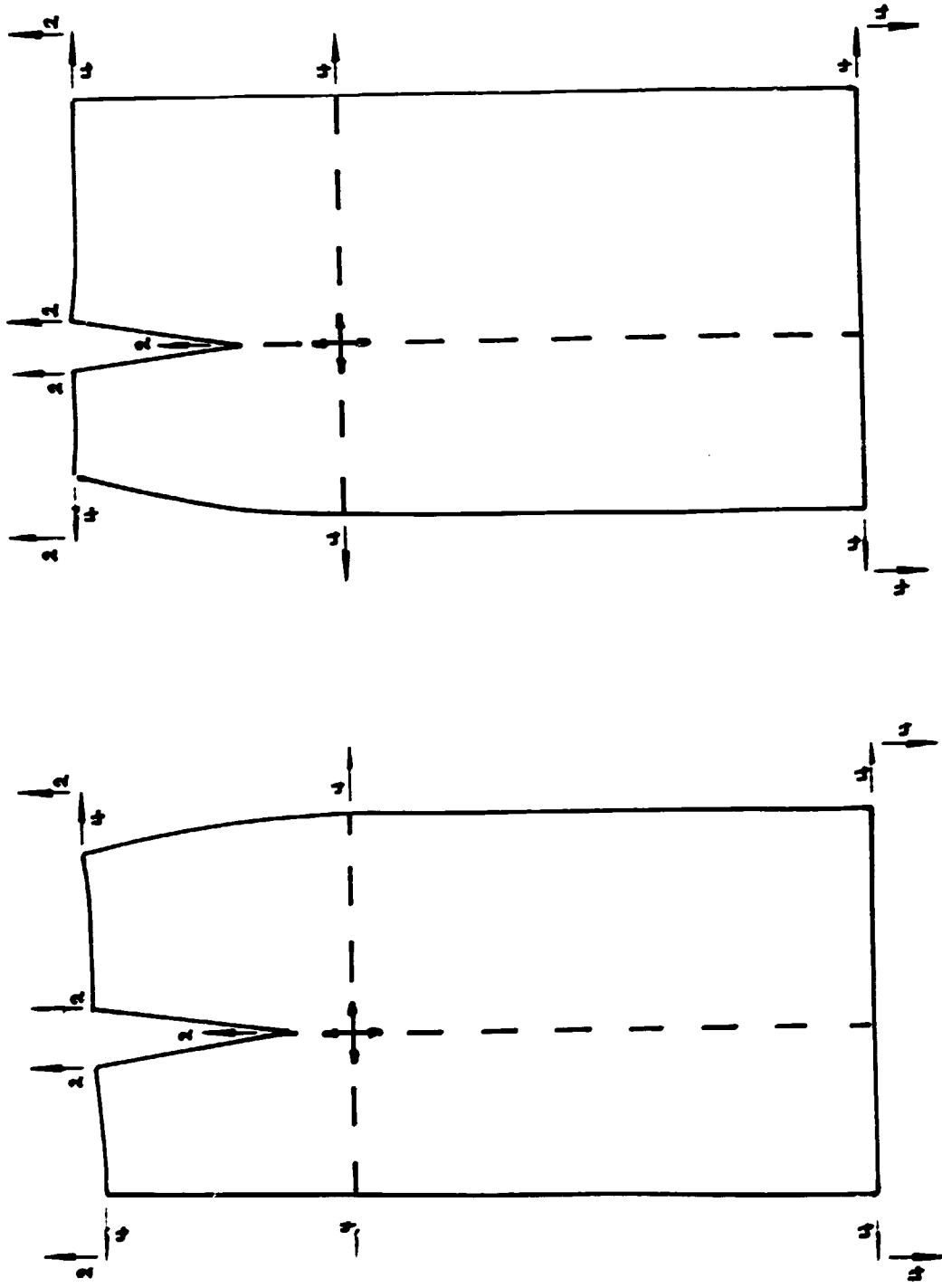


Figure 5 (B) Grade Plan Skirt

GRADING INCREMENT REFERENCE POINTS

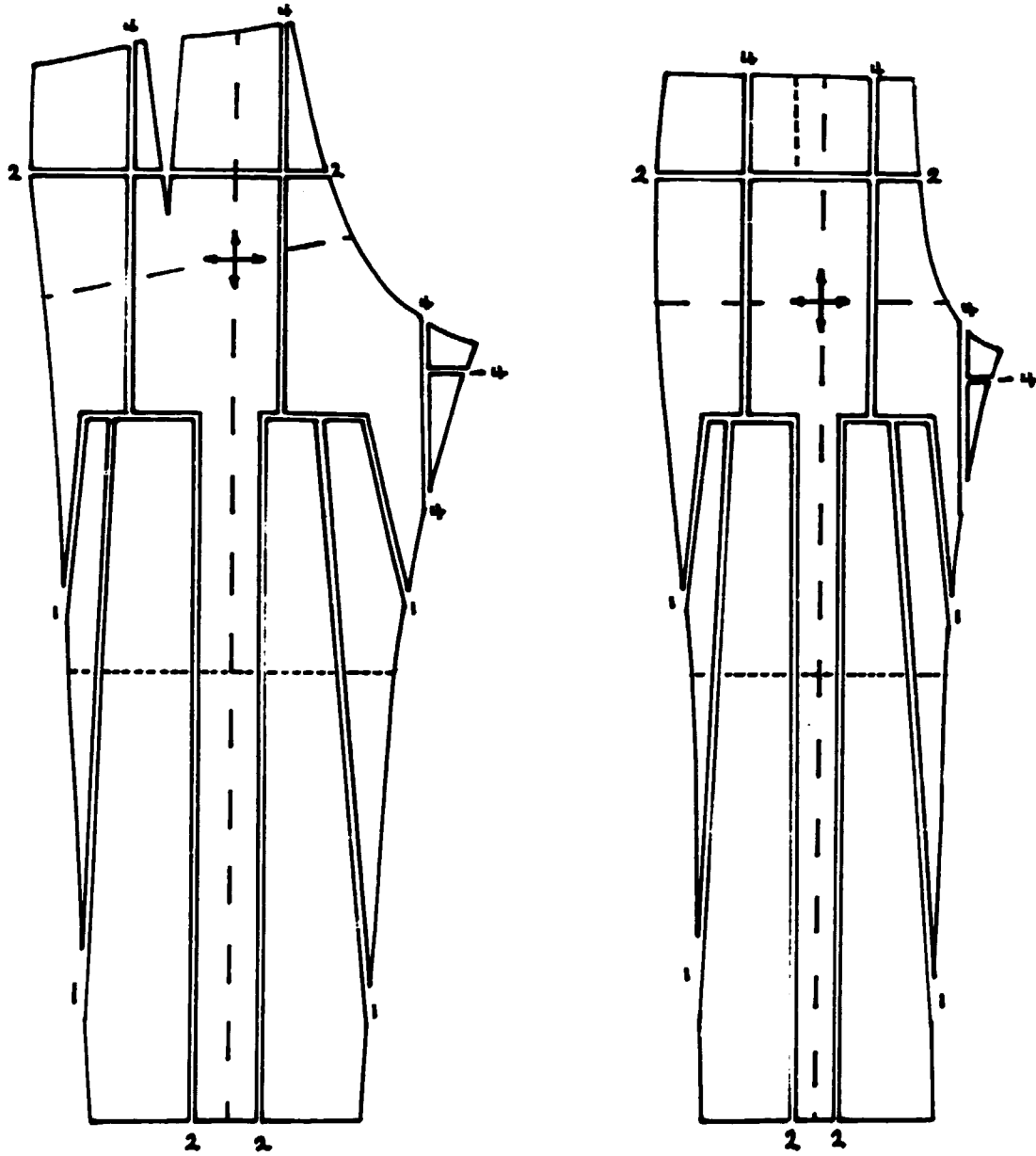


Figure 6 (A) Trousers Split Diagram

GRADING INCREMENTS REFERENCE POINTS

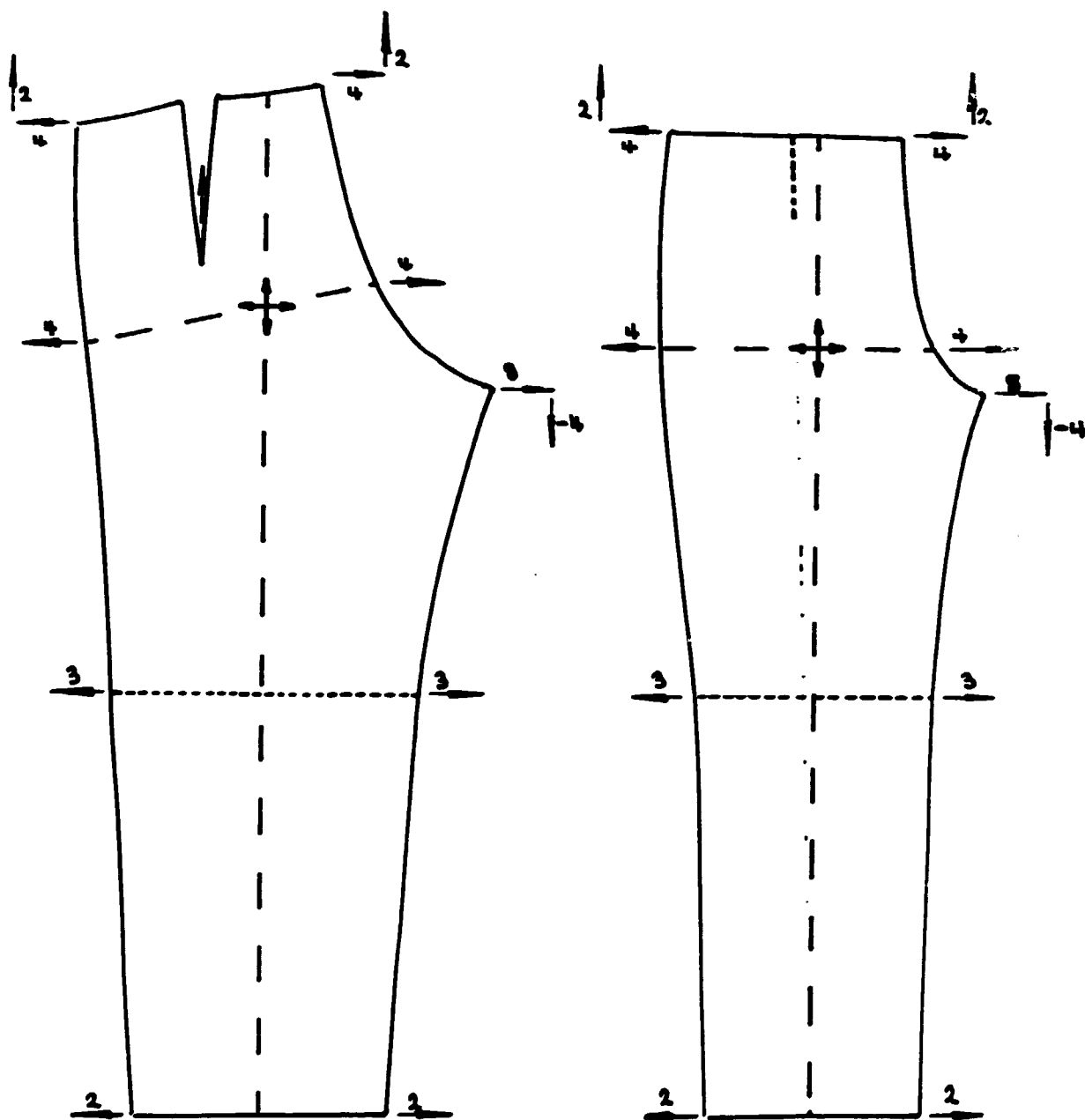
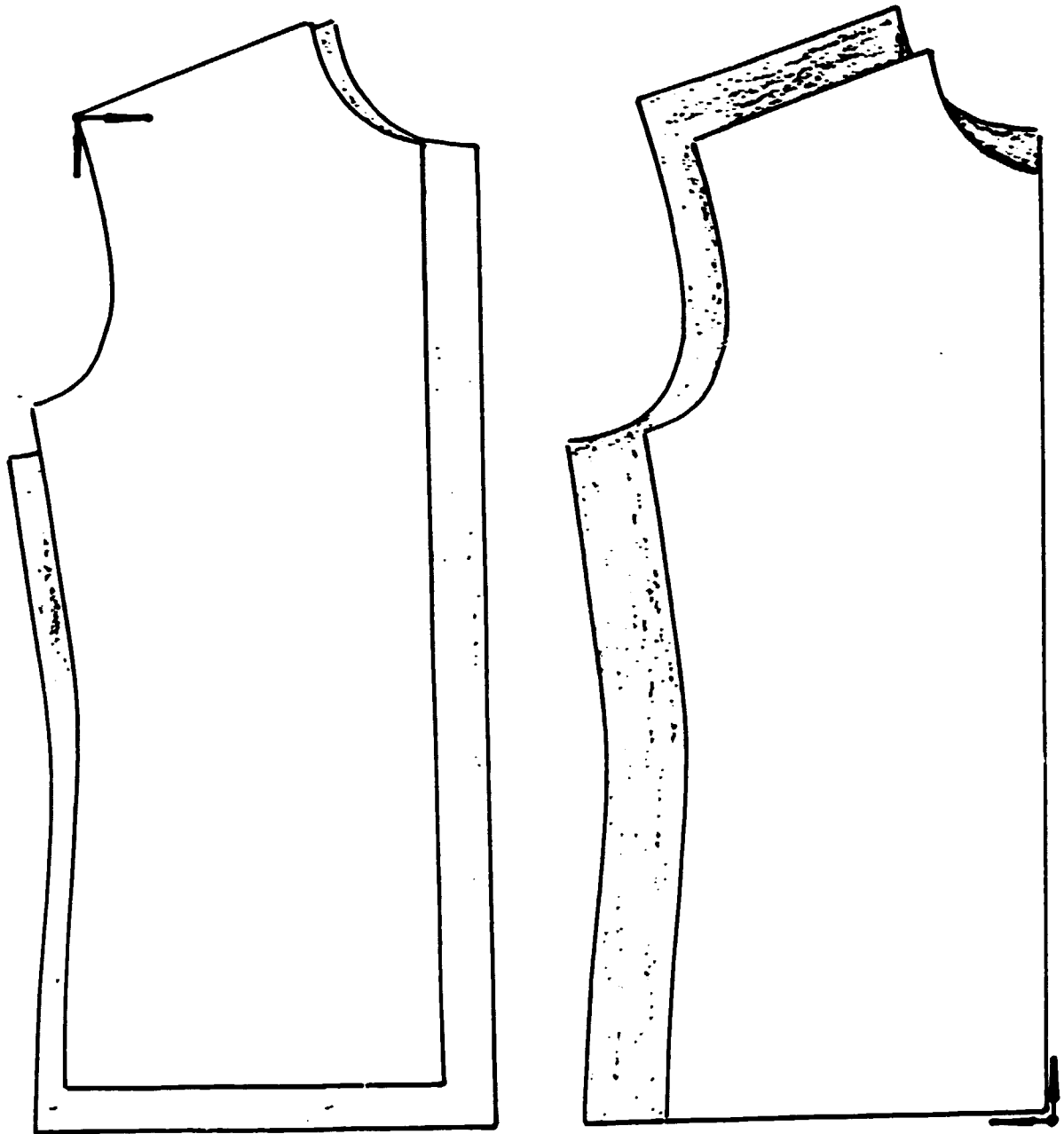


Figure 6 (B) Trousler Grade Plan

ESTABLISHING GRADE INCREMENTS FROM A START POINT

The ability to select a starting point, sometimes referred to as Zero, because no movement takes place, and calculate incremental increases from it, is another essential skill of grading. Figure 7 (A) and (B) illustrate the same pattern piece graded from a different starting point, the dimensions and shape remaining the same.



GRADING DRAFT

THIS SECTION DEALS with the operations in drafting to create the various sizes required:

- (a) Establishing Cardinal Points**
- (b) Applying increments to Cardinal Points**
- (c) Creating Graded Nest/Grid**
- (d) Spiking-off Sizes**
- (e) Stack Grade from Nest**

ESTABLISHING CARDINAL POINTS having remarked the master piece(s) accurately onto a fresh sheet of pattern paper, allowing sufficient space around for grading. The next step is to establish the cardinal points for the pattern piece(s) to be graded. This can be done by referring to Section 2, grade plans. Where patterns have been cut about for styling reasons i.e. yokes, seams, etcetera, the pattern pieces should be laid down as in figure 8 (a) and (b) bringing them back to the block form as illustrated in section 2. From there one can apply the cardinal points to the pattern pieces as required.

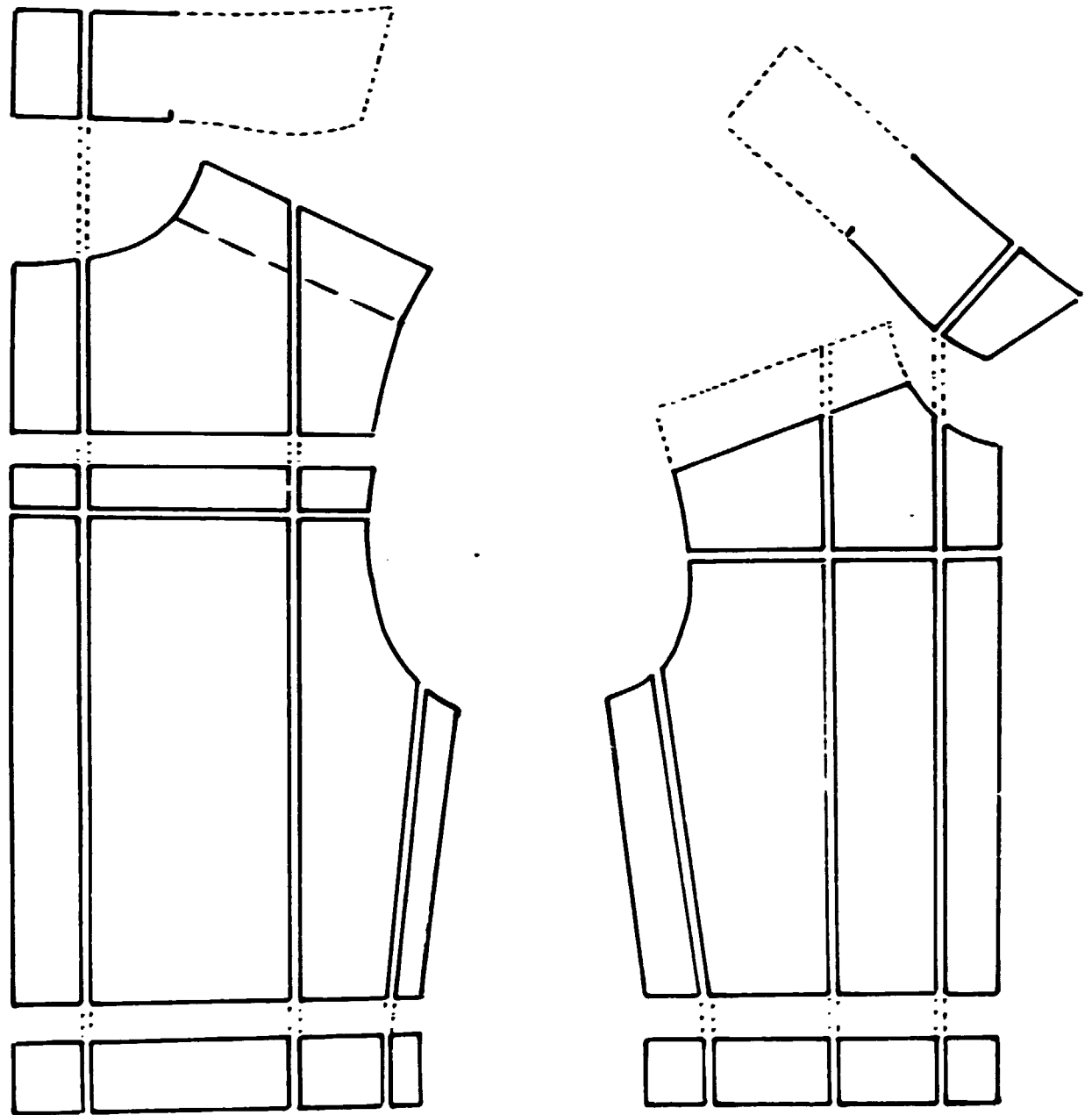


Figure 8 (A)

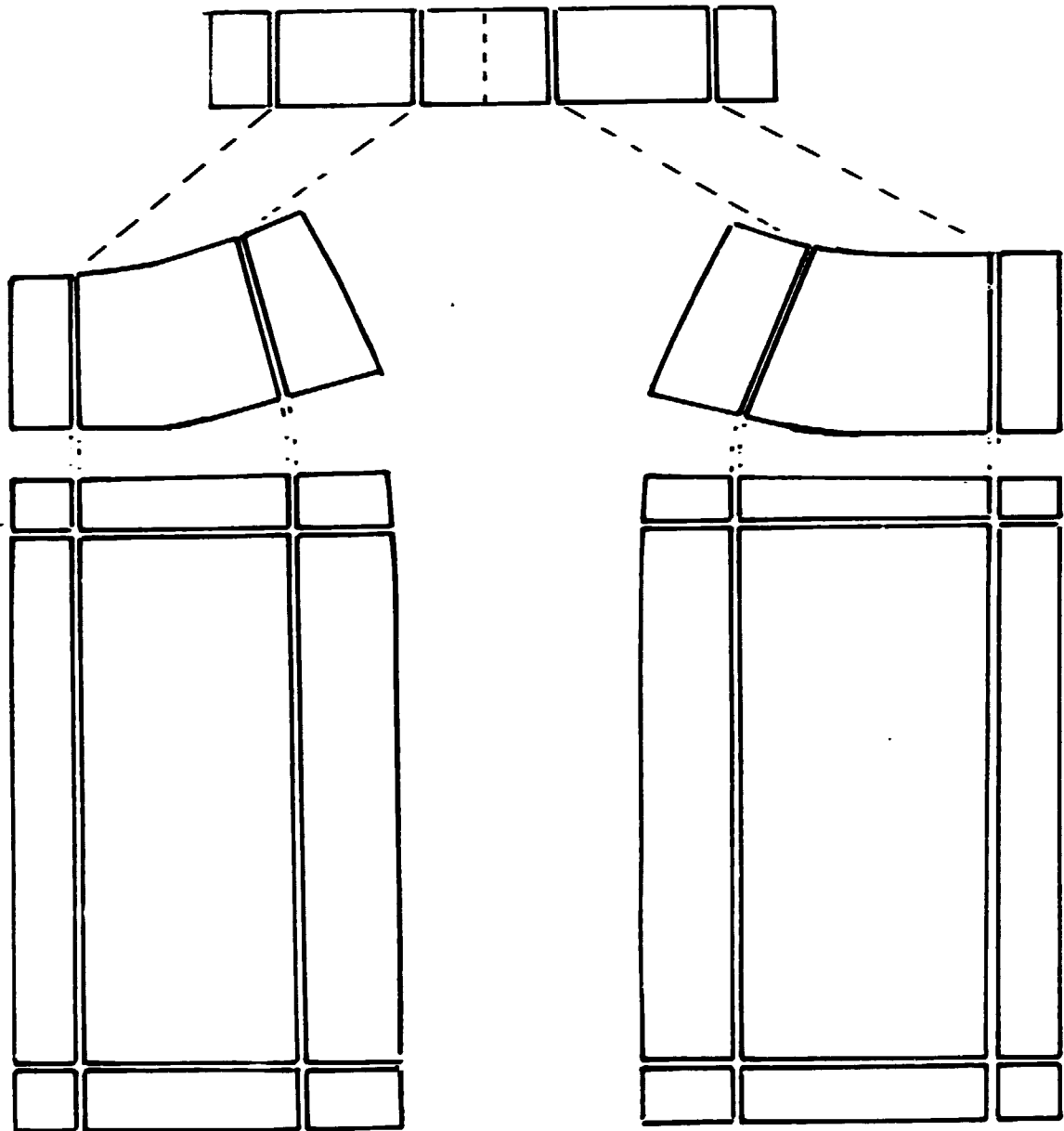


Figure 8 (9)

APPLYING INCREMENTS TO CARDINAL POINTS having established the Cardinal Points, the next stage is to apply the correct increments values to the various cardinal points. Figures 9 and 10 illustrates directional movements for single and dual movement increment points, giving the correct increment value for the points illustrated over five sizes. For more or less sizes, simply multiply the single unit values given in section 2, by the amount of sizes required. In this way all cardinal points should be established, using of the various directional movements as illustrated in Section 2.

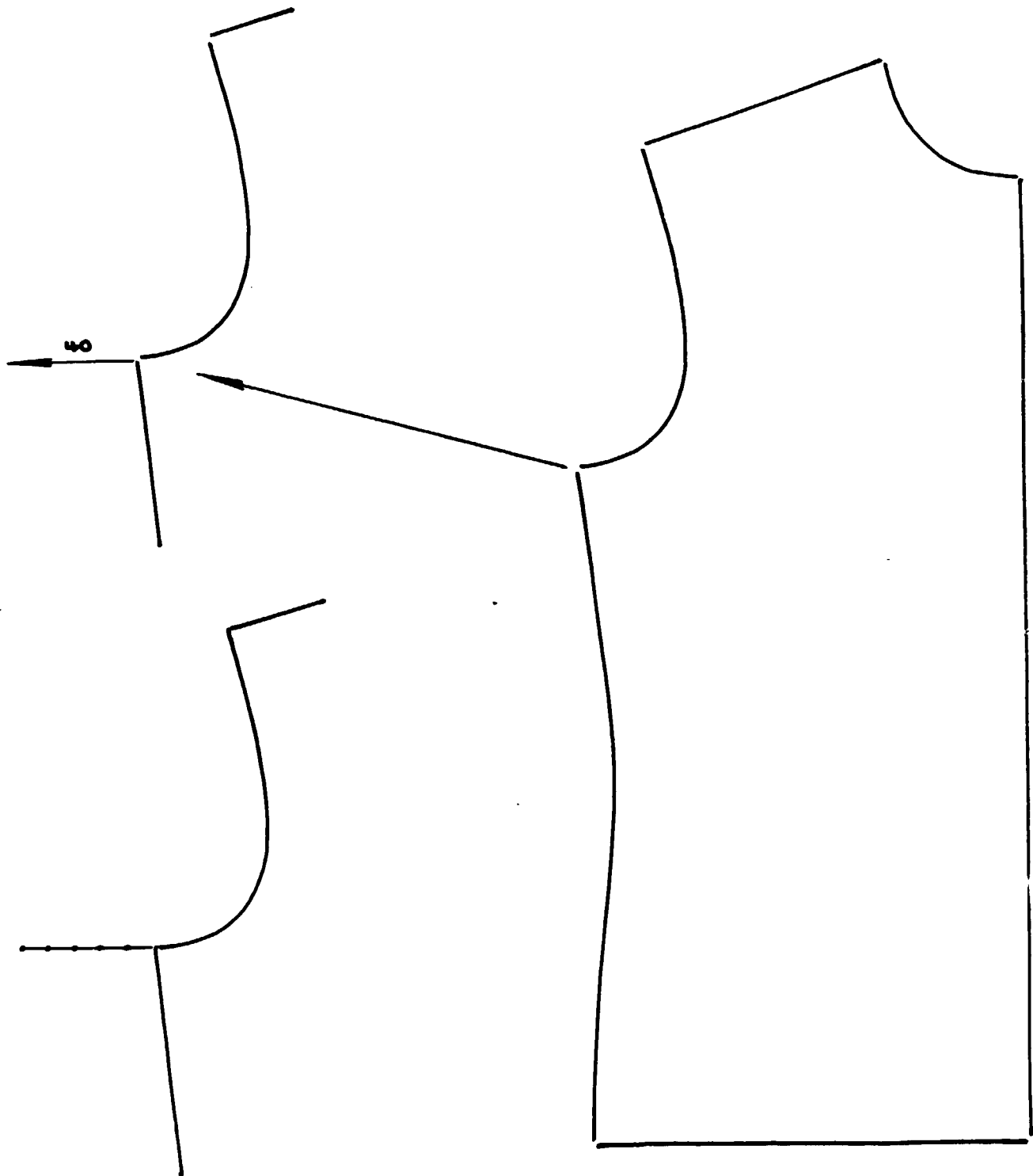


Figure 9 Single Movement Increment Point

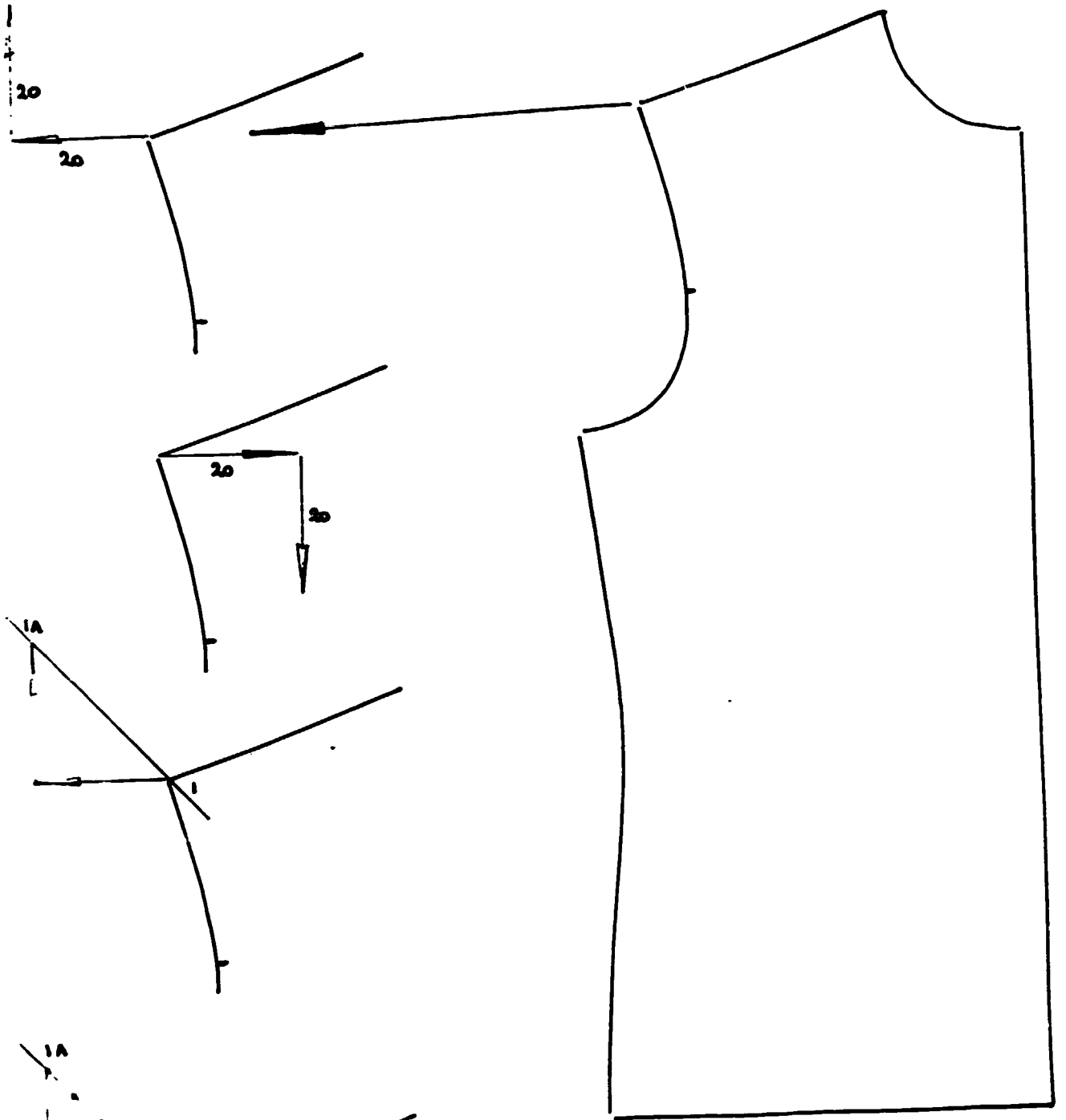


Figure 10

Figure 10 Dual Movement Increment Point

Establishing Cardinal Points: FIGURE 10

FIGURE 10

- (A) Illustrates directional movement and increment amounts for five sizes, at point illustrated i.e. one size multiplied by five.
- (B) Illustrates arriving at the cardinal point for smaller sizes.
- (C) Having defined point 1A, connect with original pattern point 1, using a diagonal line to connect the two points.
- (D) By dividing line 1-1A equally to arrive at the intermediate size points.

CREATING THE GRADED NEST having established all cardinal and increment points for the pattern piece(s) being graded, the next stage is the inter-connecting of the various cardinal points for each size, to form the graded nest. To do this you will need to use the master pattern to recreate the same, or similar contours to those of the master pattern figures (11, 12, 13) illustrating some of the styles as completed nests.

NOTE

- (a) Due to dimensional changes that occur in grading, not all contours can exactly follow those of the master size. Where this occurs the lines of the larger and smaller sizes should appear similar to those of the master pattern, avoiding hollows and points not featured in that section of the pattern.
- (b) Cardinal points can be easily established for either larger or smaller sizes by continuing line 1 - 1 (a), beyond the master point, as illustrated in Figure 14.

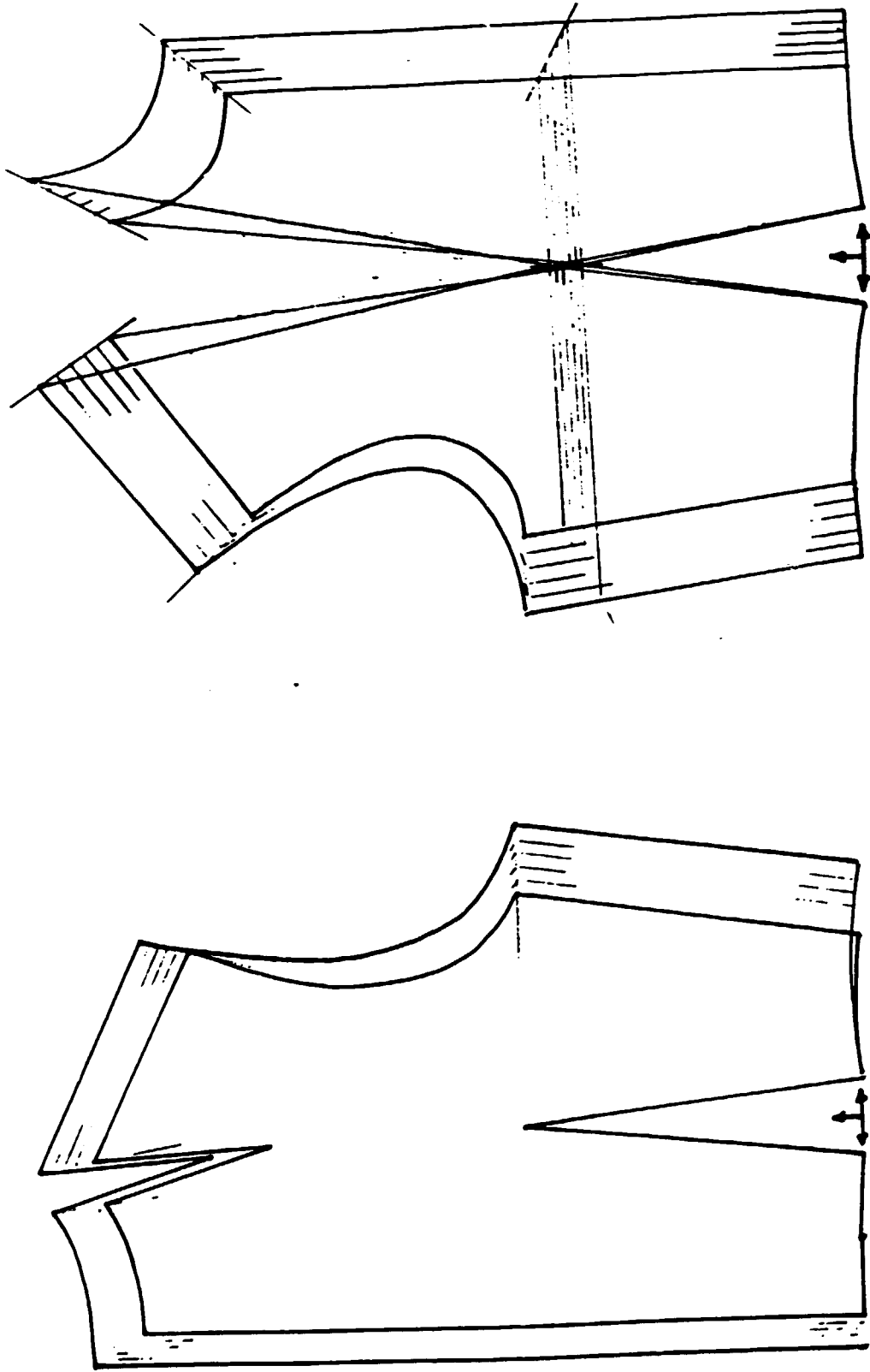


Figure 11 Graded Nest

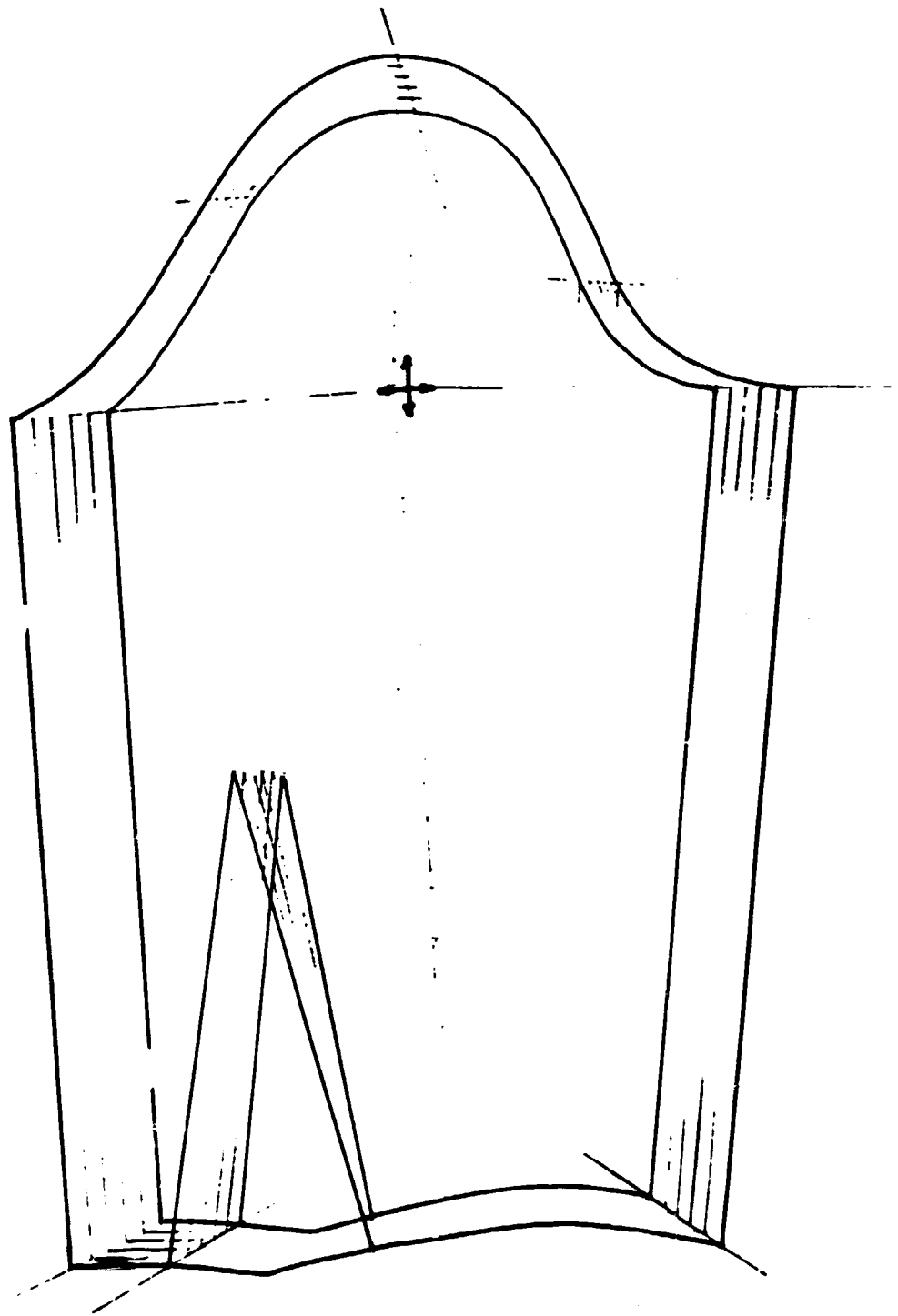


Figure 12 Graded Nest

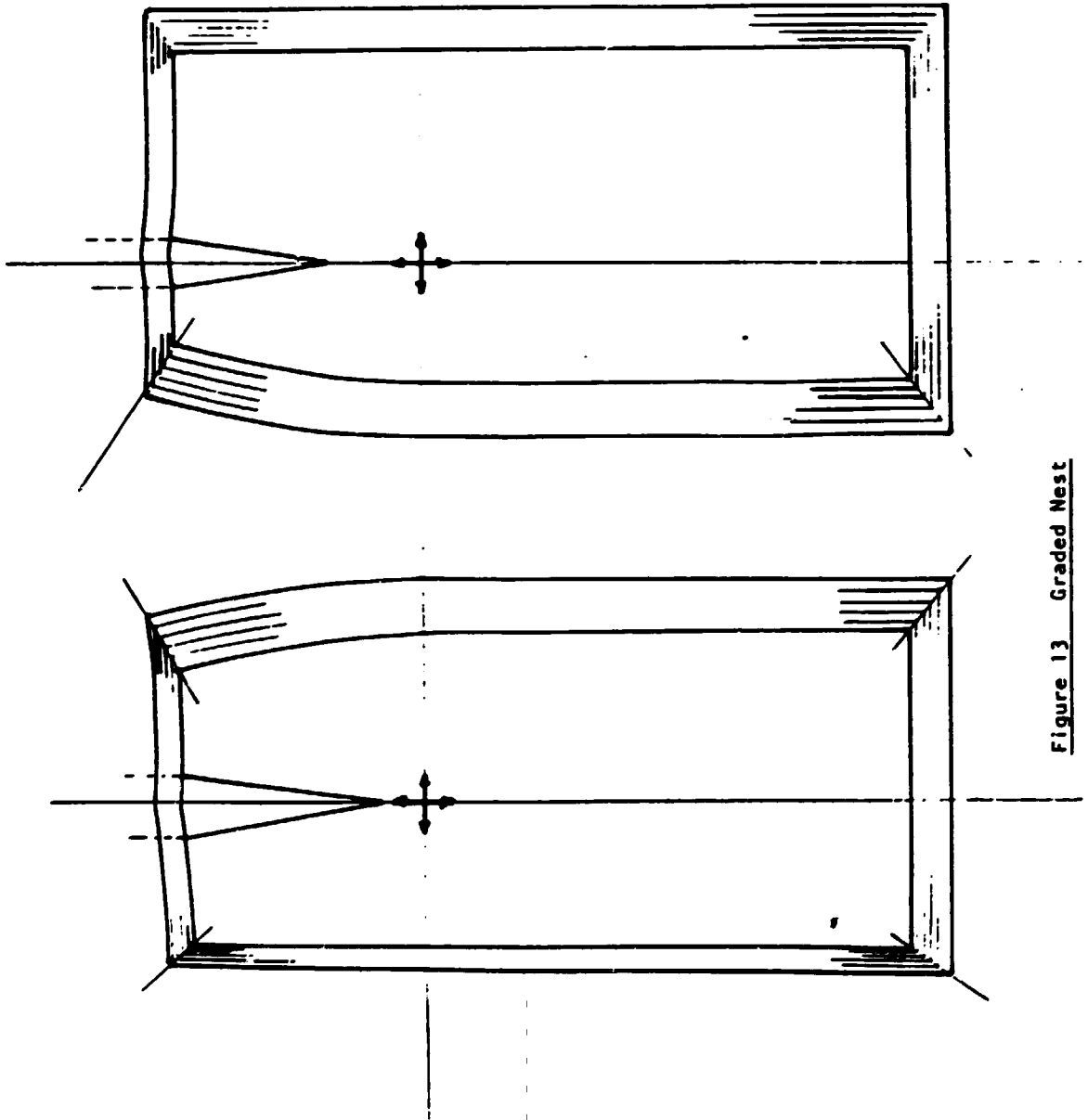


Figure 13 Graded Nest

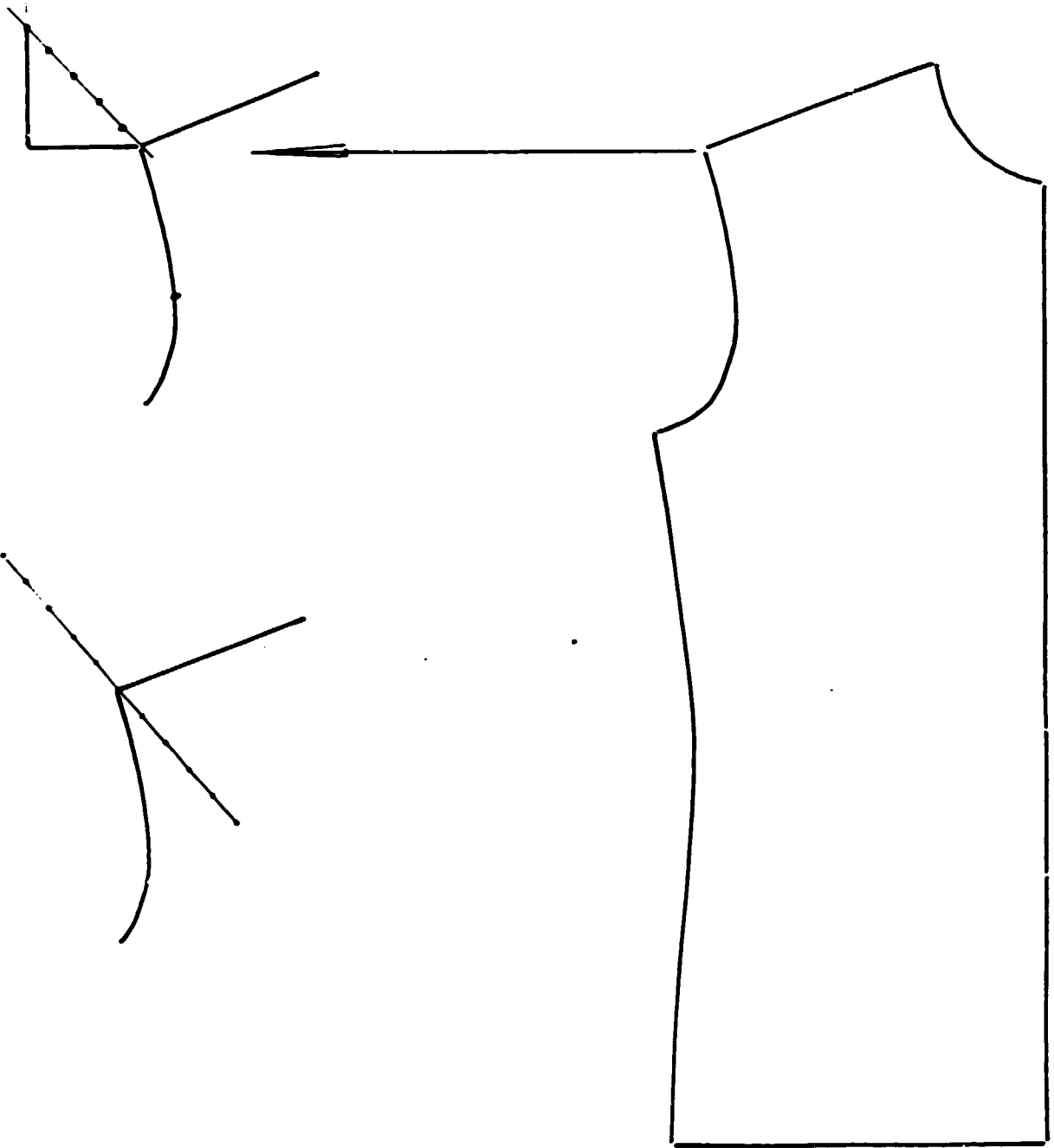
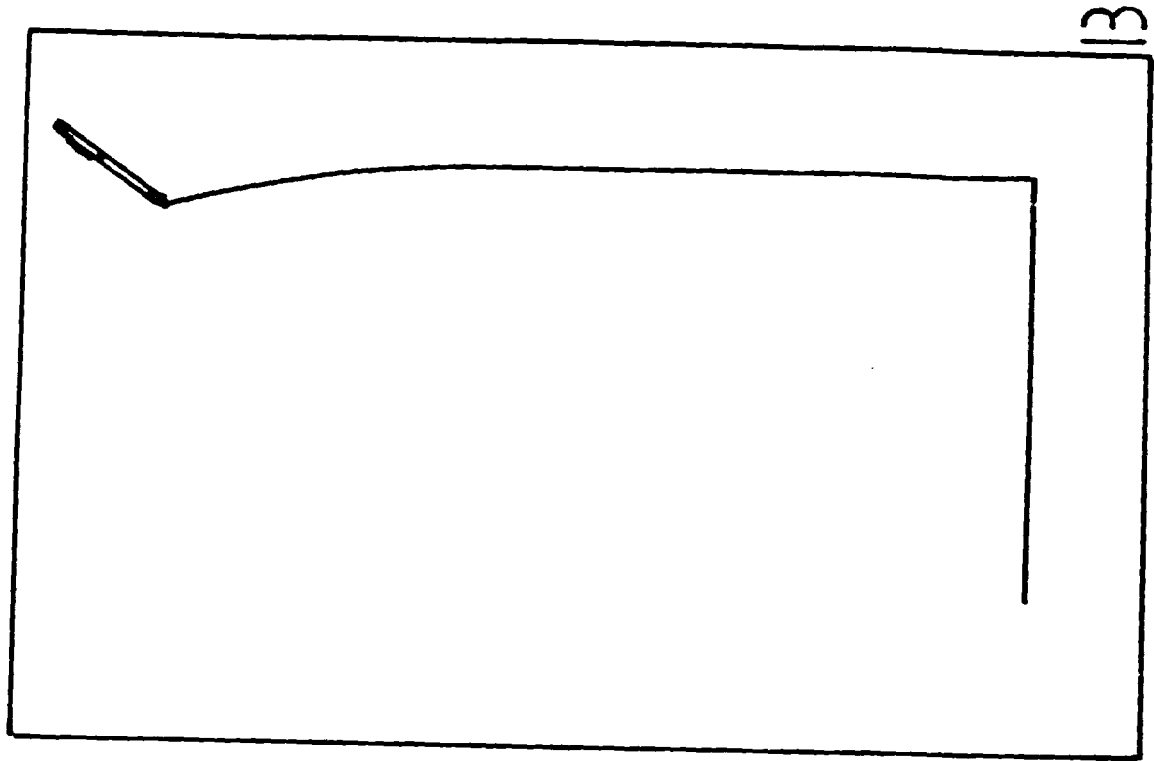
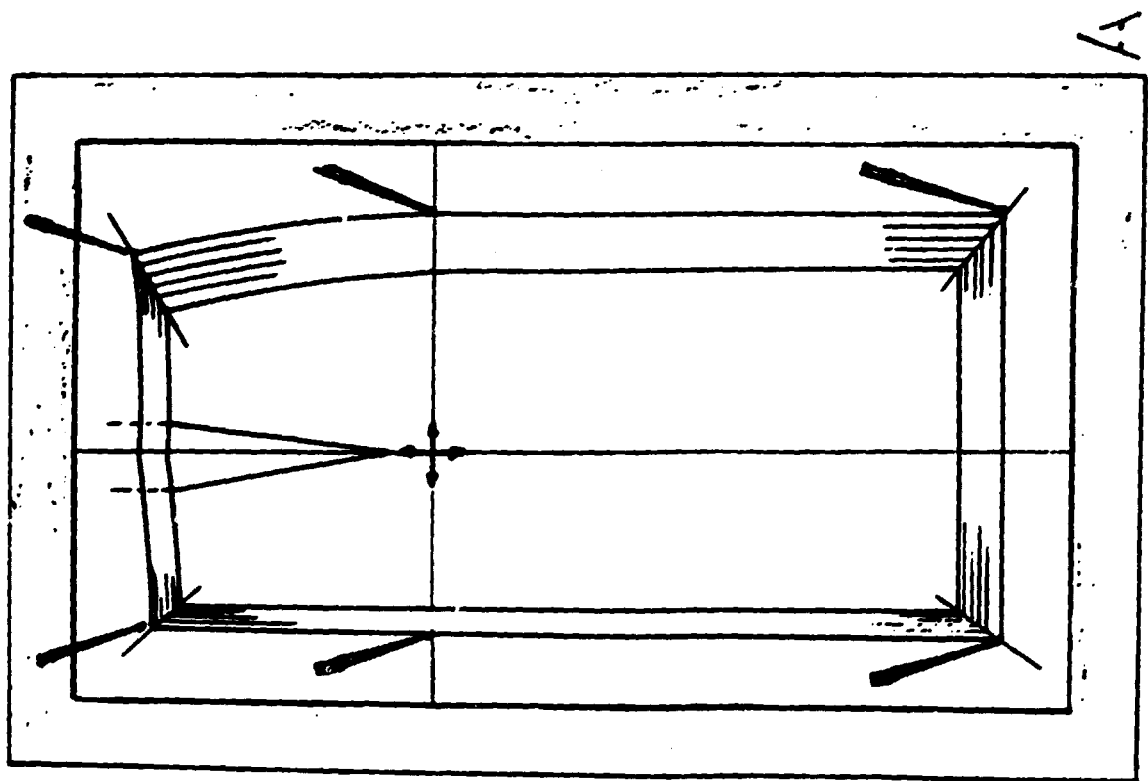


Figure 14

SPIKING OFF SIZES using the grades nest, by laying the nest on top of a fresh sheet of pattern card, then by using a pointed instrument and carefully spiking off the cardinal points for the required size, the finally pattern used in production can be produced. Figure 15 (a) and (b) illustrates both spiking and inter-connecting the various aforementioned procedures will need to be repeated for each size.



B



A

Figure 15