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PROBLEMS OF ESTABLISHING A FOOTWEAR INDUSTRY AND VIABILITY PROSPECTS FOR DEVELOPING COUNTRIES V/

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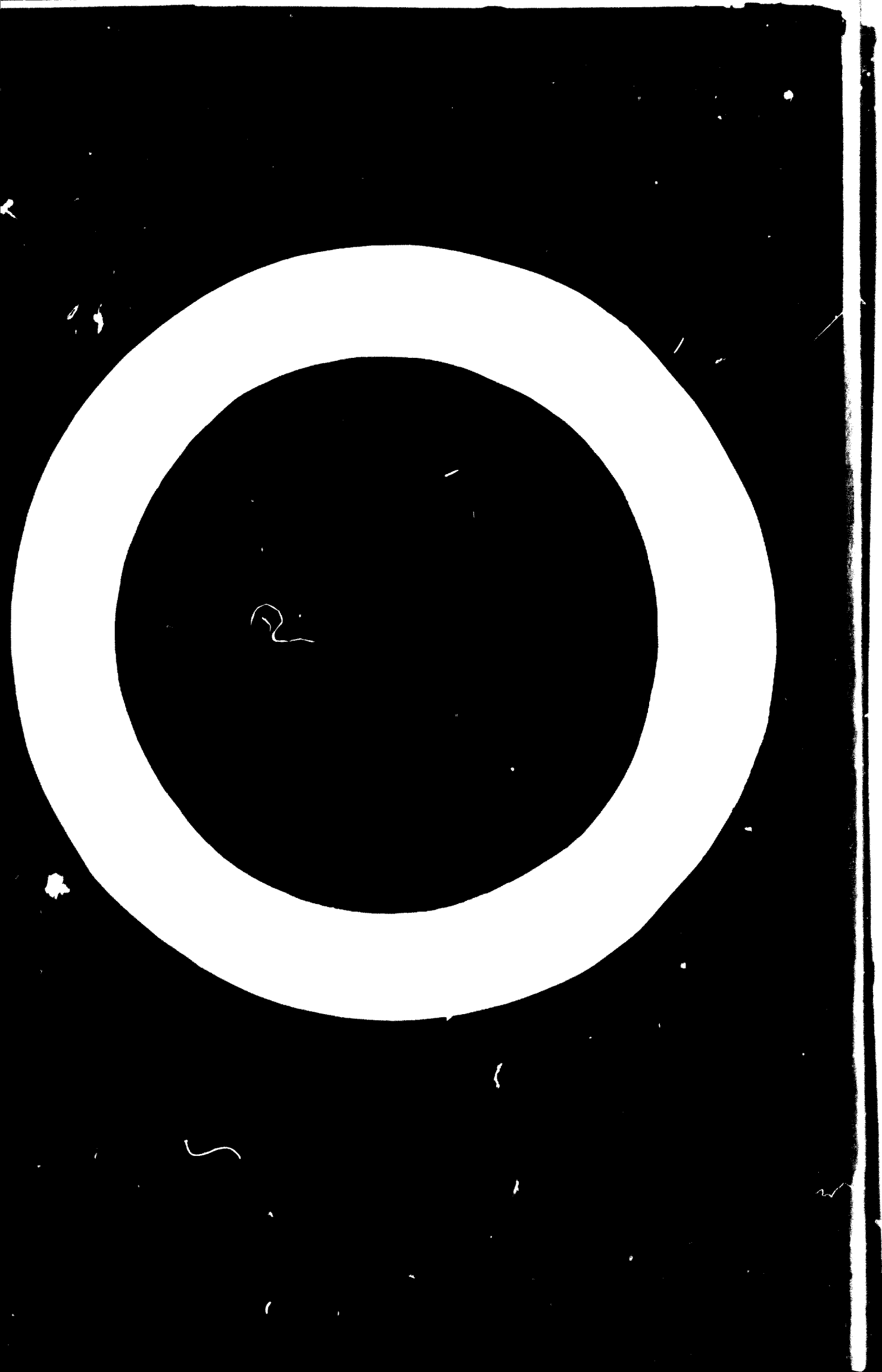

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INTRODUCTION

The aim of this paper is to state some of the problems met when establishing Footwear Factories in Developing Countries, to suggest solutions and to examine the viability of such undertakings.

There is undoubtedly a trend for the Manufacture of Footwear to decline in Developed Countries and to increase in Developing Countries where there is also a constantly rising home market. With the rising cost of Labour Costs in Developed Countries, such new ventures in Undeveloped ones lead to an increase in Export markets.

Technological progress in Footwear Machinery means that less skill is needed, although the initial cost of Machinery makes starting a shoe factory a matter of large capital investment. There is, however, capital available from Developed Countries for joint ventures. The success of many such undertakings has proved that, with proper planning, Technical assistance from Developed Countries, or through U.N.I.D.O., there should be no limit to the build-up of footwear production. It is obviously desirable to use materials locally produced, e.g. Natural rubber from Malaysia and Indonesia, rather than import synthetics.

Labour is less expensive, largely unskilled, and in most Developing Countries quite plentiful. Even with the newer processes, many minor jobs are economic when performed by hand, and machinery for such minor operations need not be purchased.

This paper outlines the Plant, Machinery and Equipment available. With it, exports from the Developing to the Developed areas can be increased, as evidenced by the tremendous increase in Brazil's footwear exports.

The perquisite to this increase is an understanding of the needs of the markets, either by Market Surveys, use of the Developing Country's own Commercial attaches abroad, or other sources. In this way, Developing Countries can ascertain what is needed and then organize to produce and sell.

1. Types of Plants

A. Large undertakings

1000 Pairs per day and over

This type of factory in Developing Countries is usually a Branch of a Multi-National Company, or a joint venture between a business from a Developed Country with a local entrepreneur or a Quasi-Government Agency.

Because of the need, in many Developing Countries, to provide jobs for as many workers as possible, careful judgment must be exercised before investing in sophisticated and expensive machinery and equipment.

The use of Tracks and/or Conveyers in both Upper and Bottoming Departments may be justified because-

a. It helps to get a steady flow of work through the factory.

b. It reduces the amount of "Work-in-process" and therefore the investment.

c. With efficient scheduling of work, it cuts down the time taken to get shoes through the factory, thereby reducing investment.

While powered Conveyers are efficient, the advisability of the large investment may be questionable. Locally made tracks using angle iron and roller skate wheels, are easily constructed, inexpensive, and quite efficient. With Conveyers or Tracks in the Bottoming Departments, operatives stand to work at both Machines and Benches, and this makes for efficiency. Closing Room Tracks, when properly used, save on the amount of Work-in-process and through-put time.

Types of buildings vary widely. In Singapore the Government have constructed "Flatted Factories" in the center of housing estates. These are rented in varying sizes to accommodate the particular requirements of different businesses. Departments must be organized to fit into the available floor space and the shape of the Factory. Other Developing Countries offer the following-

(a) Standardized factories (usually single storey) on

Industrial Estates.

(b) Financial assistance and land for Companies to build their own factories.

(c) Accelerated Depreciation allowances and other Tax incentives for Companies building new premises.

When building a factory for large scale production the decision to have single or multi-storey buildings depends largely on the price of the land. This usually depends on the location, i,e. in the City or on the outskirts.

Organization of production is easier in single storey buildings, and it is easier to locate presses, Injection and Vulcanizing equipment in the correct place in the production line as no question of floor loading arises. In Multi-storey buildings, heavy machines should be installed on the ground floor, otherwise expensive strengthening of the building may have to be undertaken.

Less sturdy types of Factory buildings, with lighter foundations are satisfactory in Tropical countries for single storey buildings. Lighter and less expensive materials can be used for roofs and walls. In the U.S.A. some new Shoe Plants are windowless and air-conditioned. This gives greater control over Temperature and Humidity, which helps with Employee contentment and can also be helpful to manufacturing.

Buildings are 360 feet long and 140 foot wide, 14 foot high, with 48 foot column centers. Offices, Boiler rooms and Storage space are built outside the perimeter so that they do not interfere with manufacturing space. Floors are Concrete. Walls are Aluminium on the outside and Galvanized Steel on the inside with 2" of Fibre-glass insulation between. This area produces 5000 Pairs per day. A large Multi-national company uses, for new factories, Saw-tooth roofs, with Corrugated Asbestos, (Experiments being made with sheet-aluminium). They try to use local Architects, who know the materials available and local tastes and preferences.

B. Medium Undertakings

250 Pairs per day and above

The space required is not in direct proportion to the output. Space for 250 Pairs per day is usually more than 25% of that needed for 1000 Pairs. The number of departments are the same, and in this size factory it is usual to do more of the work by hand, requiring more space and people.

Investment in new factory buildings is rarely justified for productions as low as 300 to 400 pairs per day.

It is, however, still necessary to organize a proper flow of work through the factory. Accommodation on one floor helps to achieve this.

Often difficulty in selling the production requires a factory to use several types of attachment, and to make Ladies', Men's and Children's footwear in the same factory. This adds to the types of machinery needed and adds to the Floor space required. With mixed productions, Conveyers and/or Tracks are seldom justified, racks being the usual method for transport through the factory.

C. Small Undertakings

Below 200 Pairs per day

These are often Cottage industries, and other than Sewing machines and Sole attaching presses, machinery is minimal, much of the work being done by hand. Success in these enterprises depends on low overheads, extreme flexibility of production, willingness to execute short runs, and very short "in process times".

In developing countries these businesses are often located in Shop Houses, making normal organization extremely difficult.

II. Machinery

The necessity to reduce the labour content in Shoe Manufacturing in the Developed Countries has led to the invention of Machines that are more and more sophisticated and expensive. Along with this has come the use of Synthetic Upper materials and Plastic Soling in various forms.

These being more uniform than Leather, are easier to use with new processes such as Injection Moulding, Vulcanizing and Flow Moulding of Uppers. The Machinery is more expensive to purchase and maintain.

A. Upper Departments. The same Sewing machines can be used for all types of production, and the Hydraulic, electric Clicking machines, being more efficient than the mechanical ones, are used for cutting leather and synthetics, lighter types for upper leather and the heavier duty ones for bottom materials. Splitting machines are needed for large scale leather production. High front Men's leather shoes and boots are helped when the Vamps are pre-formed on heated moulds or by a Blocking machine.

The latest technique for upper making, now being widely used, is Flow Forming. These machines, with the aid of inexpensive Silicon Rubber Moulds, will exactly reproduce the grain of the leather, the stitching, gimping, perforating on P.V.C. coated materials from the Sample leather Uppers. The process is being used to make uppers ranging from Children's to Safety Toe Cap Footwear. It has the additional advantage that P.V.C. injection moulded bottoms can be attached using no roughing, only a solvent wipe. Coloured appliques can be welded onto the upper during the process.

Flat and Post machines from the main suppliers are standard equipment in all Closing Departments. For larger productions, a transporter should be used in the Department. Ancillary machines (Eyeletters, Skivers, Beaders, Perforators etc.) are available from many sources.

Where a standardised production is to be made, automatic Sewing machines for jobs such as Barring, Sewing on straps

etc. are labour saving and accurate.

B. Assembling Department. The introduction of Thermo materials for Toe puffs and Stiffeners has led to the need for Toe-Puff applying machines and Backpart forming machines. If the Insoles are to be tacked onto the Lasts, Air operated machines are best, but there are Insole Attaching systems which do away with the need for tacks, eliminating the danger of leftover tacks catching on wearer's feet, and saving the cost of Tacks.

C. Lasting. Using conventional methods of attachment, Factories with productions of 300 pairs upwards, should use Pull-Toe-Lasting Machines. The Shoes can be completly lasted in two or three operations at rates up to 600 pairs per 8 hour shift.

No lasting machines are needed if the String Lasted method is used, although an Attachment has been invented which, with the aid of an Air Cylinder, reduces the physical labour of pulling the strings to last the Upper. This can be attached to an Injection Moulding machine so that the Upper is lasted to the metal foot and then reversed into the Mould for Sole Moulding.

Seat lasting machines are of two types, using either Tacks or Cement. The Tack machine gives a more solid job and is preferable with the VULCANIZING or Injection Moulding Process.

D. Welted. The major machines needed are those for Insole Processing (Channel or attached Rib), Welt Sewer, Stitcher and Rough Rounder, Heel Attacher, but more ancillary machines are needed than for other processes, and consequently more Labour.

E. Unit Sole Cement Shoes. Heated Sole and/or Shoe Activator and Sole Attaching Press.

F. Veldschoen (Stitchdown) Process, Veldt Mould and Flange machine, Seat Laster, Toe Former and Stitcher.

G. Sewn and Stitched process. Sole Sewing Machine, Stitching Machine and Heel Attacher.

H. Injection Moulding. Many types are available from single units to multiple head machines, depending upon the output. Generators are also required.

I. High Pressure Sole Vulcanising. Any number of single head Units can be used, depending upon required production. This process requires Hydraulic Units.

MACHINES NEEDED FOR BOTTOMING

Table 1

Welted, Veldschoen and Sewn & Stitched Attachments. (A) shows machines required to commence production. (B) Those extra ones needed later when pairage is to be increased.

Table 2

Needed to make 1200 pairs per day in one 8-hour shift, Men's Unit Sole Cemented.

Table 3

Needed to produce 240 pairs Ladies' String Lasted, Injection Moulded with uppers cut and moulded by the Flow Form Process.

Table 4

Needed to produce 250 pairs per 8-hour shift, Men's Heavy Boots with Vulcanised Soles.

These are the main methods of Shoe Production and Machines required. Additions or subtractions depend on pairage required, Shift Working, Finance available, etc. Many minor processes can be done by hand if inexpensive labour is available and the provision of more jobs is important to the Country involved.

Machinery is available from many countries and when embarking upon the large initial expense, Tenders for the machinery and equipment should be asked.

To protect the large investment involved when purchasing machinery, it is necessary to have competent, trustworthy Engineers, who should be taught by the Company supplying the machines. Proper maintenance, systematic lubrication of machines, and the ability to teach new Operatives by this Department will ensure uninterrupted production and save on machine breakdowns and spare parts.

A very careful analysis of Spare Parts needed to keep the

machinery and equipment running should be made at the beginning, and a proper Stock Control System for Spare Parts installed. This should be checked weekly by the Chief Engineer and should include the Maximum and Minimum Quantity of all parts which may be required. When machines are bought overseas, it is particularly important to allow ample time for delivery of spare parts to prevent loss of production because a small part is unavailable.

III. Components

A. Insoles

If suitable locally produced leather is available, it can be used for women's shoes. The backpart should be re-inforced with Fibre-Board, then moulded.

Composite strips made with rigid fibre backs, (and sometimes toes) and flexible board foreparts can be imported from Developed Countries for cutting into Insoles. They are inexpensive. Insoles with moulded Fibreglass or Polypropolene backs, incorporating the steel shank, can also be obtained. These must fit the Last, and unless production is substantial, they are expensive to use.

Sheet Cellulose board prepared especially for Insoles is available at reasonable prices from several countries.

B. Soles

Where a Country can produce leather from local hides which is suitable for Sole leather, it is obviously desirable to use it rather than import substitutes.

It is, however, cheaper and easier to make Shoes using pre-prepared Unit Soles from synthetic materials. These can be used for Men's, Women's and Children's Shoes, and are made from P.V.C. compounds, Polyurethanes, Thermoplastic Rubbers, Natural Rubber, and other similar materials.

They can be imported. If the factory has Injection Moulding or Vulcanising Machines, moulds can be obtained and Unit Soles made in the factory. They can be made to fit the feather of the Shoe exactly or with a trimmingallowance on the forepart. New designs are available each season in Developed countries, but substantial orders are needed unless standard shapes can be used on the lasts being used. In many developing countries locally produced lasts are not accurate enough for use with Imported Unit Soles. The local wood is not properly dried and with changes in temperature and humidity, the lasts swell.

C. Stiffeners/Counters

Unless Shoes are hand made, leather stiffeners are difficult to use and rarely uniform. They can be moulded on a back-part moulding machine, but it is easier to make uniform shoes with moulded fibre board stiffeners. Using heated moulds on these machines, impregnated thermo boards, partially moulded, give a first class job, and are easily stored. Solvent activated materials such as Celastic and poly-styrene impregnated material also give good results with back-part moulding machines.

D. Toe-puffs/Box toes

As with Stiffeners, leather is not the best material from a Shoemaking point of view for Toe-puffs. They also need a lot of extra work and lack uniformity. Celluloid or styrene thermo materials and rubberised material are easier to use and give excellent results in wear. They are, however, rarely made in developing countries, and are usually imported in sheet form or ready cut. It is also possible to print puffs onto the uppers with rod plastic. With Pull-toe-lasting machines, heat activated puffs are best, although solvent activated ones can be used.

E. Shanks

For Men's shoes, wood or fibre shanks are satisfactory and cheaper than steel, but cannot be used satisfactorilly with platforms. Steel should be used in Women's and Children's shoes. High heel Ladies' shoes need fluted steel shanks for strength, and the curve must fit the last, if satisfactory results are to be obtained during wear. These steel shanks can be fastened to the Insole before use and can be attached to Unit Soles.

Experiments are being made using Plastic insole backparts as a substitute for Steel shanks.

F. Heels

In Developing Countries where leather is freely available it can be used on Men's, Ladies' flat heel and Children's Shoes, especially if heel building machines are available.

Making leather heels by hand is a time consuming, expensive job. A cheaper heel for Men's which is satisfactory in wear on medium class shoes is the moulded Rubber or Plastic heel. These can be bought from Rubber Companies in Developing Countries, and Plastic Top-pieces can be slugged on to them, giving a satisfactory hard wearing heel.

For Women's fashion shoes moulded plastic heels are in general use. They are usually pre-finished to avoid the cost of covering. When these are difficult to obtain, covered wood heels can be used.They must be made from hard wood to avoid the danger of splitting in wear. It is impossible to produce a good laquered finish on them with a single coat, and care must be used to have a fine flat surface before laquering. Wood heels are not satisfactory for very slender heels because they split during wear.

IV. Types of Production

Developing Countries anxious to build up a viable Shoe Industry must be aware that Manufacturing Techniques are being simplified, that more and more sophisticated machines are coming onto the market, cutting need for man power.

As the ratio of men to machines becomes less, the advantage of a plentiful supply of the less expensive labour becomes smaller. It is, therefore, very important which market it is best to cater for (i.e. Home and/or Export), and to find which Construction will be required (to cater for the market).

This can be done by using a Market Survey, getting information from potential buyers, or from Partners in a joint venture.

At first, simplified constructions which are labour intensive offer Developing Countries their best opportunities.

The success in the Export field by countries like Spain and Brazil show that eventually an industry doing a substantial Export business can be built up. Spain's Shoe Exports in 1961 were 212 Million pairs, in 1971 - 12,509 million pairs. Brazil's exports to the United Kingdom jumped from 58,000 pairs in 1971 to 323,000 pairs in 1972. In both cases the footwear was stylish and commanded more than £2.00 per pair.

With help from outside Experts through U. N. I. D. O. and other Agencies, Developing Countries could, in time, learn the latest Techniques, and using more sophisticated machinery, produce fashionable shoes of good quality, for Export to many parts of the world

Brazil and other South American Countries are fortunate in having a large Cattle population. In fact, Brazil has the fourth largest in the world after India, Russia and the U.S.A. It also has a sophisticated Tanning Industry.

Each year a larger proportion of shoe uppers are made from non-leather materials, and if these cannot be produced locally, they can be imported at a reasonable cost. Using them

and Unit Soles, Developing Countries can produce low cost stylish shoes for Export.

If they can produce Upper Leather of an acceptable quality standard, they are in an even stronger Export position.

Methods of making shoes currently in use are as follows-

1. Canvas Upper, Sneaker/Plimsoll type using natural rubber for bottoming, Vulcanized after assembly in Ovens. Rubber Wellingtons are made by this technique.

2. String Lasted. The latest method in this construction uses a reaction device operated by a foot pedal , which is mounted onto a Direct Vulcanizing machine or an Injection moulding machine. This is sucessful with flow moulded P.V.C. Upperslasted on the metal foot, then reversing the foot and moulding on the bottom. With P.V.C. uppers only a solvent wipe is used, but if leather uppers are used they must be pre-roughed before Closing. A special patented metal shank piece is used. It has hooks to allow the strings to be retained in the waist.

3. Veldtschoen (Stitch-down) this inexpensive process is particularly good for making Children's Crepe Sole Sandals, Women's Flatties, and Men's Casuals with Crepe or Unit Soles.

4. Conventional Cement lasted shoes, with seats tack lasted, (preferred) or Cement lasted. These can be made entirely by hand, (slow and costly) or with Pulling-over machines using Bed lasted toes and seats, uppers being pre-cemented.

Pull-toe-lasting machines, with the waist either hand lasted or machine lasted, (with or without rod cement). For machine production the seats should be pre-moulded using Thermo Stiffeners.

Soles can be attached with Neoprene or Poly-Eurothene Cements. On Women's Fashion shoes, with leather or Resin soles, one-way Rod Cement applied at Sole laying is quicker and cleaner.

5. Sewing on the Sole either by Chain stitch or lock-stitch machines is a more expensive method, but with leather

soles it is cleaner and faster.

The further operations needed, levelling, Edge trimming and setting and Bottom finishing add to the cost.

6. Sewing and Stitching, for heavy footwear sewing (or Sewing) on a Through Sole and then Stitching on the outsole is still a standard method of production. It makes heavy solid shoes, but requires more labour than other methods.

7. Direct vulcanizing with D. M.S. machines using natural rubber is widely used for heavy footwear. It is a good way to make footwear for the Armed Forces, Police, Customs, Farm Workers, Building Workers etc. Safety Boots with steel caps can also be made by this construction.

8. Injection Moulding with either P. V. C. or Polyurethanes is a widely used method of bottoming for Mens and Boys footwear. It will produce light weight bottoms or heavy ones. At the present time and for some time into the future the shortage of Polymer to make the P. V. C. will make this construction more expensive.

9. Welted. A decreasing proportion of the footwear in the world is being made by this process. It is costly in machinery and requires a labour force skilled on many types of machines. It is very questionable if it is worth while for Companies in Developing Countries to incur the expense of the equipment and the cost of training the labour to make shoes this way.

V. Marketing

Whoever is placed in charge of Marketing in a new business in a Developing Country should know precisely the Type of Product, the Quality, the Price Field, and the ultimate Customer.

He should decide where (Export and/or Home Market) and which (Direct Selling, Wholesalers, Agents etc) have the best potential, bearing in mind the additional work and expense involved in Export.

It is also necessary to study Competitors' products and their success (or failure), and what promotional techniques they use. If it is decided to advertise, the Marketing Department should be aware of the appropriate Media, the costs involved, and the likely return on the outlay.

Developing Countries have positive advantages over Competitors in Developed Countries because of lower wage rates, Government assistance with grants, etc. The effect of such advantages and how long they will last should be studied.

Some of the potential outlets for their Shoes are as follows-

(a). Own Shops or Departments, in Shopping Centers or Supermarkets.

(b). Direct Sales to Retailers by the Factories Sales Force.

(c). Exports through a. Agents, b. A Joint Venture with a Foreign Firm who will either buy the whole or a substantial part of the output of the factory, c. Contracts for supplying Government Departments, eg. Footwear for the Armed Forces.

It is also the Marketing Department's responsibility to know which Designs are most likely to meet current fashion trends or Industrial needs. They should be involved in the Selection of the Design team, and the Development Department.

Factors which limit Manufacturing capacity must always be borne in mind. Selling should be geared to the type and Quality of the Shoes the Factory is capable of Manufacturing, on which realistic Quality Standards and Profits can be

maintained.

Finally they should be examining new markets for their existing production, and studying what new products, with Sales possibilities, can be made.

VI. Government help and assistance from outside Agencies

Help from Government of the Country and/or U.N.I.D.O. or other Agencies, e.g. Columbo Plan, can be given to-

A. A new Company either locally financed or joint venture with Capital from outside the Country or raised locally.

B. An established Shoe Factory needing technical assistance, either to raise its efficiency, or to begin the manufacture of a new type of shoe.

C. Assistance to small and medium sized factories already established. This can be given to a number of businesses up to 25. The assistance should be organized centrally, with Government personnel acting as Counterparts to the Experts.

D. Where a new factory is to be established, The Expert's assistance should be sought from the planning stage on, especially regarding factory layout, decisions about/and purchase of machinery, laying down systems of Production Control, Wage and Salary standards.

E. If a new production is to be introduced, the Expert should be invited to analyse the existing machinery and equipment and to co-operate with management if additional machinery is necessary and suggest where it may be obtained. If sizeable purchases are to be made, tenders should be invited from several suppliers for comparison.

F. If the Expert is to render help to a number of Companies in a City or Country, it is important to draw up a Rota for his visits. A Chart should be kept in the Expert's office or that of his Counterpart. After discussion with the factories' Managements the Expert's time can be organized to give maximum help to those who require it and are willing to follow his advice. Each factory should nominate a counterpart to follow up suggestions, to achieve maximum benefits.

VII. Recruitment and Training

When recruiting new unskilled Labour, in addition to completing Rating Scale at interview (see copy), a simple aptitude test for screening out slow learners, assessing intelligence, adaptability, colour blindness, etc. is invaluable. This type of test has shown surprisingly good results, revealing the degree of manual dexterity, colour awareness, orderliness of mind, and ability to understand simple instructions.

When new employees have been selected, they should have a period of induction to familiarize them with the Company, its welfare and safety matters, conditions of employment and the sort of work in the Department in which they are to be trained. Whether this period lasts for two weeks or two hours is a Management decision.

For recruits in the Closing Department, a simple system of Analytical Training can be used. This method aims at training the sense of touch, vision and movement, as well as the judgement, anticipation, perception, co-ordination (of hands, feet and eyes), rhythm and tempo, as well as dexterity of fingers, wrists, hands, arms, legs, knees and feet.

The newcomer is introuduced to the type of machine she is to operate, by doing her initial training upon it, as follows-

1. Learn to pedal without needle or thread. Complete control must be achieved ... stopping, going slow and speeding up. (It is essential that the machine is functioning properly). If a clutch motor is used, it should be set so that the machine can be started, stopped, slowed down, or speeded up without undue pressure on the treadle.

2. Insert needle. Practice should be continued until putting the needle into the machine correctly is almost automatic.

3. Thread up machine. At first slowly until correct method is mastered, then practice until working speed is

achieved.

4. With machine threaded. Operative sews on pieces of scrap leather marked with circles, squares and other shapes. It is desirable to use white thread on black leather at first, so that stitching shows up clearly. Accuracy must be the first consideration. Only after accuracy is achieved should speed be built up to normal standards.

Using this method, girls who are adaptable can become efficient operatives in a matter of weeks. Those who haven't the ability or temperament to become good stitchers are weeded out during training.

It is also important to select and train Clickers. Careful competent men can save a lot of money by cutting materials correctly and closely. It is good practice to hang skins and sides of leather up in the Department. Paper patterns, stuck onto these skins, illustrate the correct method of cutting. Someone should watch new Clickers closely and train them to place knives onto the leather correctly.

In other Departments, it is necessary to have competent instructors to train new operatives in the right way of operating machines.

When new major machines are brought, the training of an Engineer or Foreman upon the operation of the said machines should be the responsibility of the Company supplying the machines.

At least one of the engineers on the staff should be trained to service machines in the Closing Department. The best training is given by the Company supplying machines, in their own workshops. The Engineer should be required to take apart and re-assemble a Flat, Post, and Zig-zag machine. If he works away from the factory for one day a week, and on the factory floor on the other days, he will get practice applying his knowledge. Training usually takes six to eight weeks to become competent.

VIII. Quality Control

It is not feasible from an economic point of view t. physically examine all shoes at every ope ation, even every major operation. However, it has been proven that "spot checking" even a 5% sample of shoe at every major operation, will give almost the same coverage of faults as a 100% check.

The method suggested here is that the Quality Controller shall examine shoes at an agreed number of points, possibly 5 pairs from a ten pair ticket, and list on a pre-printed from the faults in the five pairs. He will not work around the factory in a systematic operation by operation, routine, but will jump about from one operation to one in another part of the Department. The reason for this is so that the operator and Supervisors cannot prepare cases of shoes for the Inspector to look at. He should also use the same technique for moving from Department to Department, say going from Clicking to Finishing and then Lasting one day, then from Bottom Clicking to Closing another day etc.

A list of operations to be examined and the faults likely to be found there are put on Duplicated Chart (as sample) and the Quality Controller fills in at each examination point. When he has examined shoes in a Department - he fills in the Master Chart showing the number of faults at each examination point. This should be in triplicate, one for the factory Superintendent, one for the General Manager and another one for the file. A weekly or monthly summary is also advisible.

Table 1.

Machines required for Bottoming 350 pairs per 8 hour day

	Machine Description	Welted	Veldts	Sewn & Stitched
	Skiving (Triple)	A.	A.	A.
♦	Stamping (1 row)	A.	A.	A.
♦	Sock Stamping.	A.	A.	A.
♦	Insole Channeling (Leather)	A.		
♦	Lip Turner.	A.		
♦	Insole Tacking.	A.	A.	A.
	Sole Edge Cementer.	B.	B.	B.
	Pull-Over Machine.	B.	B.	B.
	Toe & Seat Laster.	A.	A.	A.
	Tacker & Filler.	A.	A.	A.
♦	Side Staple Laster.	A.		
	Rough Upper Trimmer.	A.		
	Welt Sewer.	A.		
	Inseam Trimmer.	A.		
♦	Welt Beating & Slashing.	A.		
♦	Welt Butting.	A.		
♦	Air Sole Press.	A.	A.	A.
	Stitching Machine.	A.	A.	A.
♦	Rough Rounder.	A.	A.	A.
	4" Band Scourer.			A.
♦	Veldt Mould & Flange.		A.	
♦	Vertical Spindle Roughor.		A.	
♦	Toe Forming Machine.		A.	
♦	Veldt Seat Laster.		A.	
	Sole Sewing Machine.			A.
♦	Heel Attaching.	A.		A.

These machines are for a Factory with a limited Production not wishing to invest in larger, more expensive Machinery Machines marked ♦ have capacity for double stated production. A. Machines necessary to commence production.

B. Machines to install at later date to increase production.

Table 2

MODEL LAYOUT FOR 1,200 PAIRS/DAY MENS CEMENTED

STORES

The Preparation and Leather Stores are situated between the Clicking Room and access road which facilitates easy handling of stores.

CLICKING ROOM

The Clicking Room is designed in a conventional manner incorporating nine Cutting Presses arranged in pairs.

CLOSING ROOM

The Closing Room consists of two Transporters each comprising of 54 work stations. This is slightly in excess of the number required but the extra 5 or 6 stations are useful for unusual work. Petty stores, tape etc., can be kept in a small store by the Foreman's office.

PREPARATION

The preparation of insoles progresses from the rear of the room forwards towards the assembly area. Soles or insoles are stored to ticket in Racks (52).

LASTING ROOM

The components and lasts are assembled and processed through Back Part Moulding to Insole Attaching, and then loaded onto the Transporter.

The Making Transporter is expected to make 12 complete turns during the day, each taking approximately 40 minutes. A three tier Transporter with 50 carriages per tier is recommended. Two tiers would be for general use with the third for samples, oddments, etc.

The operative working the Last Slipping Machine will take the work off the track and put it on a rack ready for the Shoe Room.

While on the rack the socks are fitted up to the work.

SHOE ROOM

The shoes are off loaded from the rack by the Hot Blast Treeing operative who, after treating them, places them on the Transporter.

The shoes take 30 minutes to complete the Finishing operations, and during a day 15 complete turns can be expected.

Table 2

The Transporter would have 3 tiers with 40 carriages on each tier. Two tier working is visualised.

WAREHOUSE

The pairs stored in the Warehouse can be on loaded in the bay at the rear of the building. Adjacent to the Warehouse is the Box Forming area (85).

SERVICES

The services provided incorporate as shown, the normal requirements for a modern factory, The Offices would be situated above the ground floor.

FACTORY TO PRODUCE 1,200 PAIRS IN ONE 8 HOUR SHIFT OF MENS UNIT SOLED CEMENTED SHOES

Table 2

NO	OPERATION	MACHINE OR FIXTURE	NO. OF MCS
	CLICKING ROOM		
1	Leather Room	Bench	1
2	Give out	Bench	1
3	Store Press knives	Rack	1
4	Cut outsides - linings	Hytronic Cutting Mc.	9
5	Samples	Clickers Bench	1
6	Split components	Band Knife Splitting Machine	1
7	Form vamps	Forepart Upper Forming Machine	1
8	For use with No.7	Contact Mulling Mac.	1
9	Stamp linings	Lining Marking Mac.	1
10	Stitch mark	Stitch Marking Mac.	2
11	Cut stock, sort, colour mark, and store stitch marker dies	Table with Rack below	
12	Store stitch marker dies	Rack	1
13	Stamp socks	Embossing Machine	1
14	Assemble cut uppers to ticket and place in closing room box	Table	1

- continued -

Table 2

NO	OPERATION	MACHINE OR FIXTURE	NO. OF MCS
	CLOSING ROOM		
15		Work Storage Fixture	
16		34 Station Closing Room Transporter	2
17	Skive uppers	Upper Skiving Machine	4
18	Folding and cementing edges	Thermo Cementing & Folding Machine	2
19	Reduces seam	Seam Reducing Machine	1
20	Reinforces and presses seam	Taping & Seam Pressing Machine	1
21	Perforates upper	Perforating Machine	1
22	Reinforces eyelet	Eyelet Stay Cementing & Applying Machine	1
23	Insert eyelet	Eyeletting Machine	1
24	Insert eyelet	Eyeletting Machine	1
25	Temporarily lace upper	Lacing Machine	1
26	Fixes toe puff on vamp	Thermo Toe Puff Applying Machine	1
27		Coat-Kite Cementing Machine	1
28	Reduces toe puffs and linings to facilitate lasting	Toe Puff & Lining Trimming Machine	1
30		6 Tables	6
40		Various Sewing Machs	46
	BOTTOM PREPARATION		
41	Give out soles	Bench	
42	Cement soles	Sole Cementing Mach.	1
43	Enables soles to be dried	Sole Drying Rack	2
44	Hand sole cement	Bench	1
45	Cut out insoles	Electric Hydraulic Cutting Machine	1
46	Rack	Knife Rack	1
47	Store cut insoles	Table	1
48	Bevel edge of insole	Insole Bevelling Mac.	1
49		Filter Unit	1
50	Stamp size on insole	Sole Stamping Machine	1
51	Mould sole to last	Twin Sole Moulding Ma.	1

- continued -

Table 2

NO	OPERATION	MACHINE OR FIXTURE	NO. OF MCS
ASSEMBLY			
52	Store bottom components	Rack	3
53	Store uppers hanging on Ellis frames	Rack	3
54		Peg type Last Storage Fixture	5
LASTING AND MAKING			
55	Mould backpart of shoe	Backpart Moulding Ma.	2
56		Table	1
57			
58	Attach insoles to last	Insole Attaching Mac.	1
59	Last forepart	Pull Lasting Machine	2
60	Prepare upper	Pulling & Lasting Heater	2
61	Last sole	Cement Side Lasting Ma.	2
62	Last seat	Cement Seat Lasting Ma.	1
63	Set shoe	Automatic Humid HVA Setting Plant	1
64	Exam	Bench	1
65	Scour and rough shoe botton	Upper Roughing & Scouring Machine	2
66	Dust extract	Filter Unit	1
67	Fasten shank to insole	Staple Fastening Machine Model	1
68	For shanks	Rack	1
69	Lay cement on lasted margin	Bottom Cementing Mach.	2
70	Cement	Cement supply Unit	1
71	Felt bottom fillers	Tables	2
72	Dry cement	Drying Unit	1
73	Activate soles and shoe bottom	Cement Shoe Heat Activating Unit	2
74	Sole attach	Cement Sole Attaching Machine	2
75	Remove last from shoe	Last Pulling Machine	1
76	For socks	Rack	1
77	For removing creases	Hot Blast Treeing Equipment	1

- continued -

Table 2

NO	OPERATION	MACHINE OR FIXTURE	NO.OF MCS
78	Cementing socks	Coat-Rite Cementing Machine	1
79	Clean and repair	Table	1
80	For antiquing etc.	Spray Booth	2
81	Reform backs	Shoe Quarter Reforming Machine	1
82	Final spray	Spray Booth	1
83	Lace	Bench	1
84	Exam - box	Table	1
95		H.S. Box Forming Mac.	1
86	Store box flats	Rack	1
87	Store boxes	Rack	

Table 3

FACTORY TO PRODUCE 250 PAIRS IN ONE 8 HOUR SHIFT OF LADIES STRING LASTED SHOES WITH INJECTION MOULDED SOLES AND UPPER COMPONENT CUTTING AND EMBOSSING BY THE UNIDEC SYSTEM

Table 3

NO	OPERATION	MACHINE OR FIXTURE	NO.OF MCS
1	Upper material and grinding	Racks	
2	Give out	Bench	1
3	Store knives	Rack	1
4	Cut combined upper andlining	Travelling Heat Cutting Machine	1
5	Hold and feed materials	Material Roll Holding Device (1 in use, 1 in stores ready loaded	2
6	Hold cut stock	Rack	1
7	Emboss upper castor	H/F Combining & Embossing Machine R.F. Generator - 10Kw output	1
8	Make up rubber moulds	De-Aeration Unit and Mould Making Kit	1
9	Sock stamp	Embossing Machine	1
10	Size and fitting mark	Lining Marking Machine	1
11	Apply toe puffs	Toe Puff Fusing Press	1
12	Seam reduce	Seam Reducing Machine	1
13	French bind - EITHER		
	(Post machine attach binding	Dry Thread Closing Ma.	1
14	(Cement and turn over edge (of binding	Thermo Cementing and Folding Machine	1
	OR		
15	U Bind or Shell Bind		
	Bind toplines	Cylinder Binding Mac.	1
16	Stitching Machines	Dry Thread Closing Ma.	3
	Backseam close		
	Insert counters		
	Run round topliners, etc.		
17	Back part mould	Backpart Moulding Mac.	1
18	String last	Stringing Machine	1
19	Store closed uppers	Rack	1
20	Injection mould	Twin Injection Moulding Machine	1
21	Exam, sock, box	Bench	1

Table 4

FACTORY TO PRODUCE 250 PAIRS PER 8 HOUR SHIFT OF MENS HEAVY BOOTS VULCANISED SOLES

Table 4

NO	OPERATION	MACHINE OR FIXTURE	NO.OF MCS
CLICKING ROOM			
1	Store knives	Knife Cabinets	2
2	Hold cut work	Work Bench	1
3	Cut uppers	Electric Hydraulic Cutting Machine	2
4	Sort and paint mark cut work	Bench	1
5	Split back straps, tongues etc	Band Knife Splitting M.	1
6	Stitch mark uppers, by hand	Bench	1
7	Skive uppers	Upper Skiving Machine	1
8	Assemble work for closing	Bench	1
BOTTOM STOCK PREPARATION			
9	Cut leather insoles, leather stiffeners, toe puffs, shanks and rubber blanks.	7' Revolution Press or Heavy Duty Clicking Press	1
10	Hold cut work and knives	Bench	1
11	Examine cut stock and bring insoles to even substance	Sole Splitting Machine	1
12	Cut stock	Bench	1
13	Stamp insoles	Sole Stamping Machine	1
14	Scour insoles	Surface Scouring Mac.	1
14a	Dust extract	Filter Unit	1
15	Store cut stock	Rack	2
16	Mould Insoles	Twin Sole Moulding Mach.	1
17	Store insole moulds	Rack	1
18	Skive stiffeners and toe puffs	Cylinder Knife Skiving Machine	1
CLOSING ROOM			
19	Transport work	22 Station Transporter	1
20	Hold work in progress	storage fixture	2
	Fold where necessary	Thermo Cementing & Folding Machine or Rapid Folding Machine	1
	Close Uppers	Various Sewing Machines (Flats)	4

- continued -

Table 4

NO	OPERATION	MACHINE OR FIXTURE	NO.OF MCS
		Zig-Zagging Machine	1
		Twin Post Heavy Stitching Machine	3
		Single Needle Heavy Stitching Machine	1
		Twin Flat Heavy Stitching Machine	1
		Semi Automatic Staying Machine	1
	Hand operations	Bench	2
	Insert eyelets	Eyeletting Machine	1
	Lace uppers	Lacing Machine	1
ASSEMBLY			
21	Store closed uppers	Upper Carrying Rails	1
22	Store insoles etc.	Rack	1
23	Store lasts	Last Storage Cubs	3
LASTING ROOM			
24	Transport work through operations	Rail Transporter (2 tiers) (14m long)	1
25	Tack on insoles and load Transporter	Hand Bench	1
26	Paste and insert stiffeners	Pasting Machine	1
27	Store stiffeners	Rack	1
28	Tack backs	Hand Bench	1
29	Condition upper	Lasting Heater	1
30	Pull over and insert toe puffs	Pulling & Lasting Mac.	1
31	Store toe puffs	Rack	1
32	Last sides and waists	Side Lasting Machine	1
33	Condition seats	Seat Lasting Machine	1
34	Seat last	Heel Seat Lasting Mac.	1
35	Pound seats	Rotary Pounding Up Mac.	1
36	Dust extract	Dust Control Unit	1
37	Heat set	Automatic Humid HVA Setting Plant	1
38	Unload Heat Setter and examine	Hot Blast Treeing Equipment	1
39	Rough bottom of lasted shoe	Upper Roughing & Scouring Machine	1

- continued -

Table 4

NO	OPERATION	MACHINE OR FIXTURE	NO.OF MCS
40	Dust extract	Dust Control Unit	1
41	Attach leather shank	Staple Fastening Machine	1
42	Slip lasts and unload Transporter	Last Pulling Machine	1
43	Cement bottoms and attach wood heel filler blocks	Bench	1
44	Vulcanise boot bottoms	High Pressure Sole Vulcanising Machine	5
45	Timing unit	Hydraulic Unit	1
	SHOE ROOM		
46	Trim off surplus rubber	Rubber Flash Trimming Machine	1
47	Insert socks	Coat-Rite Cementing Machine	1
48	Store socks	Rack	1
49	Clean boots	Bench	1
50	Dress and repair	Bench	2
51	Brush off	Polishing & Brushing Machine	1
52	Extract dust	Filter Unit	1
53	Examine boots, lace and box	Bench	1

Table 5

APPROXIMATE PRICES FOR MACHINERY PLANTS. FOB.UK PORT.

TABLE 1. Welted.	A.	£ 17,500.
" A. "	B.	£ 6,150.
" 1. Cemented-Unit Soles.	A.	£ 8,300.
" A. " " "	B.	£ 5,225.
" 1. Veldschoen.	A.	£ 12,685.
" A. "	B.	£ 950.
" 1. Sewn & Stitched.	A.	£ 12,100.
" A. " "	B.	£ 5,225.

(Above Plants are inexpensive types without Pull-Toe-Lasters).

TABLE 2. Mens Cemented-Unit Sole.	£130,000.
" 3. Mens Vulcanised.	£ 75,000.
" 4. Ladies String Lasted Flow Mould Upper Injection Sole.	£ 35,000.

Table 6

String Lasted P.V.C. Uppers
Upper making plant for shoes using Flowform

Machine Description	Quantity for 250 Prs per dy.	Quantity for 1000 per day.	Approx. Price Each.
Electro Hydraulic Clicking Press.	1.	1.	£ 1200
Travelling Head Cutting Press.	x	1.	£ 3450
2/WB/10 KW. H.F. Welding Machine.	1.	x	£ 6900
Mould Macking Equipment allow £ 500 Extra.			
CF/20/KW Rotary H.F. Welding machine.	x	1.	£ 9500
Mould Making Equipment allow £ 500 Extra.			
Toe puff fusing Press.	1.	1.	£ 295
Air operated. 1PH. Heating Back Seam reducer.	1.	1.	£ 1000 Estimate.
Binding over Machine.	1.	3.	£ 515 with Motor
Flat Sewing Machine.	1.	4.	£ 500 with Motor
Bar tacking machine for Back straps/Seams.	1.	1.	£ 750 with Motor
Stringing Machine Type CC, A/M Model.	1.	2.	£ 365 with Motor
Lining Stamping machine Air operated.	1.	1. £715	Type etc. £75 Foil etc. £75
Post Sewing machine for Counters.	1.	2.	£ 670 Motor-Stand under edge
Punching and Eyeletting machine.	1.	1.	£ 1250
Air Compressor Unit, Model 13 PU (11 c. f. m.)	1.	1.	£ 315 Piping Fitting Allow £50

FAULTS CHECK SHEET - CLOSING I

OPERATION	NUMBER FAULTS SPR	REMARKS
EDGE INKING		
LINING SEAMS		
LAPS		
BACK SEAM		
RUNOFF EDGE		
TOO FAR IN		
" CLOSE - TOE EDGE		
OTR - NOT LEVEL		
ZIG-ZAG. SEAM WRONG		
SEAM RUB		
NOT SMOOTH		
STITCH BROKEN		
TAPE - INCORRECT		
CEMENT FOR FOLD		
NOT ENOUGH		
TOO MUCH		
CEMENT ON UPPER		
FOLDING - NOT STUCK		
MARGIN UNEVEN		
STITCHING		
FACING - NOT TO MARK		
STITCH LENGTH WRONG		
SKIP OR BROKEN STITCH		
TENSION WRONG		
BACK STRAP		
STITCH NOT EVEN WITH EDGE		
STITCH LONG/SHORT		
SKIP OR BROKEN STITCH		
TENSION WRONG		

Rating scale for job applicant

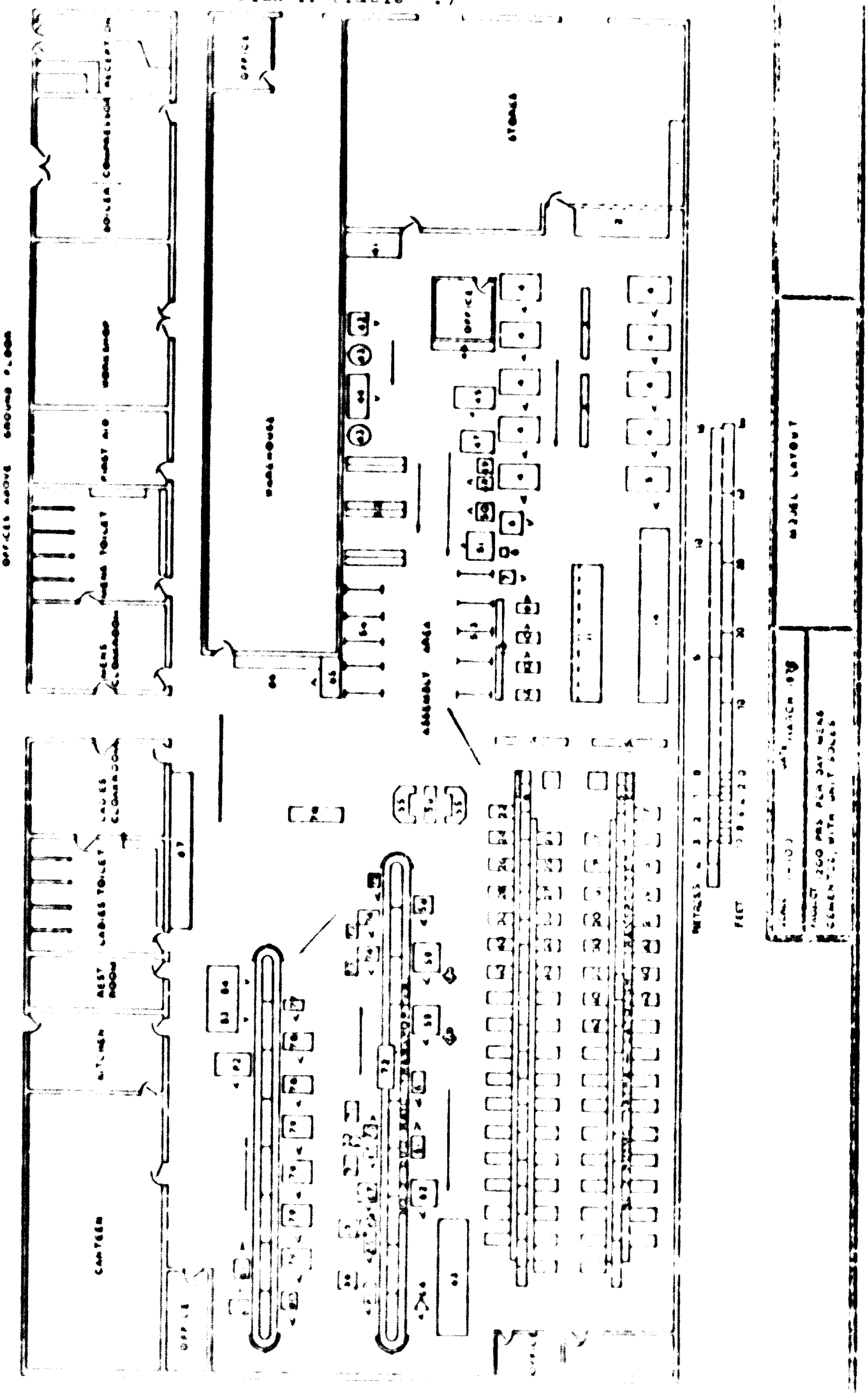
Name. Address.

Position applied.
Department.

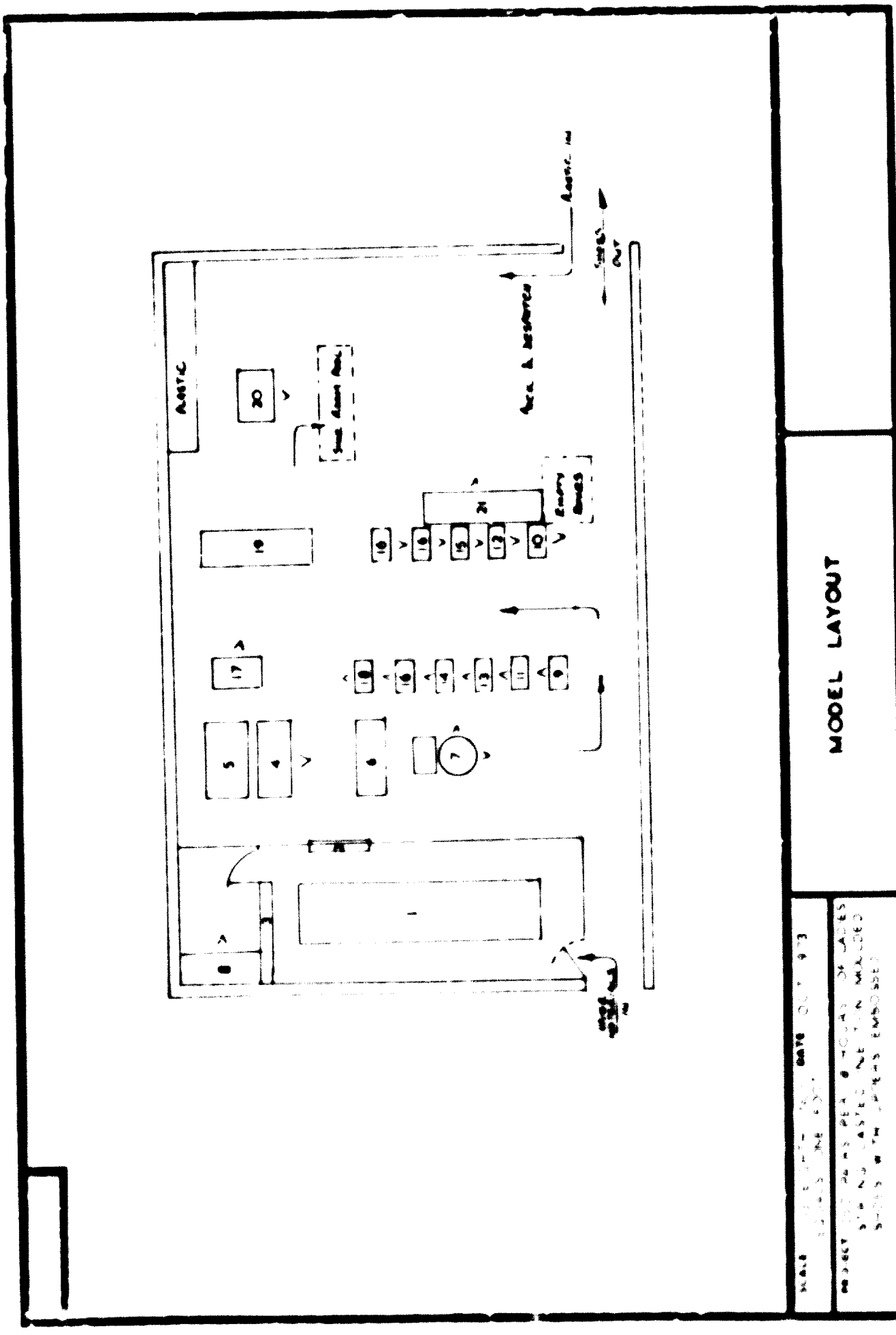
---

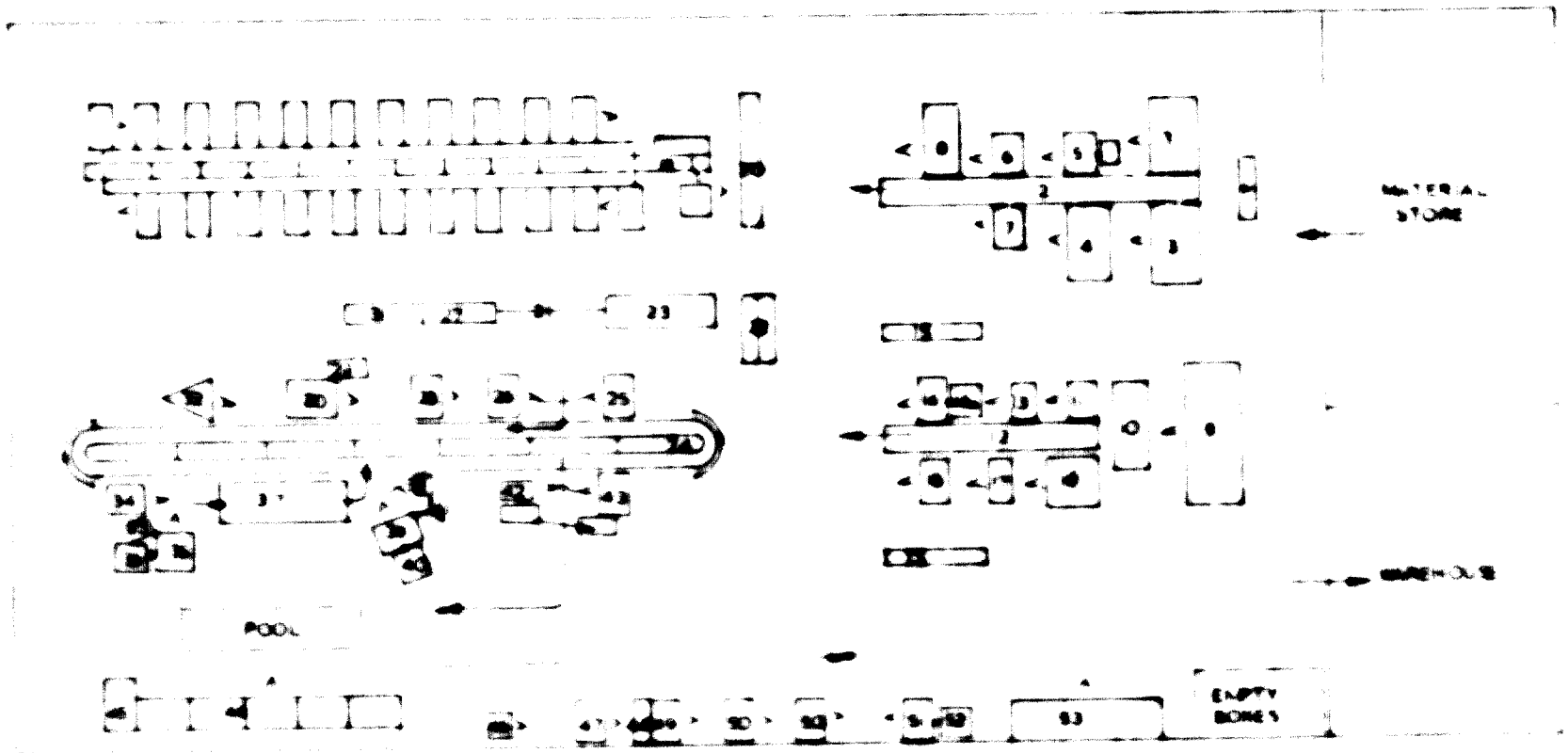
1. Appearance. 1. 2. 3. 4. 5.
   Remarks.
2. Scholastic record. 1. 2. 3. 4. 5.
   Remarks.
3. Previous employment. 1. 2. 3. 4. 5.
   Remarks.
4. Intelligence. 1. 2. 3. 4. 5.
   Remarks.
5. Co-operativeness. 1. 2. 3. 4. 5.
   Remarks.
6. Keenness. 1. 2. 3. 4. 5.
   Remarks.
7. Initiative. 1. 2. 3. 4. 5.
   Remarks.
8. Dependability. 1. 2. 3. 4. 5.
   Remarks.
9. Final assessment.

Plan 1. (Table 2.)



Plan 2. (Table 3.)





MODEL LAYOUT

FIGURE 1

Forepart Upper Forming Machine.

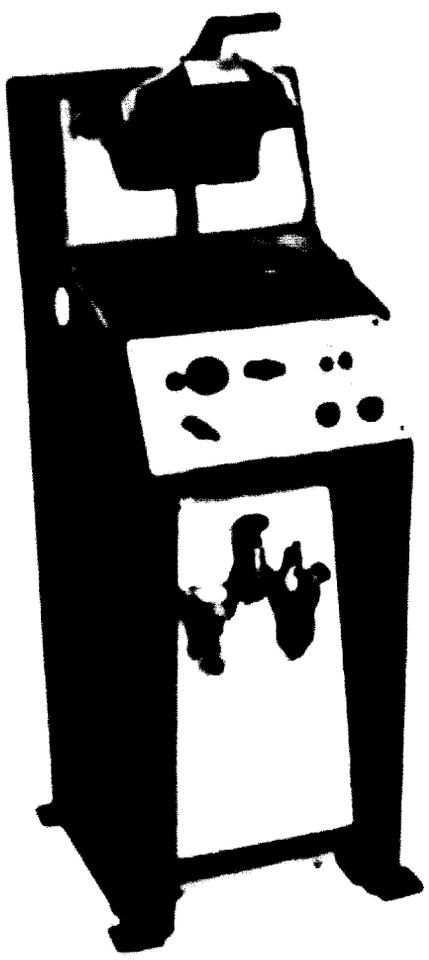


FIGURE II

Band Knife Splitting Machine.

FIGURE III

Closing Transporter.

FIGURE IV

Backpart Moulding Machine.

FIGURE V

Transporter.

FIGURE VI

Full Toe Lester.

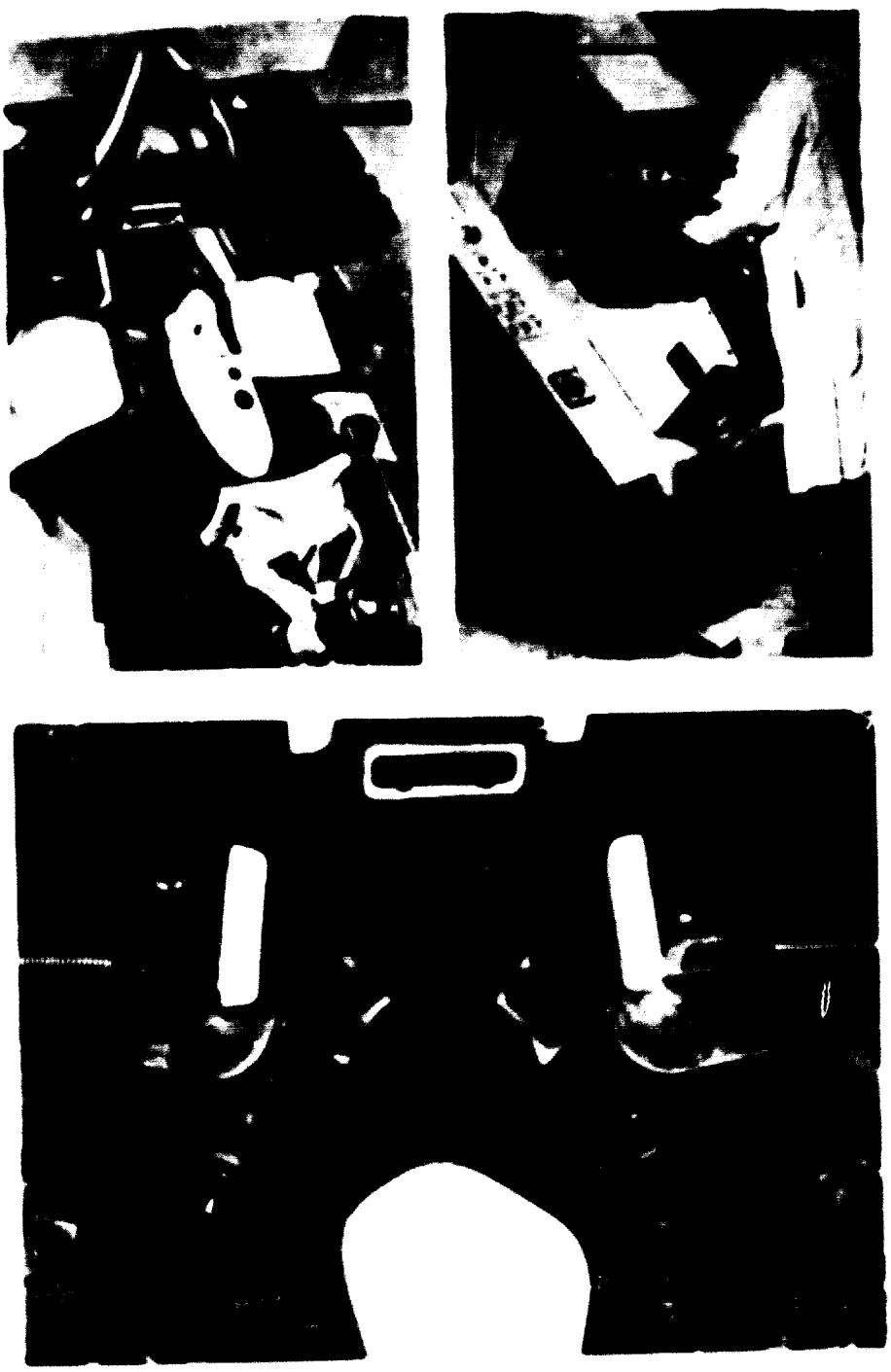
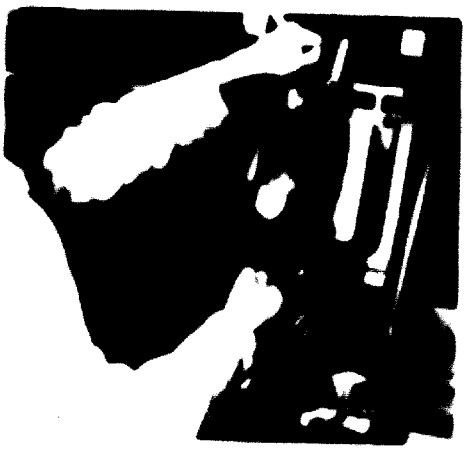
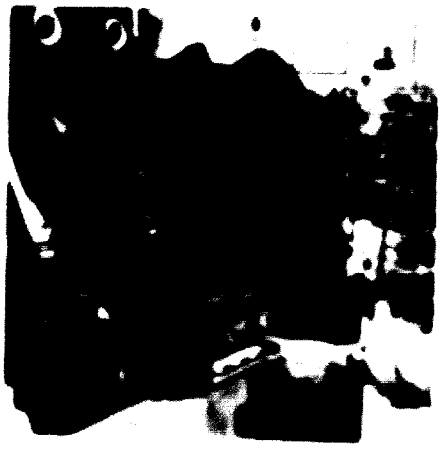
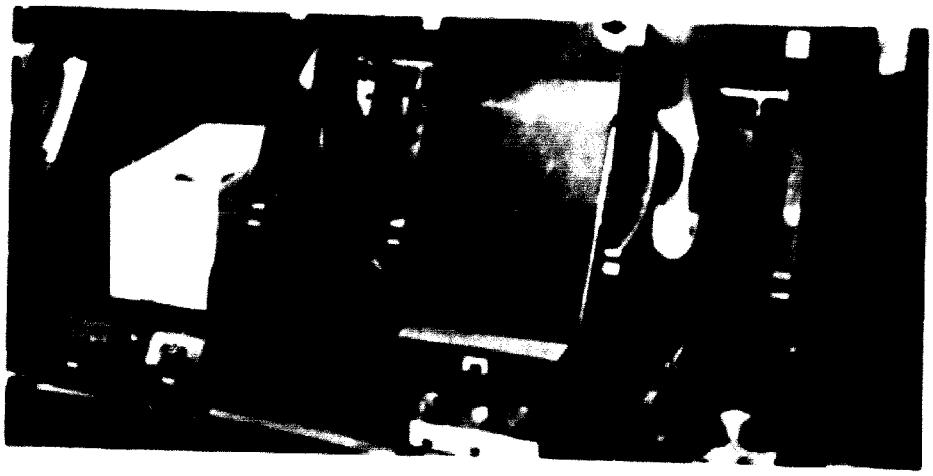


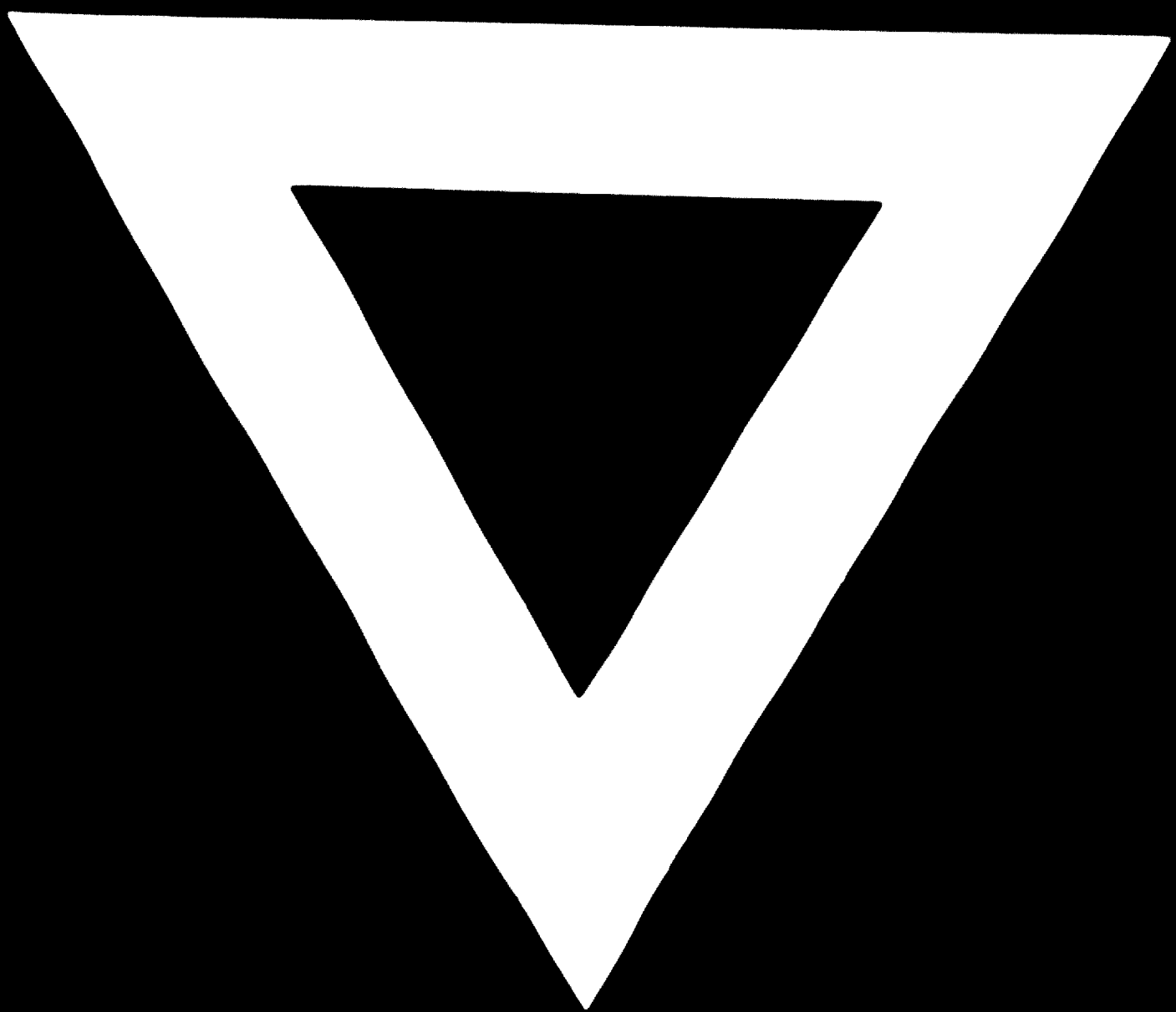
FIGURE VII

High Pressure Sole Vulcanizing Machine..









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