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A REARRANGEMENT of the HEAVY SHOE PLANT of W.L.Felch & Co., North Natick, Mass.

Cambridge,Mass.,

March 6,1924.

Prof.A.L.Merrill,
Secretary of the Faculty,
Mass.Inst.of Technology,
Cambridge,Mass.

Dear Sir;-

We, the undersigned students of the Mechanical Engineering Department, of the Massachusetts Institute of Technology, do hereby submit for your approval,Thesis, "A Rearrangement of the Heavy Shoe Plant"of W.L.Felch & Co., North Natick,Mass.

Respectfully,

Signature Redacted

Roger Cutting,

Signature Redacted

Harry R.Hammond.

140907

ACKNOWLEDGEMENT

The writers wish to acknowledge the kind assistance rendered them in preparing this thesis, by Professor George B. Haven of the Massachusetts Institute of Technology, Mr. Walter L. Felch and Mr. Theodore Russell of the W. L. Felch and Company and also by members of the United Shoe Machinery Company, General Electric Company and Otis Elevator Company.

Signature Redacted

Signature Redacted

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OBJECT OF INVESTIGATION

Purpose

The purpose of this thesis is to rearrange the plant of W. L. Felch and Company, North Natick, Mass. for more efficient operation in view of present business conditions. A new building which would undoubtedly contribute a great deal toward better efficiency, is not considered as the present volume of business does not seem to warrant it. Our plan is to give a better distribution of power by electtic motors in place of one large steam engine, a better routing for the work through the plant, from receiving raw material to shipping the finished product, more light on the machines, and better conditions for employees. At the same time we have attempted to make the plan practical as to the expense of putting it into effect.

History

The original plant of Felch Brothers, Manufacturers of Heavy Shoes, was built in 1858. Since that time there have been nine additions to the original building until at the present time the plan view is shaped like a shallow letter U. In 1900 the firm was changed to its present organization as W. L. Felch and Company. Most of the company's trade is in the south but a general decline in the shoe trade of recent years has made it more essential than ever to bring the present haphazard arrangement due to the numerous alterations into a more compact and efficient whole.

Procedure

In orderto do this it was necessary first to draw up detailed plans of the building,to locate the power plant, machinery and shafting, to measure the power input to machines and to trace the present routing of work in as much as there was no data of this sort available. Then using the old building plan the machinery was rearranged by making templates of all the machines and distributing them over the floor space, keeping in mind the necessity for good routing, good light, space requirements around the machine for operatives and trucks, and the possibility of adding more equipment without disturbing the location of the present machines. Where the arrangement of the machinery, as it is, was consistent with our plan it was not moved even though its position could be improved upon in respect to grouping for overtime. We then drew up power tables, selected motors, and laid out the plant.

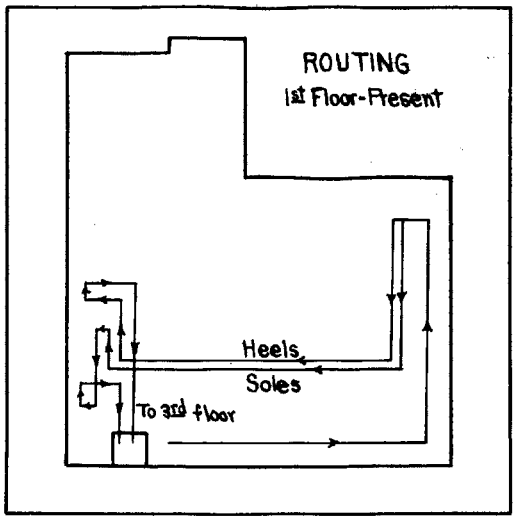
Present Conditions.

Buildings. The plant consists of a four-story main building with a one-story boiler house attached at the rear. The building is of wood frame construction throughout, with the exception of the boiler house and some pillars on the first floor which are of brick. There is no basement but owing to a sidehill slope the second floor is at ground level at the rear. The stairs are external except from the third to the fourth, and there is a light freight elevator in the front of the building. Floors are of 2" planking, rafters are 3" x 8" spaced 1 1/2' on centers, beams 8" x 10", columns 8" x 8" except brick which are 1 1/2' x 1'. All windows are 2 1/2' x 5'. There is a 5' x 8' skylight in the boiler house roof and ten 3' x 6' skylights in the main building roof. Fire escapes lead from the three upper stories to the boiler house roof anf thence to the ground.

Power Plant. The power plant consists of a 100 H.P. Robb Munford horizontal multitubular boiler and a 35 H.P. Parsons horizontal single cylinder reciprocating engine. The boiler is fed by a Knowles direct-acting steam pump. The engine drives the shafting from an 8' flywheel and exhausts into the heating system of the plant. All machinery in the plant is operated by this engine through belts and shafting. Main shafts are 2" in diameter, all others 1 1/2". There are numerous quarter turn drives and countershafts employed.

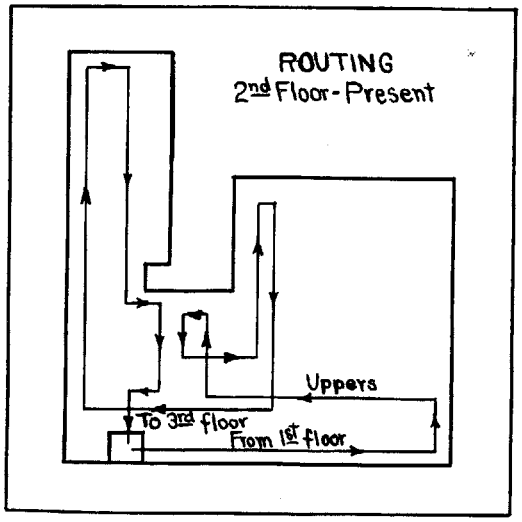
Routing.

First Floor. Raw materials are received on the first floor and stored at different places throughout the plant. The hides go to the sole cutters in the north front of the first floor. The cut soles are then passed back to the splitters and from there to the toe gouger at the south end of the floor. Outer and inner soles are tacked together by the grip tacker, stitched, and the soles moulded, doubling on themselves several times and then passing to the elevator. The heel pieces cut from the remnants of the sole leather are tacked together by hand at the south end of the floor. Then the heels are compressed and breasted and passed to the elevator.



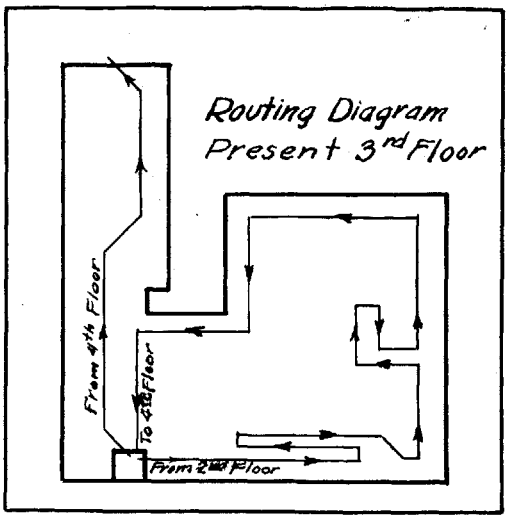
Second Floor.

On the second floor the uppers are cut by hand at benches along the entire front of the building. They are perforated by the crown tip puncher and then skived. They are sorted and paired by hand and

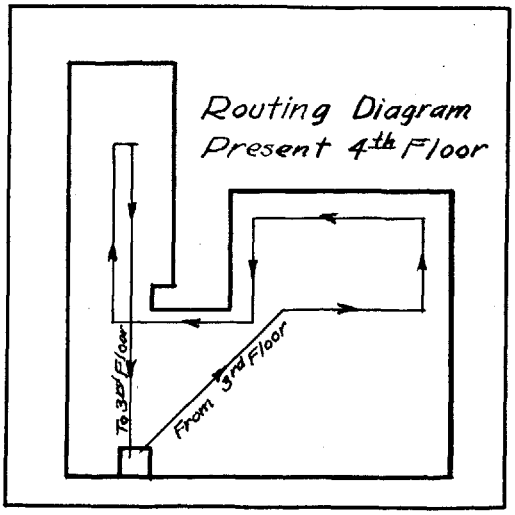


the size marked at benches near the center of the building. They then pass to the crimper at the far rear of the building, then back to the south front to the stitcher and eyeletters, doubling on themselves again. From there they take the elevator to the third floor.

Third Floor. On the third floor the uppers are tacked by hand to the inner soles at benches along the front of the floor and then lasted. The soles are again tacked by a grip tacker and then loose nailed or pegged, the routing here being fairly good. Then they are levelled and the heels attached. The heels are shaved and the edges trimmed. Then the heels are sanded, staired and burnished. The shoes then go to the elevator.



Fourth Floor. Upon reaching the fourth floor the soles are finished on sand wheels at the north end of the building and polished. Then the soles are stamped and the uppers treed in the south wing of the building. The shoes are polished and the vamps creased.



Lighting. Many of the machines in the building are not placed so as to give the most advantageous lighting and artificial illumination is resorted to, using electric fixtures of the old direct type. Also there is considerable obstruction of light, as well as waste of space, due to the storage of discarded machinery and surplus material about the building.

Sanitary Conditions. Toilet facilities are rather meagre and poorly placed. There is a toilet and sink on each floor but no lockers are provided in which the employees may leave their clothing.

Proposed Plan.

Power Distribution. In the first place we purpose to discard the present steam engine, supplanting it by electric motors which will operate on 60-cycle, 220 volt alternating current supplied by the Natick Edison Company from their power wires which are convenient to the plant. We would retain the present boiler for heating purposes in cold weather. We recommend the use of General Electric Company Types KT and KQ From C Induction motors for driving shafting, and a General Electric Type 3AC, 5 H.P. motor for the elevator. These motors are listed in the Appendix. The shafting will require eight motors, ome 15 H.P., one 10 H.P., and six 5 H.P., totalling in all 55 H.P. Three of the 5 H.P. motors however are operated only for overtime work. The motors are arranged as follows.

First Floor. On the first floor there are two 5 H.P. motors, each driving a group consisting of two sole cutters and two splitters, one group being regular and the other overtime. Each group is driven by one 1 1/2" 300 r.p.m. overhead shaft, to which the motor, hung on the ceiling, is directly belted.

Second Floor. On the second floor are a 15 H.P. and a 10 H.P. motor. The 15 H.P. motor drives a 2", 300 R.P.M. shaft hung from the ceiling, the motor being mounted on a bench. This shaft drives a group consisting of one grindstone, one tip puncher, one regular and one overtime

skiver, one marker and one crimper. From the shaft belts runmthrough the floor and ceiling to 1-1/2" 300 R.P.M. shafts hung from the ceiling of the first and third floors pespectively. The first floor shaft drives one grinder, one toe gouger, one grip tacker, one stitcher and one moulder. The third floor shaft operates one regular and one overtime leveller, one heeler, one heel shaver and one knife grinder.

The 10 H.P. motor is mounted on a bench and drives a 2" R.P.M. shaft hung from the ceiling. This shaft drives a cutter block planer and grinder on the same floor. which will be only infrequently used. Belts run through the floor and ceiling to 1-1/2" 300 R.P.M. shafts, on the ceiling of the first floor, and beneath a bench on the third floor, respectively. The first floor shaft drives one heel compressor, one grinder and two heel breasters, only one of which is used at a time. The third floor shaft is belted to two regular and two overtime edge trimmers, and one regular and one overtime burnisher.

Third Floor. On the third floor are 5 H.P. motors. A 5 H.P. motor mounted on the floor drives a 1-1/2" 300 R.P.M. overhead shaft which operates a overtime consisting of two lasters, one grip tacker, one grinder, one loose nailer and five polishers. A second motor operates a similar regular group except that the loose nailer is replaced by a pegger and the five polishers are operated from a

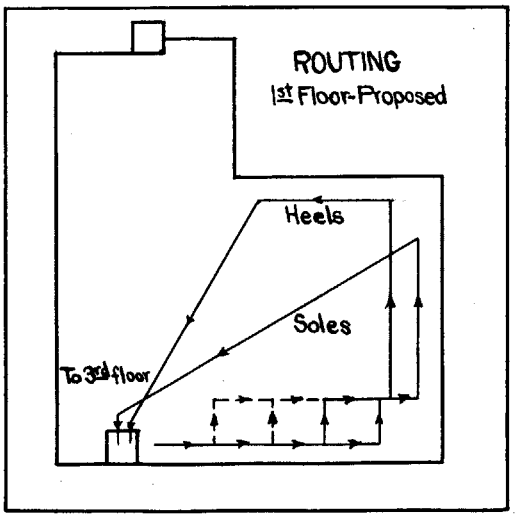
separate shaft, both shafts being driven from a jack-shaft on the ceiling over the motor. A third 5 H.P. motor mounted on the wall drives, from a 1-1/2" 300 R.P.M. overhead shaft, two tree-ers and a stamper, the stamper being driven from a countershaft. A belt runs from the main shaft through the floor to a 1-1/2" 300 R.P.M. shaft mounted under a bench on the second floor. This shaft operates nine stitchers, and, by means of two countershafts, an eyeletter.

The fourth motor operates an identical overtime group.

Fourth Floor. The 5 H.P. elevator motor is mounted at the top of the elevator shaft.

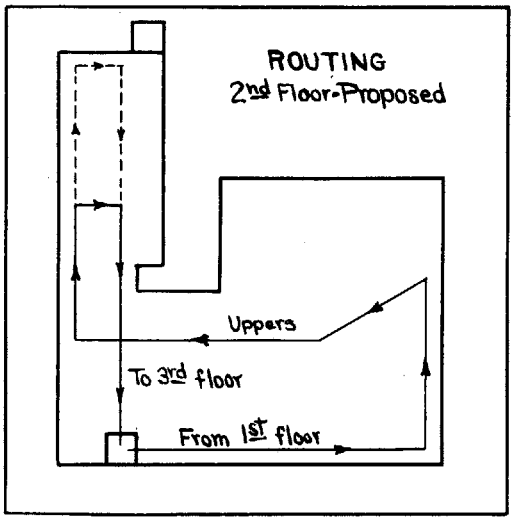
Routing.

First Floor. The same machines are retained on the first floor with the exception that two unused sole cutters, a former, and three unused butters have been discarded. A stock room running the entire length of the south end of the building has been partitioned off, with a receiving door cut through the outer wall at the rear. The sole leather leaves this room from a sliding door at the front



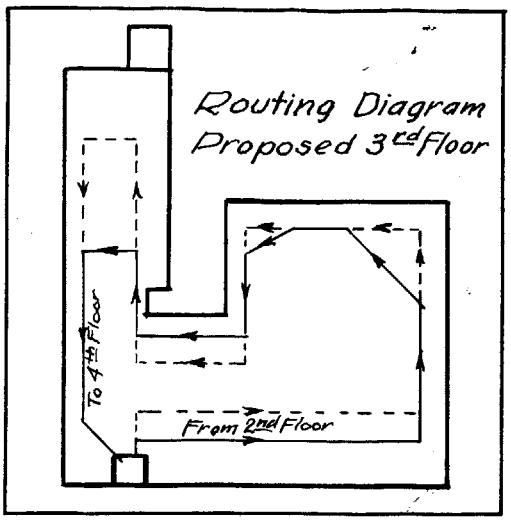
and passes to the sole cutters in the front of thebuilding. Each sole cutter has an adjacent splitter, from which the soles pass to the toe gouger, tacker, stitcher and moulder at the north end of the floor, and then to the elevator. The heel pieces go to the tacking bench, compressor and breasters at the rear of the buiding and thence to the elevator. All machines are arranged about the outside walls and the middle of the floor is clear.

Second Floor. On the second floor the upper leather is received from the stock room and cut at the present benches. Then the uppers pass to the tip puncher, skivers, markers, and crimpers at the north end of the floor and from there to the stitchers and eyeletters at the south end and to the elevator. A splitter, a butter and two eyeletters have been eliminated on this floor, and the cutter block planer moved into a corner and housed to leave the floor clear.

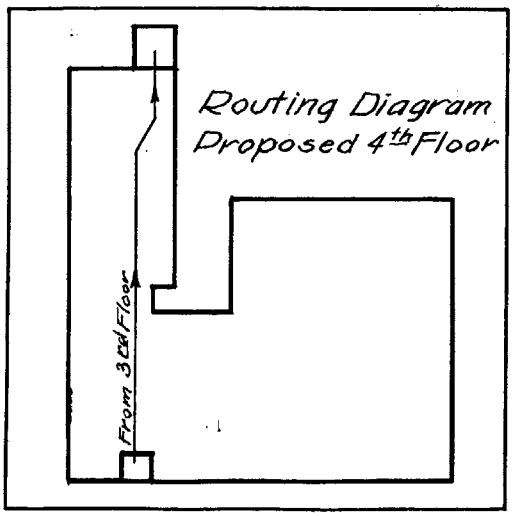


Third Floor. Upper soles and heels are received from the elevator at the third floor, and go to the lasters, tackers and peggers, which have been arranged in parallel rows along the front of the building. Then the shoes pass

to the levellers, heelers and heel shavers at the north end and to the trimmers, burnishers, staining bench and polishers along the rear. The packing and shipping room on the third floor has been removed to the fourth, and the fourth floor chemical laboratory placed in the rear of the south wing of the third floor. This leaves sufficient space to bring down the tree-ers and stampers from the fourth floor, which are arranged, with the vamp creasers, along the south end.



Fourth Floor. The shoes then pass by elevator to the fourth floor for packing and crating. We recommend the installation at the rear of the building a spiral gravity conveyor to carry cases to the shipping platform below.



Lighting. As far as p[ossible] ... been placed about the outside ... the centre of the floor left clear. We have indicated in the drawings additional windows where necessary, and left

space for storage on the fourth floor front for racks and other articles that might obstruct lighting.

Sanitary Conditions. We have retained all the present toilet facilities and recommend adding on the rear of the fourth floor two locker rooms for the employees. These rooms are to be equipped with toilets, washstands and lockers as shown in plans appended.

Schedule of Operation in Heavy Shoe Factory

Sole Leather Department.

Soles and heel pieces cut

" " " " split

" fitted (toe gouged)

" tacked (double sole)

" stitched (double sole)

" moulded

Heel pieces tacked

" compressed

" breasted

Upper and Stitching Department.

Uppers cut

" perforated

" skived

" paired and fitted

" size marked

" crimped

" stitched

" eyeletted

Making and Finishing Department.

Uppers tacked to inner soles

" lasted " " "

" tacked

" nailed or pegged

Shoe levelled

Shoe heeled

Heels shaved

Edges trimmed

Heels sanded

Edges stained

" burnished

Soles sanded

" polished

" stamped

Uppers treed

Vamps creased.

POWER TABLE

Machine	Pulley Dia. Inches	Pulley Width Inches	Belt Width	C.L.Pulley above floor Inches	R.P.M.	Belt Speed l/min.	H.P./ Inches Width	H.P. for Machines	Number Machines
Sole Cutter									
USMC	26	5	5	18	225	1530	1.53	7.65	2
Hawkins	16	5	4-1/2	18	225	940	.94	4.70	2
Splitter									
Stowe	10	2-1/2	2-1/4	48	360	1050	1.05	2.36	2
Worcester	14	3-1/2	3-1/2	36	360	1320	1.32	4.62	2
Grinder	2	2	1-1/2	42	1660	870	.87	1.30	5
Toe Gouger	6	3	3	18	750	1180	1.18	3.54	1
Grip Tacker	6	2	1-1/2	54	480	760	.76	1.14	3
Stitcher	3	1/4	1/4(dia.)	48	1340	1050	1.05	.26	19
Moulder	16	4	4	12	190	790	.79	3.16	1
Heel Compressor	18	3	3	12	325	1530	1.53	4.60	1
Heel Breaster	11	2	1-3/4	48	200	570	.57	1.00	2
Eyeletter	8	2	1-1/2	45	245	510	.51	.76	2
Planer	9	4-1/2	4	84	330	780	.78	3.12	1
Grindstone	15	2	1-1/2	28	100	400	.40	.60	1
Tip Puncher	8	2-1/2	2	36	270	570	.57	1.14	1
Skiver	8	2-1/2	2	36	200	420	.42	.84	2
Marker	5	1/4	1/4(dia)	48	300	390	.39	.10	1
Cri,per	12	3-1/2	3	68	360	1140	1.14	3.42	1
Laster	9	3	3	12	425	985	.985	2.95	4
Pegger	7	2-1/2	1-1/2	60	545	1000	1.00	1.5	1
Loose Nailer	10	3	3	12	290	760	.76	2.28	1

POWER TABLE (CONT.)

Machine	Pulley Dia. Inches	Pulley Width Inches	Belt Width	C.L.Pulley above floor Inches	R.P.M.	Belt Speed 1/min.	H.P./ Inches Width	H.P. for Machines	Number Machines
Leveller									
Hercules	16	4	4	24	420	1755	1.755	7.02	1
Tripp	12	4	2	42	420	1326	1.32	5.28	1
Heeler	23	5	4-1/2	13	120	730	.73	3.28	1
Heel Shaver	5	3	3	13	1300	1700	1.70	5.10	1
Knife Grinder	4	1-1/2	3/4	48	600	630	.63	.472	1
Edge Trimmer	5	2-1/2	2	12	1220	1620	1.62	3.24	4
Burnisher	6	2-1/2	2	12	765	1400	1.40	2.80	2
Polisher	4	2-1/2	2	48	1510	1300	1.30	2.60	10
Stamper									
Brewer	12	3	2-3/4	16	400	1260	1.26	3.46	1
Fifield	12	3	2-3/4	16	400	1260	1.26	3.46	1
Tree-er	16	3-1/2	3	28	120	490	.49	1.47	4

DISTRIBUTION TABLE

Machine	Pulley Dia. In.	Pulley Width In.	Belt Width In.	R.P.M. Driv. Shaft	Dia. of Driv. Pulley In.	H.P. per Machine	Regular Group Net H.P.	Overtime Group Net H.P.
Sole Cutters 2 Hawkins	16	5	4-1/2	300	12	2		4
Splitters 2 Worcester	14	3-1/2	3-1/2	300	17	1/2		1/5
Sole Cutters 2 U.S.M.C.	26	5	5	300	20	2	4	
Splitters 2 Stowe	10	2-1/2	2-1/4	300	12	1/2	1/5	
Grinder	2	2	1-1/2	300	11	1/6	1/6	
Toe Gouger	6	3	3	300	15	1/6	1/6	
Grip Tacker	6	2	1-1/2	300	10	1/2	1/2	
Stitcher	3		1/4(dia.)	300	13	3/4	3/4	
Moulder	16	4	4	300	10	1-1/2	1-1/2	
							3-1/12	
Grindstone	15	2	1-1/2	200	8	1/4	1/4	
Tip Puncher	8	2-1/2	2	200	11	1/4	1/4	
2 Skivers	8	2-1/2	2	200	8	1/4	1/4	1/4
Marker	5		1/4(dia.)	200	8	1/8	1/8	
Crimper	12	3-1/2	3	200	21	2	2	
							2-7/8	1/4

DISTRIBUTION TABLE(CONT.)

Machine	Pulley Dia. In.	Pulley Width In.	Belt Width In.	R.P.M. Driv. Shaft	Dia.of Driv. Pulley In.	H.P. per Machine	Regular Group Net H.P.	Overtime Group Net H.P.
Levellers								
1 Hercules	16	4	4	300	22	1-1/2	1-1/2	
1 Tripp	12	4	2	300	17	1-1/2		1-1/2
Heeler	23	5	4-1/2	300	10	2	2	
Heel Shaver	5	3	3	300	22	2	2	
Knife Grinder	4	1-1/2	3/4	300	8	1/2	1/2	
							6	1-1/2
Heel Compressor	18	3	3	300	20	2	2	
Grinder	2	2	1-1/2	300	11	1/6	1/6	
2 Heel Breasters	11	2	1-3/4	300	7	3/4	3/4	3/4
							2-11/12	3/4
Planer	9	4-1/2	4	300	10	3		3
Grinder	2	2	1-1/2	300	10	1/6		1/6
								3-1/6
4 Edge Trimmers	5	2-1/2	2	300	20	1-1/2	3	3
2 Burnishers	6	2-1/2	2	300	15	1/4	1/4	1/4
							3-1/4	3-1/4
2 Groups of 9 Stitchers	3		1/4(Dia)	300	13	1/4	9/4	9/4
1 Eyeletter	8	2	1-1/2	300	7	1/2	1/2	1/2
							2-3/4	2-3/4

DISTRIBUTION TABLE (CONT.)

Machine	Pulley Dia. In.	Pulley Width In.	Belt Width In.	R.P.M. Driv. Shaft	Dia.of Driv. Pulley In.	H.P. per Machine	Regular Group Net H.P.	Overtime Group Net H.P.
2 Groups of								
2 Tree-ers	18	3-1/2	3	300	7	1	2	2
1 Stamper	12	3	2-3/4	300	16	3/4	3/4	3/4
							2-3/4	2-3/4
2 Lasters	9	3	3	300	13	1/3	1	
Grip Tacker	6	2	1-1/2	300	10	3/4	3/4	
Pegger	7	2-1/2	1-1/2	300	13	1-1/2	1-1/2	
5 Polishers	4	2-1/2	2	300	20	1/8	5/8	
Grinder	2	2	1-1/2	300	11	1/6	1/6	
							4-1/24	
2 Lasters	9	3	3	300	13	1/2		1
Grip Tacker	6	2	1-1/2	300	10	3/4		3/4
Loose Nailer	10	3	3	300	10	1-1/2		1-1/2
5 Polishers	4	2-1/2	2	300	20	1/8		5/8
Grinder	2	2	1-1/2	300	11	1/6		1/6
								4-1/24

MOTOR TABLE

Elevator Motor - General Electric Type 3AC 5 H.P. Motor.

Motor No.	Full Load H.P. Net	+ Frict. All.	Overload H.P. Net	+ Frict. All.	H.P. of Motor	% Over-load	Speed R.P.M.	Pulley Dia. In.	Dia. Shafting In.	Shafting Speed R.P.M.	Shafting Pulley Dia. In.	Belt Speed l/min.	Belt Width In.
I	5	5.88	0	0	5	17.6	1740	4-1/2	1-1/2	300	26	2040	4 s.
II	5	5.88	0	0	5	17.6	1740	4-1/2	1-1/2	300	26	2040	4 s.
III	3-1/12 2-7/8 6		0 1/4 1-1/2										
	11.96	14.08	1-3/4	2.06	15	7.6	1755	4	2	200	35	1830	5 d.
IV	2-11/12 3-1/4		3/4 3-1/4										
	6-1/6	7.26	4	4.71	10	19.7	1740	4-1/2	2	300	26	2040	6 s.
V	2-3/4 2-3/4		0 0										
	5-1/2	6.48	0	0	5	29.6	1740	4-1/2	1-1/2	300	26	2040	4 s.
VI	2-3/4 2-3/4		0 0										
	5-1/2	6.48	0	0	5	29.6	1740	4-1/2	1-1/2	300	26	2040	4 s.
VII	4-1/24	4.75	0	0	5	0	1740	4-1/2	1-1/2	300	26	2040	4 s.
VIII	4-1/24	4.75	0	0	5	0	1740	4-1/2	1-1/2	300	26	2040	4 s.

All motors General Electric Company Types KT and KQ Form C
Induction Motors, 40°, Belt Drive, 2 Bearing. 60 Cycles,
220 Volts, 4 Poles. Synchronous speed 1800 R.P.M.

TABLE OF DRIVES BETWEEN FLOORS

Drive	Net H.P. Trans-mitted	Driving Speed R.P.M.	Shaft Pulley Dia.In.	Driven Speed R.P.M.	Shaft Pulley Dia.In.	Belt Speed l/min.	Belt Width In.
A	3-1/32	200	24	300	16	1260	3 s.
B	7-1/2	200	30	300	20	1570	6 s.
C	3-2/3	300	24	300	24	1880	2-1/2 s.
D	6-1/2	300	24	300	24	1880	4-1/2 s.
E	2-3/4	300	24	300	24	1880	2 s.

Shipping & Receiving

¼ Turn Drive to 2nd floor

Puritan Stitcher

Grinder

U.S.M.C. Grip Tacker

2 Heel Breasters

2 Carver Butters

Crescent Toe Gouger

U.S.M.C. Heel Compressor

Elevator

Nahan Moulder

Drive to 2nd floor

Grinder

Storage

Elevator Hoist

Coal Pocket

Boiler House

Robb-Mumford 100 H.P. Boiler

Knowles Steam Pump

Drive to 2nd floor

Parsons 35 H.P. Engine

Drive to 3rd floor

Sole Cutter

¼ Turn Drive to 2nd floor

Stowe Splitter

U.S.M.C. Former

2 Worcester Splitters

2 U.S.M.C. Sole Cutters

Storage

Drive to 3rd floor

Carver Butter

Stowe Splitter

Drive to 2nd floor

3 Hawkins Sole Cutters

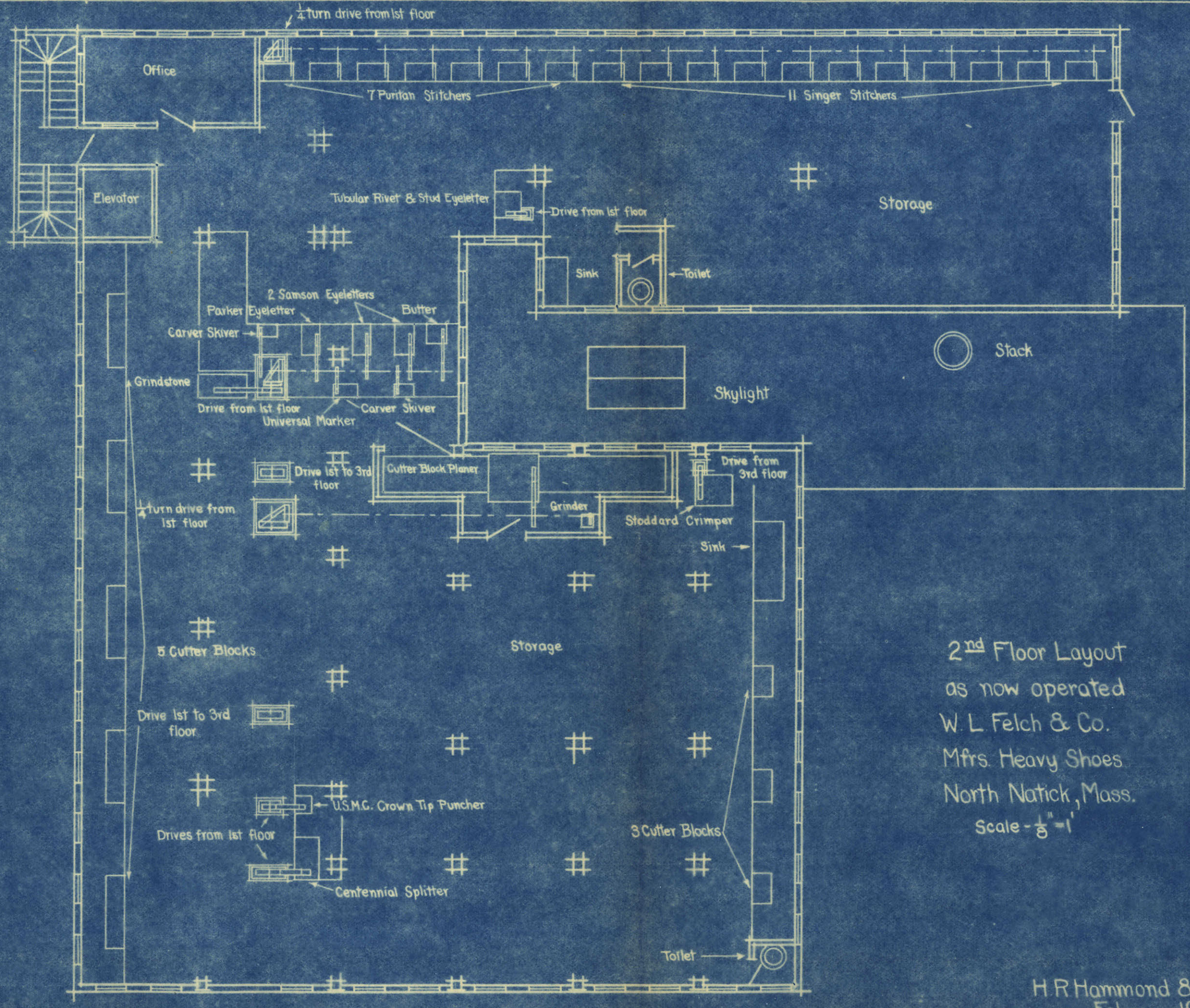
¼ Turn Drive

Toilet

1st Floor Layout as now operated W. L. Felch & Co. Mfrs. Heavy Shoes North Natick, Mass

Scale - $\frac{1}{8}$" = 1'

H. R. Hammond & R. Cutting
February, 1924



2nd Floor Layout as now operated W. L. Felch & Co. Mfrs. Heavy Shoes North Natick, Mass.

Scale - ⅛" = 1'

H. R. Hammond & R. Cutting
February, 1924

Stairway to 4th Floor

Tubular Rivet and Stud Eyeletters

Polisher

Storage

Shipping Room

Elevator Shaft

Sink

2 Polishers

Skylight

Stack

Drive from 1st Floor

McKay Laster

Polisher

Drive to 2nd Floor

2 Burnishers

Grinder

Grip Tacker

¼ Turn drive from 1st Floor

McKay Laster

Grinder

Tripp Leveler

Hercules Leveler

4 Edge Trimmers

Loose Nailer

Sink

Davey Pegger

McKay Heeler

Heel Shaver

Knife Grinder

3rd Floor Layout as now operated

W.L. Felch and Co.
Mfrs. of Heavy Shoes
North Natick, Mass.
Scale ⅛" = 1'

H.R. Hammond and R. Cutting
February 1924

Stairway to 3rd Floor

¼ Turn Drive from 3rd Floor

Brockton Vamp Creaser

Elevator

4 Copeland Shoe Treers

Chemical Laboratory

Skylight

Stack

Stamps

Brewer Stamper

Fifield Stamper

Section of Roof showing Skylights 7 spaced equally

Machines on this floor driven from 3rd floor shaft

2 Polishers

Dry Room

2 Polishers

Toilet

4th Floor Layout as now operated W.L. Felch and Co. Mfrs. of Heavy Shoes North Natick, Mass.

Scale ⅛" = 1'

H.R. Hammond and R. Cutting

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Stock Room

Coal Pocket

Conveyor

Elevator

Boiler

Pump

2 Heel Breasters

5 HP Motor on ceiling

4 Sole Cutters

Grinder

4 Splitters

Drive from 2nd floor

Heel Compressor

Tacking Bench

5 HP Motor on ceiling

Grip Tacker

Toe Gouger

Stitcher

Moulder

Grinder

Drive from 2nd floor

Toilet

1st Floor Layout as proposed

W. L. Felch & Co.

Mfrs. Heavy Shoes

North Natick, Mass.

Scale - $\frac{1}{8}$" = 1'

H. R. Hammond & R. Cutting

February, 1924.

Office

9 Stitchers

Drive from 3rd floor

9 Stitchers

Elevator

Eyeletter

Eyeletter

Conveyor

Sink

Toilet

Stack

Skylight

Cutter Block Planer

5 Cutter Blocks

Grinder

Drive to 1st floor E F

HP Motor

Drive to 3rd floor G H

Crown Tip Puncher

Drive to 1st floor
15 HP Motor

Grindstone

2 Skivers

Marker

Crimper

Sorting Bench

Drive to 3rd floor

Toilet

A

D

O

2nd Floor Layout as proposed W.L. Felch & Co. Mfrs. Heavy Shoes North Natick, Mass.

Scale - 1/8" = 1'

H.R. Hammond & R. Cutting
February 1924

Vamp Creaser

Tree-er

Drive from 2nd floor

5 HP Motor hung on wall

Tree-er

Tree-er

5 H.P. Motor hung on wall

Tree-er

Drive from 2nd floor

Chemical Laboratory

Spiral Gravity Conveyor

Elevator Shaft

Brewer Stamper

Stamp Case

Fifield Stamper

Laster

Laster

Laster

Laster

Polishers

Skylight

Stack

Staining Bench

Bench

5 HP Motor on floor

5 H.P Motor on floor

Grinder

Grip Tacker

Grip Tacker

Pegger

Loose Nailer

Grinder

Drive from 2nd floor

Burnishers

Edge Trimmers

Leveller

Leveller

Heeler

Drive from 2nd floor

Heel Shaver

Knife Grinder

3rd Floor Layout as proposed W.L. Felch and Co. Mfrs. of Heavy Shoes North Natick, Mass.

Scale 1/8" = 1'

H.R. Hammond and R. Cutting
February 1924

Packing Bench

Crating Room

Spiral Gravity Conveyor

HP Elevator Motor

Skylight

Stack

Storage

Section of Roof showing Skylights 7 spaced equally

Women's Locker Room

Storage

Men's Locker Room

4th Floor Layout
as proposed
W.L. Felch and Co.
Mfrs. of Heavy Shoes
North Natick, Mass.
Scale 1/8" = 1'

H.R. Hammond and R. Cutting
February 1924

Motors shown are not in the section

4th Floor

3cd Floor

Section C-D

Section G-H

Section I-J

5 H.P

15 H.P

10 H.P

Section A-B

Section E-F

2nd Floor

1st Floor

Cochituate End of Building

Rear of Cochituate wing of Building

Natick End of Building

Section showing main drives between floors as proposed
W.L. Felch and Co.
Mfrs. Heavy Shoes
North Natick, Mass.
Scale 1/4" = 1'

H.R. Hammond and R. Cutting
February 1924