GRA420 - Binding and Finishing II Final Exams Notes
Apr 14, 2016, 5:01:38 PM

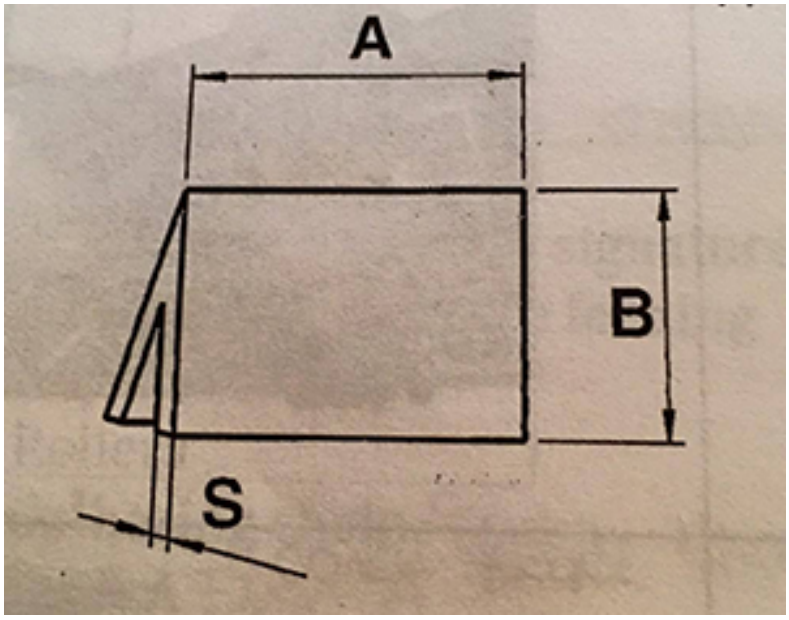
Saddle Stitcher (Specifically Muller Martini Valore)

Why is it called "Saddle stitching?"
Saddle because signatures are sitting on a conveyer belt that resembles that of a saddle
Stitching because we use a wire although it looks like a staple

Specifications:
- Only has 2 pockets
- Makes this machine an entry-level machine
- Also cannot run tabloid
- Precollates signatures then trims

Sizes:

Sizes	Max	Min
A (Spine length)	**365mm or 14 3/8"**	**145mm or 5 3/4"**
B (Spine to forehead)	**305mm or 12"**	**100mm or 4"**
S (Spine thickness)	**3-5mm or 1/8-3/16"**	**--**



Mechanical Speed:
Max. 6000 cycles/hr
- (Full size saddle stitchers run 18,000 cycles/hr

The maximum production speed depends on feeder, stitching head, paper quality and signature size.

Excess information:
- We never do less than 500 copies on this saddle-stitcher
- Why? Make ready takes too long
- Each bolt has to be adjusted manually

Make Ready; 2-3 hours

- We start at the trimming and finishing end first
- This allows us to properly adjust everything else according to the trimming and final size of the job
- This also aids in preventing paper jams while running the machine

FEEDER STATIONS

Feeders (3 Kinds)

- **Pocket Feeder**
- **Hand Feeder**
- **Cover Feeder**

Pocket Feeder

- Compact twin feeder
    - Compact because it cannot feed tabloid size
        - Feeders that CAN feed tabloid size would not be known as "Compact"

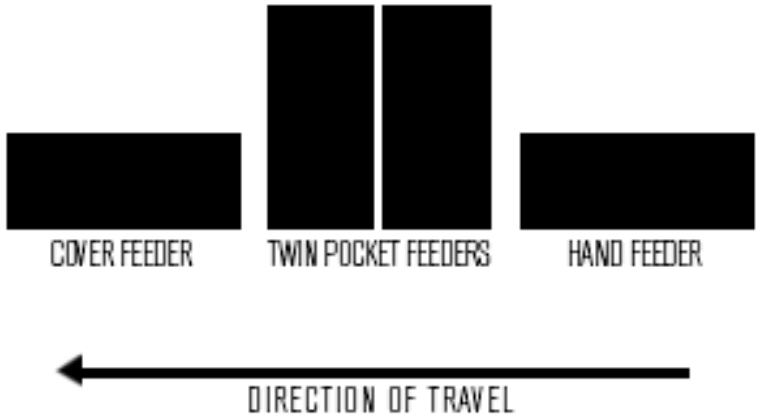
Hand Feeder

- Manually feed special pages onto a "saddle"-like belt
    - Pockets, gatefolds, etc are examples of "special pages" that are hand fed
        - If put into the pocket feeder, it risks crumpling or ruining the "specialness"

Cover Feeder (Folder Feeder)

- Feeds flat sheets that are then turned into the cover
- Location is after the pocket feeder

FEEDER ORDER



Getting Flatsheets into Covers (Refer to image below as guide when reading steps)

Signatures sit on the hopper which then get fed by the Feeder Table (A) and grabbed onto by the Sucker Bar Shaft (B)

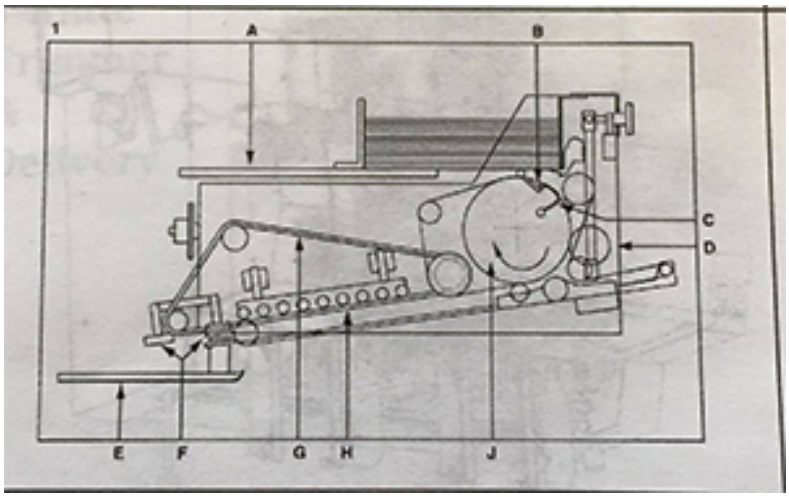
- Grippers (C) then grab the fed signature and brings it around the drum

- While going around the drum, signature goes through a Scoring Wheel (D) getting it ready to be folded

- Squeeze Rollers (F) nip and fold the signature into a cover

- The cover then goes around a V-belt (G) and drops onto a sword (H)

- Pusher on the gathering chain then marries the cover to the rest of the booklet



Parts of a Folder Feeder

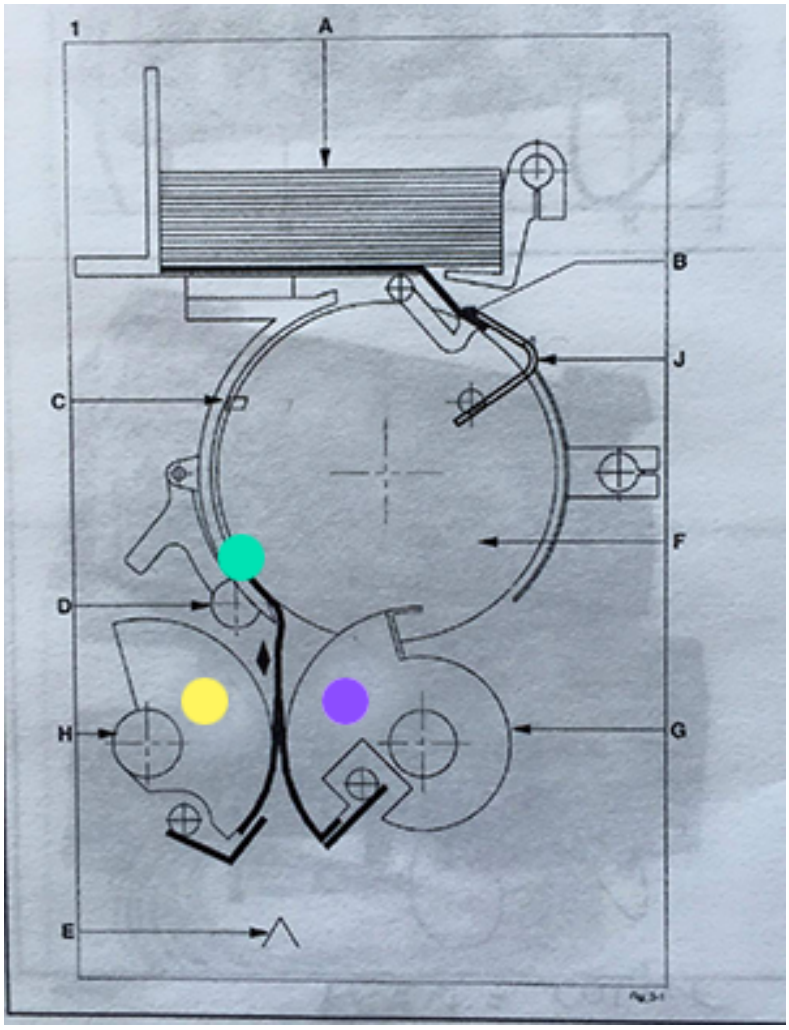
A. Feeder Table
B. Sucker bar shaft
C. Gripper
D. Scoring Wheel
E. Sword Extension
F. Squeeze Rollers
G. V-belt
H. Sword
J. Drum

Signatures sit on the hopper (A)

- Signature feeding suckers (B) grab onto the signature

- Drum A (The big circle) brings the fed signature through to the position for splitting (indicated with a green dot)

- Drum B (Yellow dot) grabs hold of the front half of the signature as Drum C (Purple Dot) grabs hold of back half with the highfolio lip and splits the signature in half as it feeds onto the Gathering Chain (E



Parts of the Pocket Feeder

A. Hopper where signatures sit
B. Suckers that feed signature into Drum A
C. Adjustble Stops
- Drum A brings signatures around until stop
D. Rollers
E. Gathering Chain/Saddle Chain/Saddle Barn
F. Drum A
G. Drum B
H. Drum C
J. Grippers/Fingers

<u>Notes to keep in mind</u>

The lip of a signature is also called a Lap or Pickup

The most efficient way to saddle-stitch is to have a good lip

Having no lip will prevent Drum C from grabbing and splitting the signature causing it to fall on the ground instead of the gathering chain

Everything on the grathering chain jogs to the saddlechains and pushers

You must also have a closed head or else the suckers on Drum B will only grab the first page instead of first half

RIGHT ANGLE STATIONS
Safety Covers
Caliper Control at Spine and Stitching Heads
Reject Bin/ Accumulation Tray

Safety Covers
- Used to fix/unjam machine

Caliper Control
- This measures the caliper of the signatures after they have been collated
    - A caliper is set, if the caliper measured does match the set measure, the machine will dump the measured booklet into the reject bin

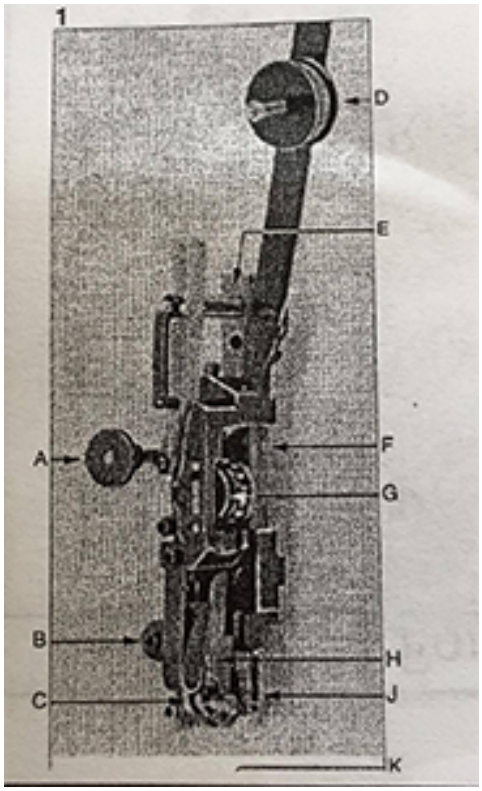
Reject Bin/Accumulation Tray
- Where all the rejects go (like York U)
    - When the binder runs out of signatures, they can grab from the reject bin and refeed

- They can do this because it is before the stitching unit therefore the signatures are not yet bound and still loose

Infeed Belts
- Leads to the stitcher
- Where is the book is trimmed
    - Clamps clamp down onto the book
        - Knife cuts head & foot (Cheers cutting)
            - Knife cuts foredge

Three Stitching Heads
- Book rides between the three heads

Stitching Procedure
The wire is first cleaned with the Wire Cleaner (D)
- The wire is then straightened as it comes out of a spool
- The wire is then measured to it's correct length and cut
- The Former slide (F) turns the wire into a staple-like shape
- It is then driven into the spine of the book
- The clinchers then close off the wire thus completing the binding



Parts of the Stitcher Head

A. Handwheel for wire feed mechanism (on/off)
B. Knife Housing
C. Knife
D. Wire Cleaner
E. Driver Slide
F. Former Slide
G. Wire Feed Wheel
H. Gripper
I. Centering Foot
J. Clincher Wing

DELIVERY STATION

Two Pocket Delivery

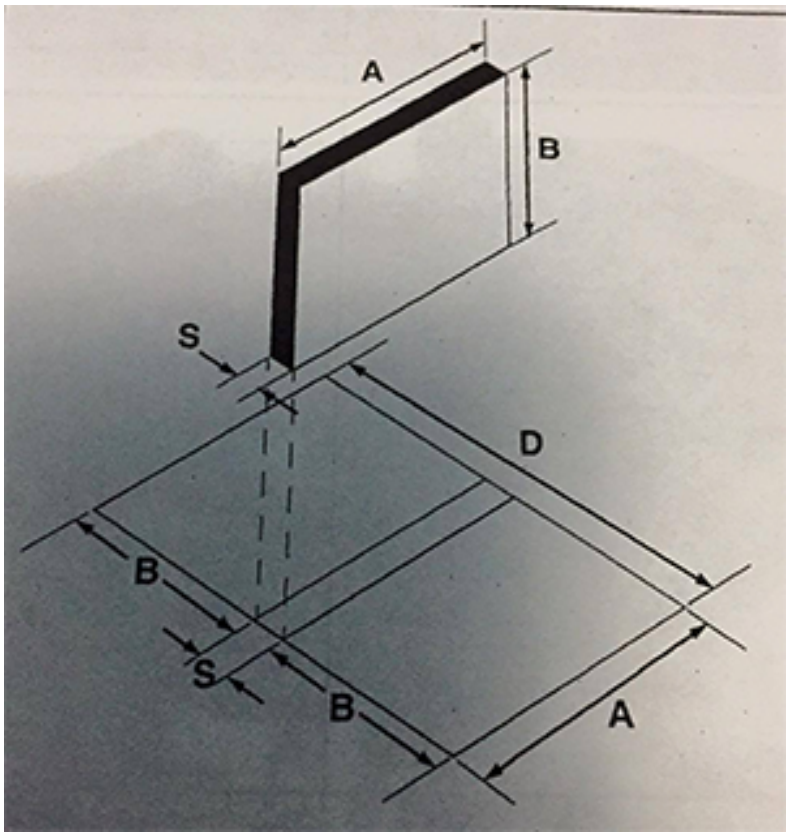
- It is a two pocket delivery allowing us to batch
    - Ex. We can send 15 booklets in the first pocket, 15 in the next and repeat.

Perfect Binder (Specifically Muller Martini Amigo Plus)

Specifications:

- No pockets for feeding (pre-collating needed)
- No trimmer
- Entry level model
    - Meant for jobs that run 500-1000 books
- Carousel perfect binder
    - 4 Clamps to feed book into
    - Carrys from station to station

	Max	Min
A (Spine)	**400mm or 15 3/4"**	**120mm or 4 3/4"**
B (Width)	**270mm or 10 5/8"**	**95mm or 3 3/4"**
S (Thickness)	**40mm or 1 9/16"**	**3mm or 1/8"**
D (Cover (Flat))	**580mm or 22 7/8"**	**193mm or 7 1/2"**



PARTS OF THE MACHINE

Front of Machine
- Chute Delivery
- Clamps
- Control Panel

Clamps
- Black Arrows indicate when the clamp opens
- Black Section indicates the "sweet spot" for feeding
- Yellow Section indicates when clamp closes
- Jogs to the head and spine

Feeding between the black arrow and section is recommended*

Side/Angle of Machine (Back Left)
- Cover Feeder

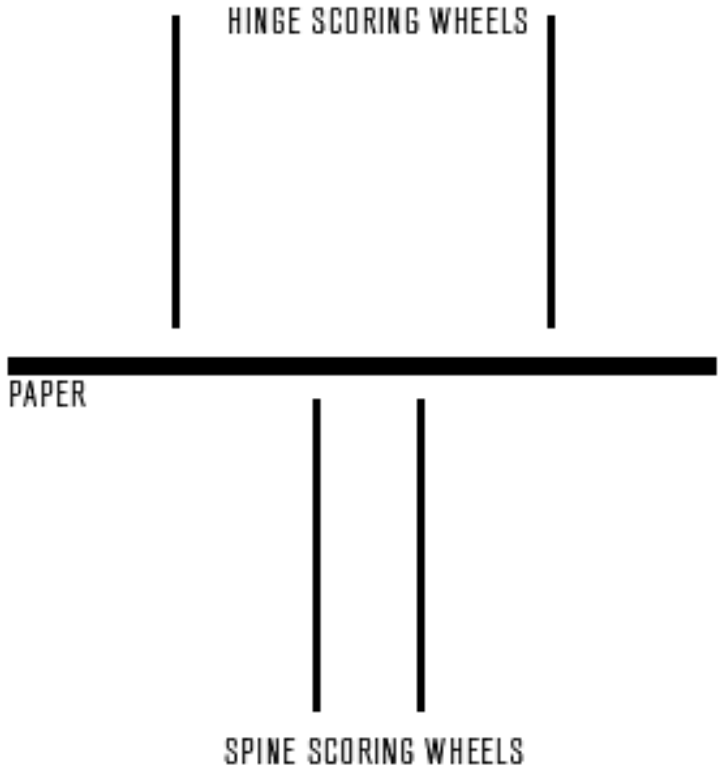
- Glue Pots
- Nipping Stations

Milling Station
- Grinds off 1/8" of spine
    - After this, book block is dropped down to the glueing station
- Air nozzels help jog the book block

Glue Pots
There are 2 different glue pots: Pot A and Pot B
Pot A
- Pot A contains glue for the spine
    - The glue in this pot is made of chiclets that are melted
        - 2 Wheels
            - Wheel 1
                - This is considered "quality' as it glues the grindoff and notches
                    - Keep in mind notches are made to allow more area for glue
            - Wheel 2
                - Floods glue in and allows the book block to attach to the cover
Pot B
- Pot B contains glue for the side of the book
    - This glue is made of clear pellets that are melted

Glue Premelter
- This machine does not have a premelter but it is useful to know it's function
    - This premelts the glue to keep the glue at max level
    - Ideal temperature is 175 degrees
        - Adding pellets will cool the temperature

Cover Feeder
- Fed as a flat sheet
- 4 scorings wheels for spine and hinge
    - 2 from top, 2 from bottom
        - Hinge scores are from top
        - Spine Score from bottom



Nipping Station
- Squeezes cover to book

Vacuum Station
- Vacuumes grind off and notch dust

STEPS (Simplized)
4 Clamp System (Feeding)
- Milling Station (Grind)
    - Drop Down Table (Reposition)

- Glueing Stations x2 (Glue Spine)
- Cover Feeder
- Nipping Feeder (Nip cover to book)
- Drying Section
- Chute Delivery

Lecture Notes (Not ALL notes)

Perfect Binding

History

- 1940's "hot melt" technology, product better than PVA
- Faster at setting

Perfect Binding Structure

- Book black is not attatched to cover
- Soft Cover Material
- Spine cover material is attatched
- Spine ranges from 1/8" to 4"
- Relatively Inexpensive

Perfect Binding Process

- Gathering, Collating stations are inline

Adhesive

- 3 kinds of glue on the perfect binder
- PVA
- EVA
- PUR
- PUR is more recent than the other two
- More flexible
- Less problems when adhering to offset inks

Other Adhesive Binding Methods

- Tape Binding
- Thermal Binding
- Unbind
- Channel Bind

Layflat Binding

- Otabind

- A hollow area is created on the spine when book is flat

Hybrid Books

- Hard cover books with perfect bound book block or soft cover with sewn book block (non grind books)
    - Hard cover is attatched using end sheets

Saddle Stitching

Benefits of Saddle Stitching

- Simple and safe working principle
- Possibility of direct finishing in workflows
- A secure block binding
- High economic efficiency

Principle Areas of Use for Wire-Stitching

- Production of mass edition magazines
- Finishing simple printed products

Shortcomings in Quality of Saddle Stitching

- Danger of oxidation of the stitches
- Danger of damage to staple arms
- Poor aesthetic effect of the binding

High Volume Feeding Systems

- **NIP: Non Impact Printing (Digital Printing)**
- Instead of having one person feed two pockets, have them feeding one pocket at max speed
- Signatures are folded off of a web press and fed around a reel
    - Hundreds of thousands of signatures in one reel

Stitching

- Stitching head with matching **Clincher (Clinching Wings)**
    - Clincher rides inside the saddle of the book and the saddle rides the outside
- **Loop Stitch**
    - Used so we don't have to drill three holes in the book
        - Putting the stitch on the outside will allow us to insert the product in a binder

Buckling Stresses

- **Hard Papers:** Tend to cause the staple to not drive through the entire book
- **Recycled paper**
- **Thicker book spines**

Trimming Systems

- **Two kinds of trimming systems**
    - ***Three knife trimmer***
        - First station trims head and foot as clamp holds book together
        - Second station trims the fore edge
    - ***5 Knife trimmer***

Delivery Systems

- Two Pocket Delivery System

- Requires someone to be at the pocket at all times
  - Two pocket allows us to batch the completed products
    - Someone must be there to take the products off as a batch

- Conveyer System (Belt)

- Requires someone to be at the belt
  - Batches signatures but needs to be jogged and manually removed off the belt

- Stacker Delivery System

- Turn table turns 180 degrees
  - Gets banded then dropped in a cage (reuseable)

Waste Removal

- Saddle Stitching units produce a lot of waste
  - Grind off and Notch making
- Vacuuming is the easiest way to remove waste

Adding Value

In Line

- Loop Stitching
- 5-knife trimmer

- Tipping

- Tips one magazine onto another

- Blow-ins

- Usually done after ALL collating is done and before stitching
- Pocket shoves card into collated book block

- Drilling

- Happens at the trimming station
  - Drill head comes down as knife trims the edges

End of Line

- Folding

- Conveyer belt that feeds the folder and into the buckle folder, or knife folding systems
- Do this to reduce the cost of postage if it is smaller

- Bundling

- Bands books with plastic band, strink wrap, etc.

Creep

Calculating Creep

Example: Book with 64 pages, thickness of 0.00"

- 64 pages/4pages per signature = 16 signatures
  - 16 signatures x 0.002" paper thickness
    - Creep is 0.032"

Challenging Saddle Stitch Products

If book is 8.5x11, is the cover also 8.5x11?

When we saddle-stitch the book then trim the fore edge, we can bring them back to the cover feeder and it will be flushed with the inside

- Crossovers

- If folding or jogging is not perfect, crossover pages will not be perfect as well
  - We do double parallel folds to get better line ups with crossover pages than right angle folding

Estimating Saddle Stitching Costs

The BHR (Budgeted Hourly Rate) should include direct cost of the machine purchase plus fixed and variable costs

- Pocket Feeders, end of line workers including floor help are added as needed

Estimating Cost

- Make-ready time x BHR
- Run time (Quantity/Speed standard) = Run time hours x BHR

- Pocket Feeders (# of Signatures/3) x Run time hours x BHR
- Add quantity of extra helpers needed to take off magazines x Run time hours x BHR

Automation

Why Automation?

- 3% of titles sold make up 50% of total volume
- 10% of the titles make up > 90% of the total volume
- 90% of titles are the long tail

CIM (Computer Intergrated Manufacturing)

- Sizes, Quantity, Property, and Action

Why do we need it?

- Gives us more accuracy
- Improves communication
- Improves productivity and efficiency

CIP4 MIS Centric View

- MIS System should drive any workflow system in the printing industry
    - Estimating is the center
- Premedia Centric View
    - Premedia is the center
- Bindery View
- MIS is also used in generic accounting
- JDF: Job Definition Format
- JMS: Job Messaging Format

CIP4

The International Cooperation for the Intergration of Processes in Prepress, Press, and Postures Organization.