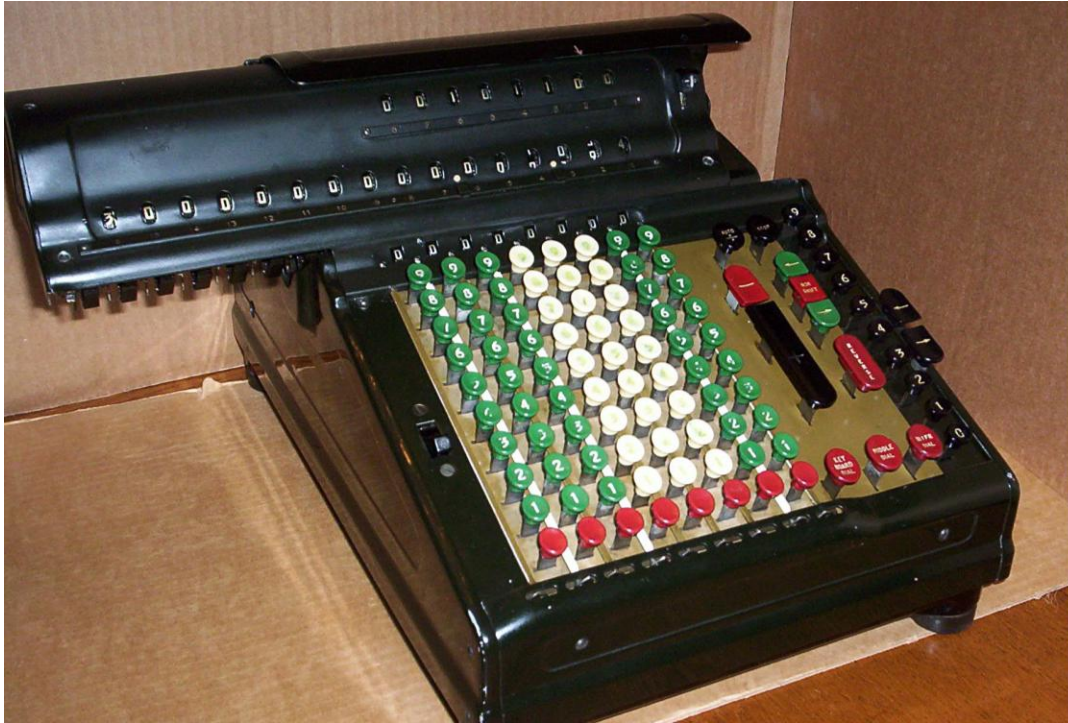


# Livermore Heritage Guild's 1937 Marchant Calculator



Rev. A - 11/12/2013  
Harry Briley

## Disassembly for Cleaning



## Simple Tools for Cleaning:

### For Refurbishing:

- Mineral Spirits for Oil-Based
- White Grease
- 91% Isopropyl Alcohol
- Repurposed Eyedropper

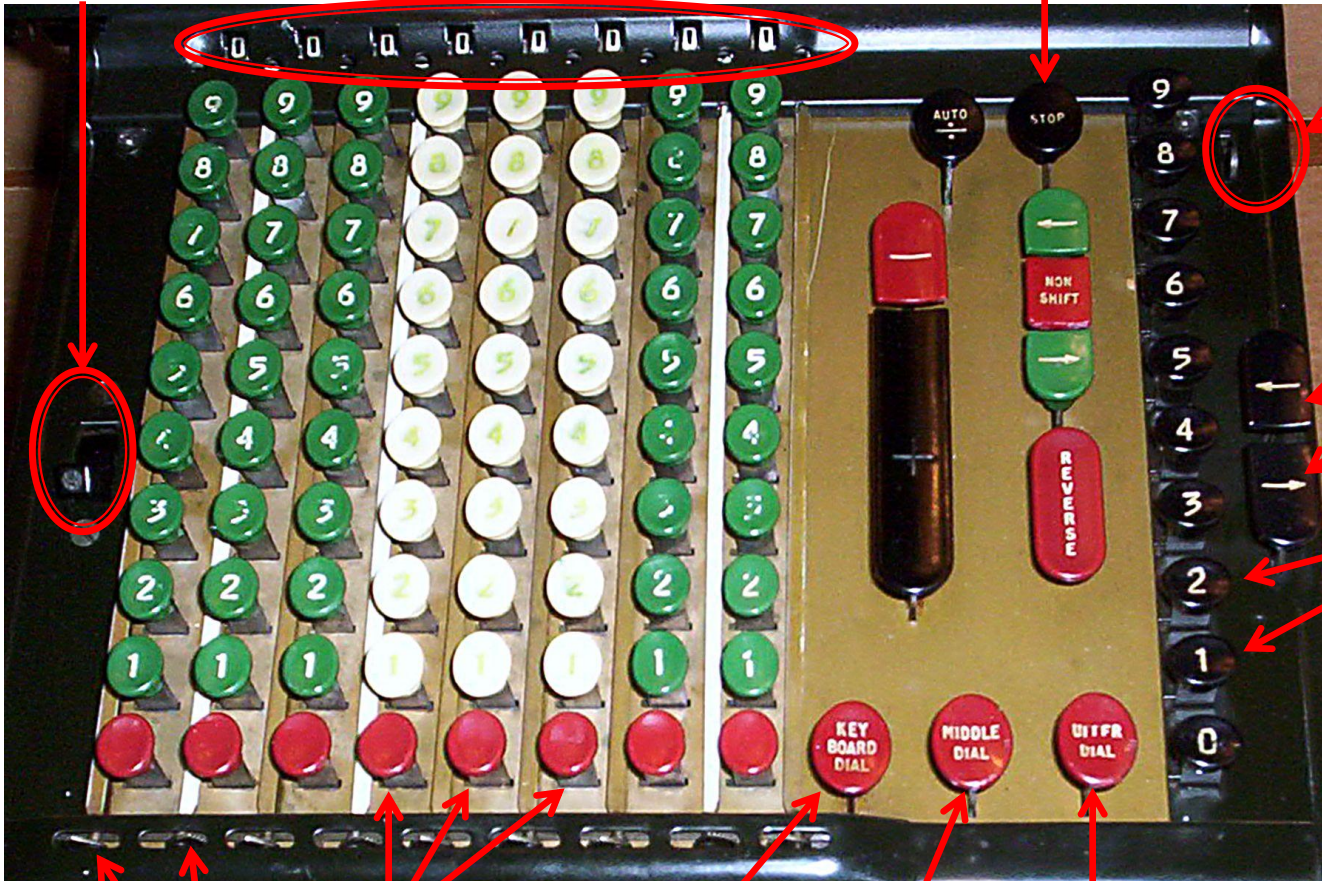
### For Maintenance:

- 10W-30 Oil (not Pennzoil)
- FLAT Screwdrivers, one with a screw-holder feature
- Needle nose pliers for clips
- Large Magnet to hold screws
- Cardboard mat to catch oil

Power Switch

Keyboard spin-dials

Stop resets any pressed buttons on this right side



Lever prevents reset of the two carriage ranks

Carriage Shift Left or Right

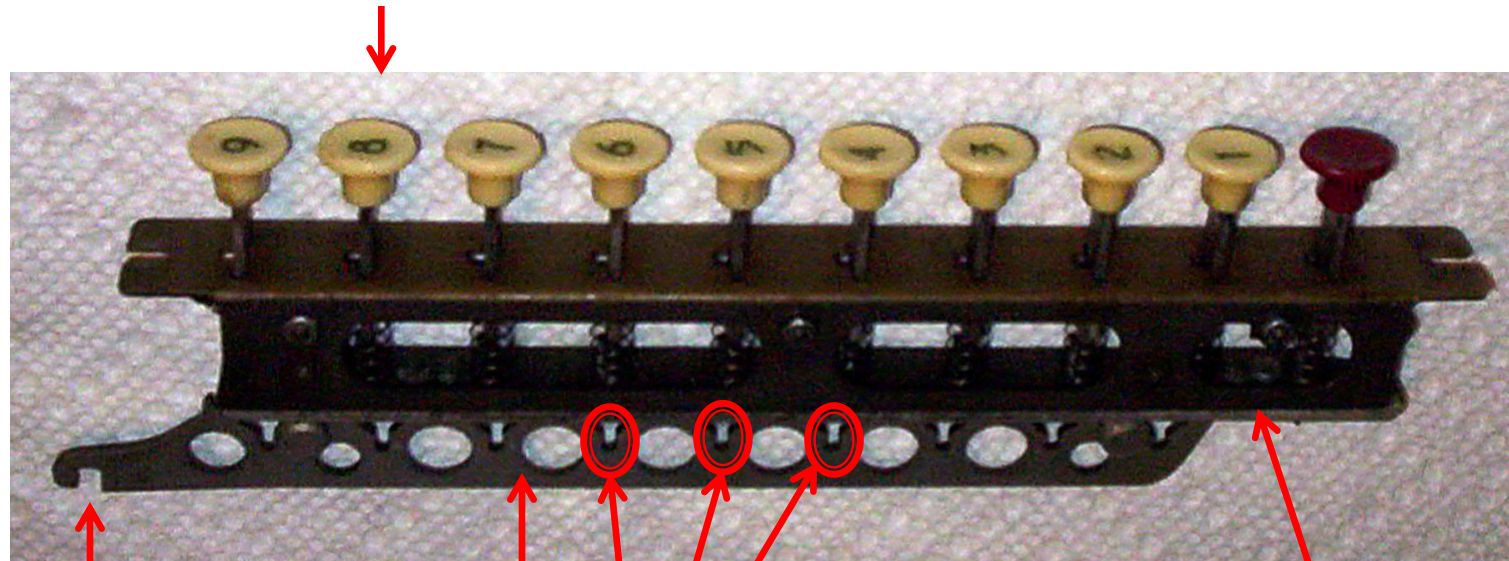
Multiplier Buttons

Clear specific digits, all digits, and bottom/top rank of carriage.

Rotate white marker bars to help human define decimal point precision

Remember the order parts removed and which machine screws used

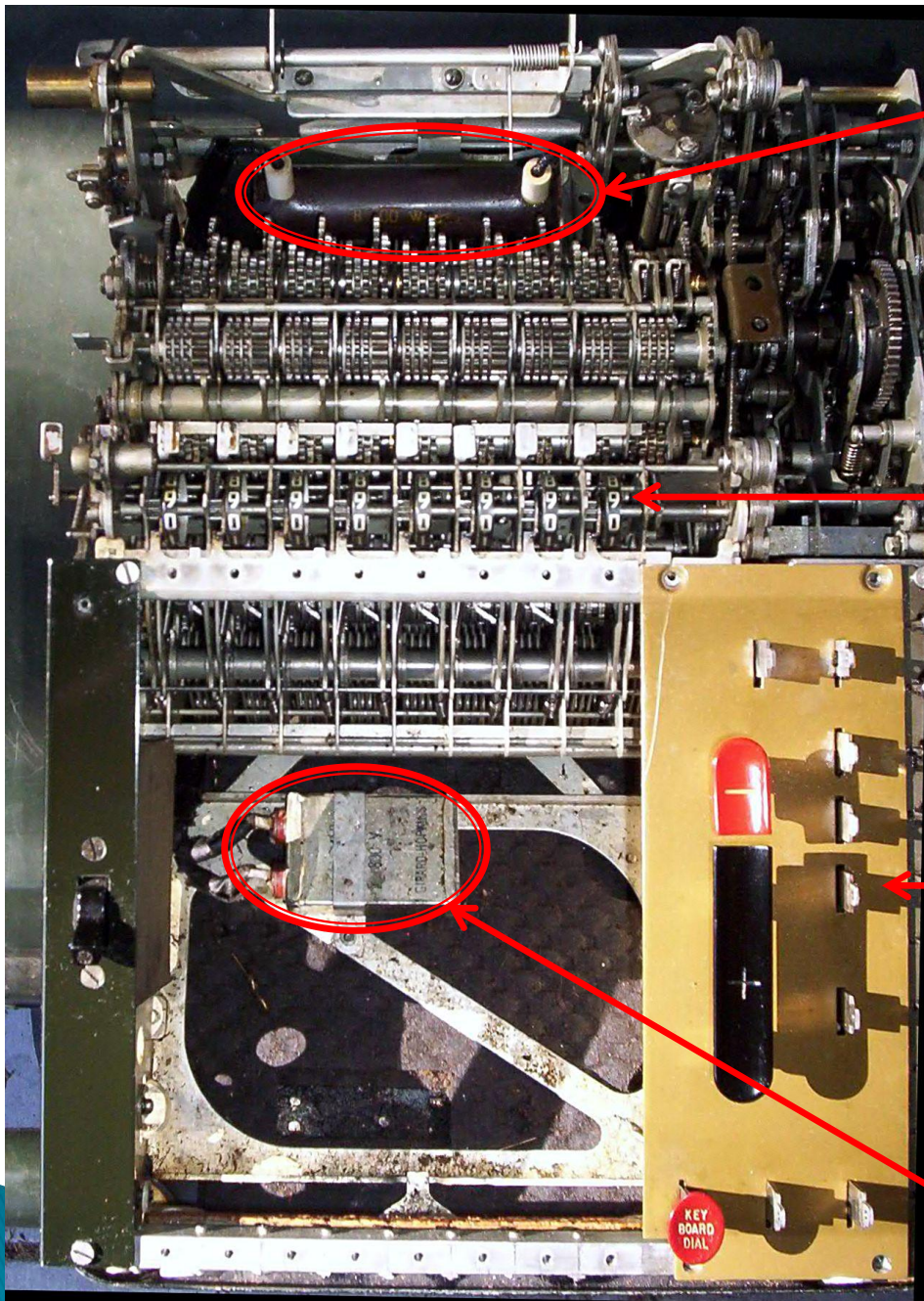
Each modular digit rank merely pushes a gauged rod into the spin-dial



Hook to the spin-dial

This push rod moves the proper distance by the gauged slots for each button plunger. The button stays down by spin-dial pressure. Oil two swinging pivot points.

The Reset Key shifts this bar slightly to let the plunged button pop up and thus allow the dial to spin back to zero. Oil interface of this flat bar.



**Caution:** Electrical

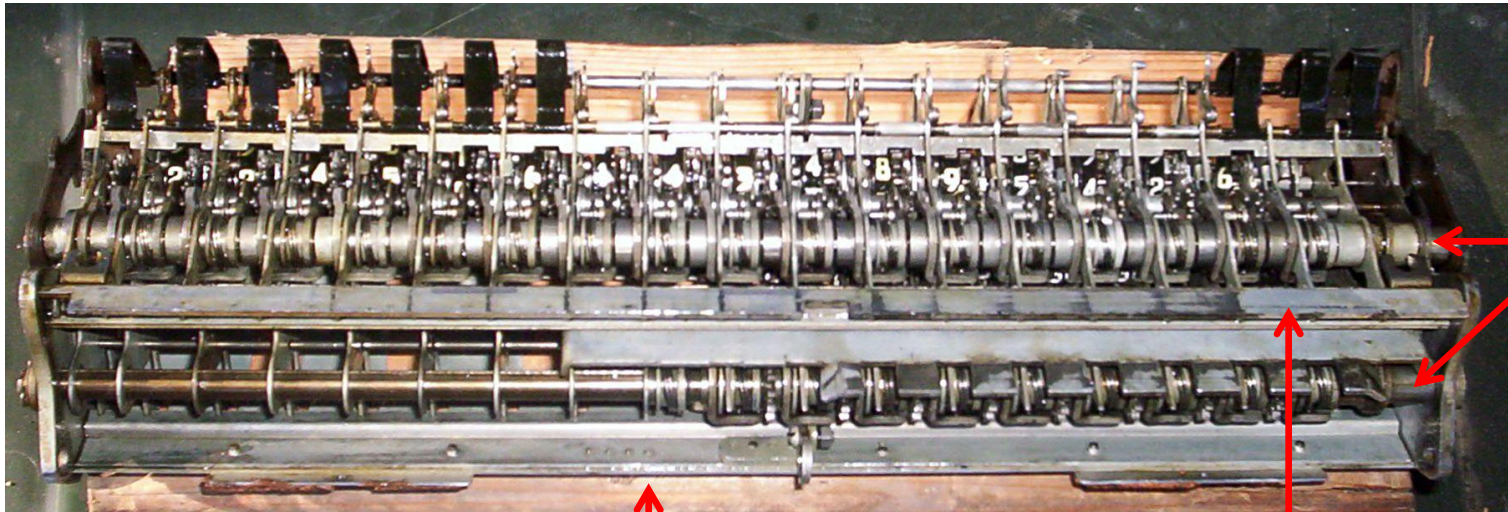
This is as far as a novice should go in disassembly of the core gear box.

Apply drops of 91% Isopropyl into spin-dial gears to free up hard-to-see mini-gears.

Unscrew buttons shown. Leave the '-', '+', and 'keyboard reset' buttons alone. The gold panel then lifts directly up and off.

Do NOT accidently press the Divide key ... as it takes two hours to figure out how to unlatch it ... even if you have done it twice before!

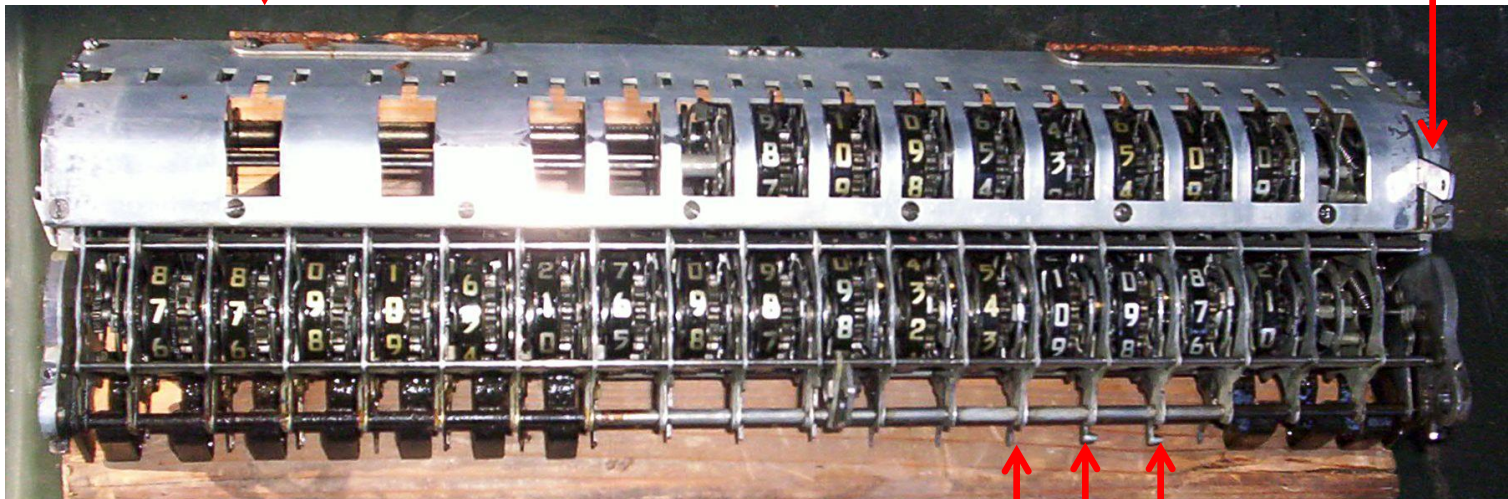
**Caution:** Electrical



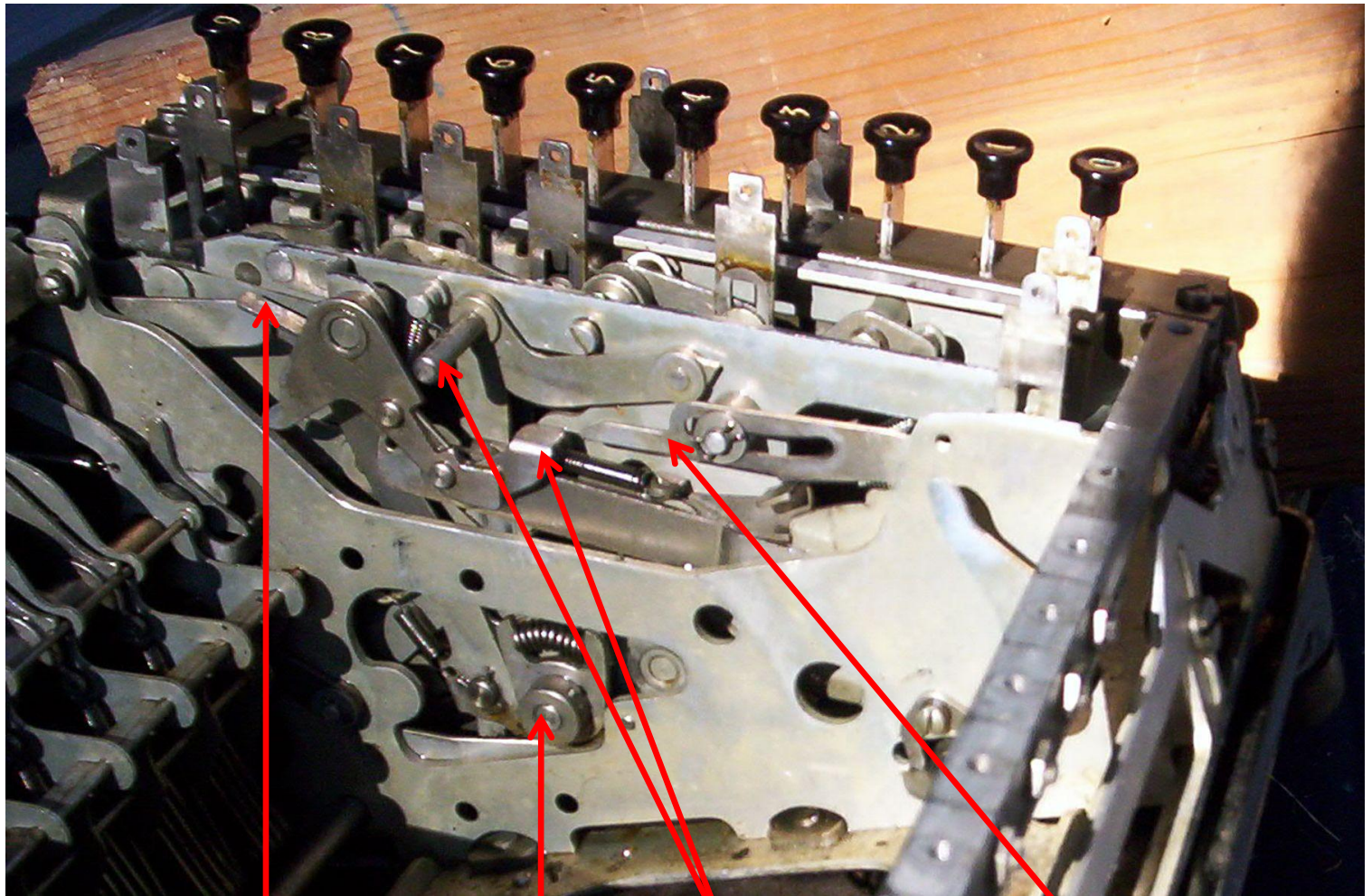
Reset  
Shafts

Carriage upright and rotated upside down

Carriage Latching Bar  
controlled by Release Lever



Push rods controlled from the keyboard spin-dial rank



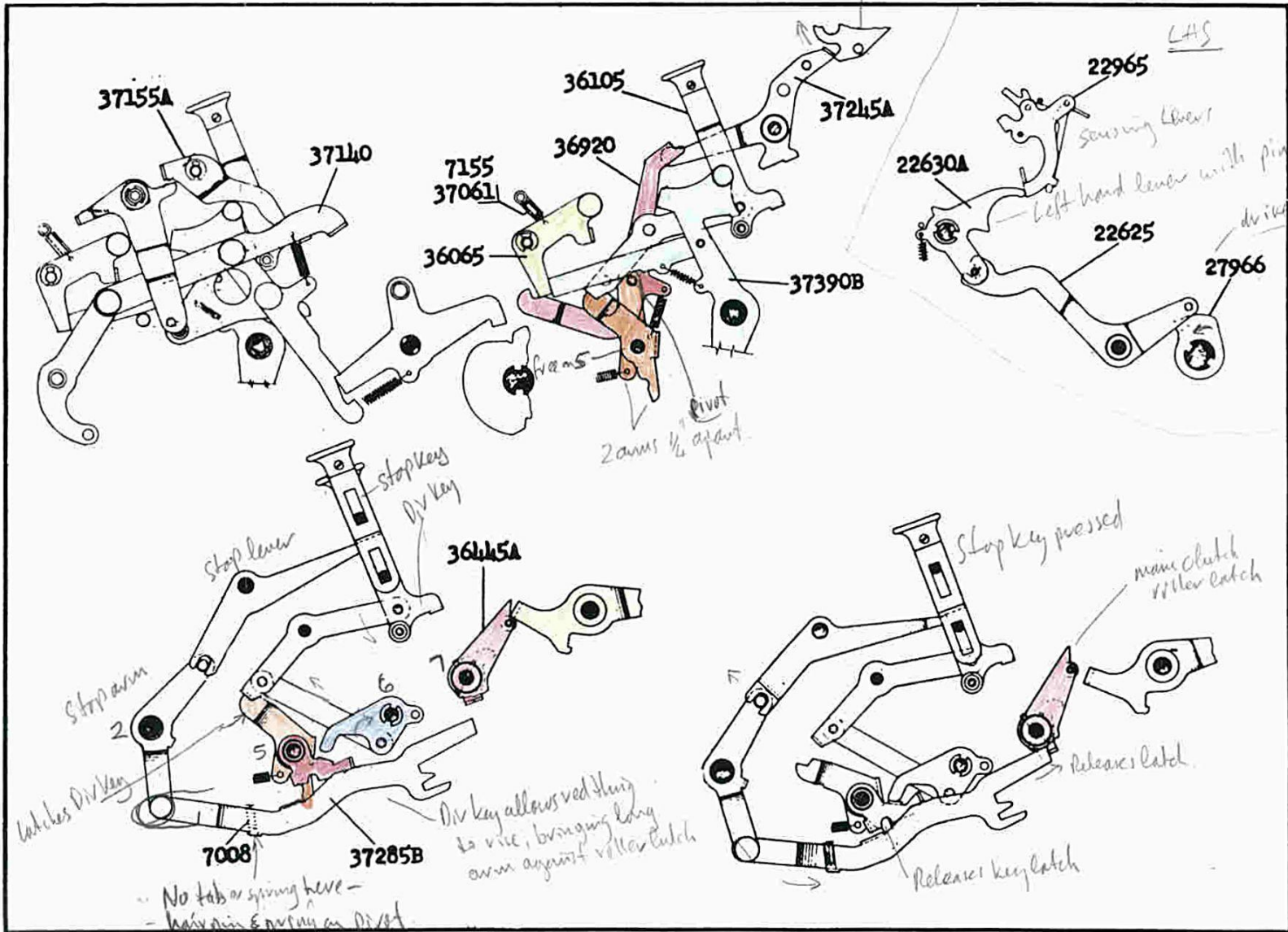
Subtract

Carriage  
Shift Left  
or Right

Addition –  
Plunges both  
in unison

Press Stop button  
to release locking  
bar ... shown in the  
released position

(13)



DIVISION CONTROL MECHANISM



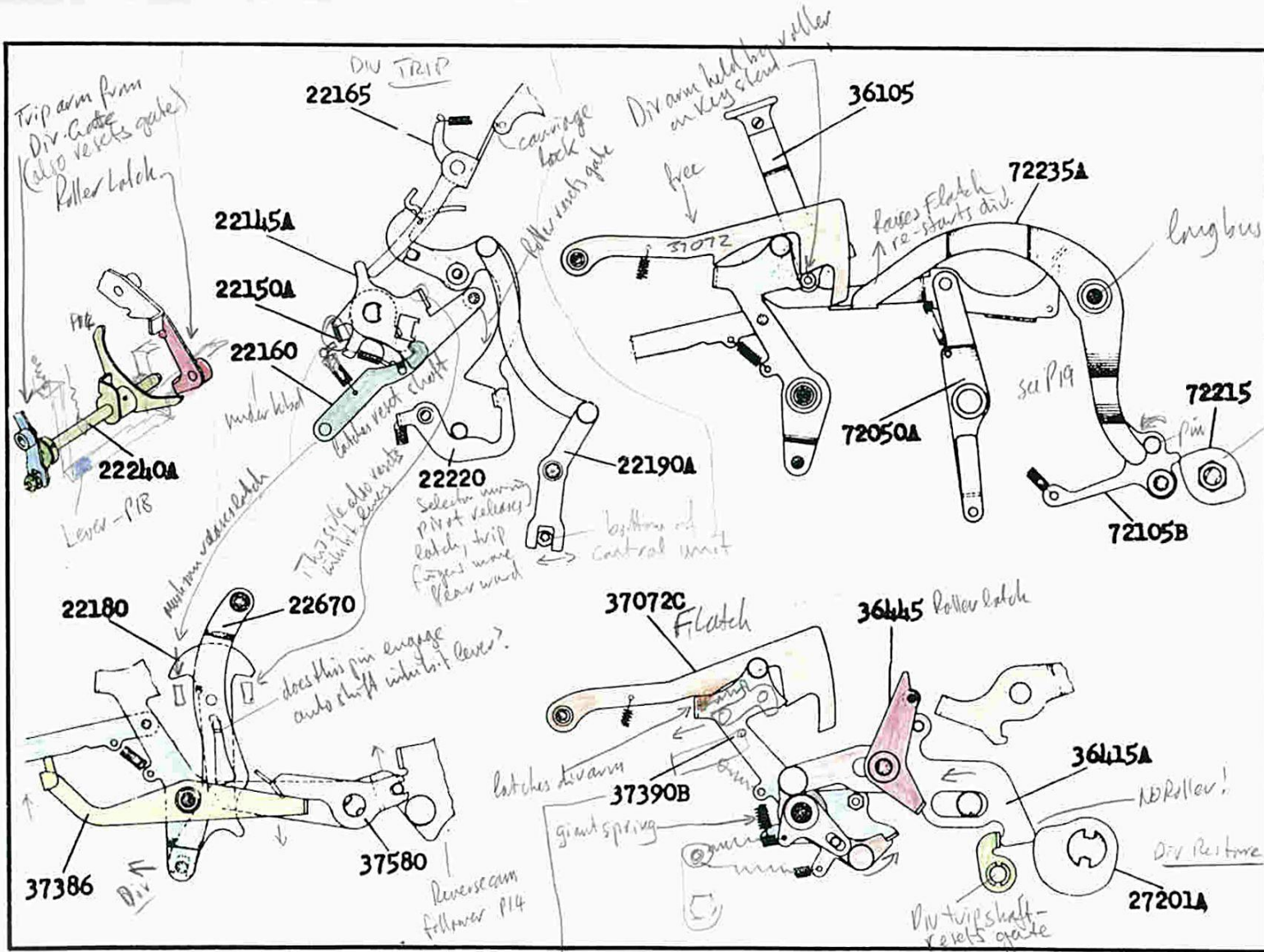
Forward

DIVISION CONTROL MECHANISM

Rear



(12)



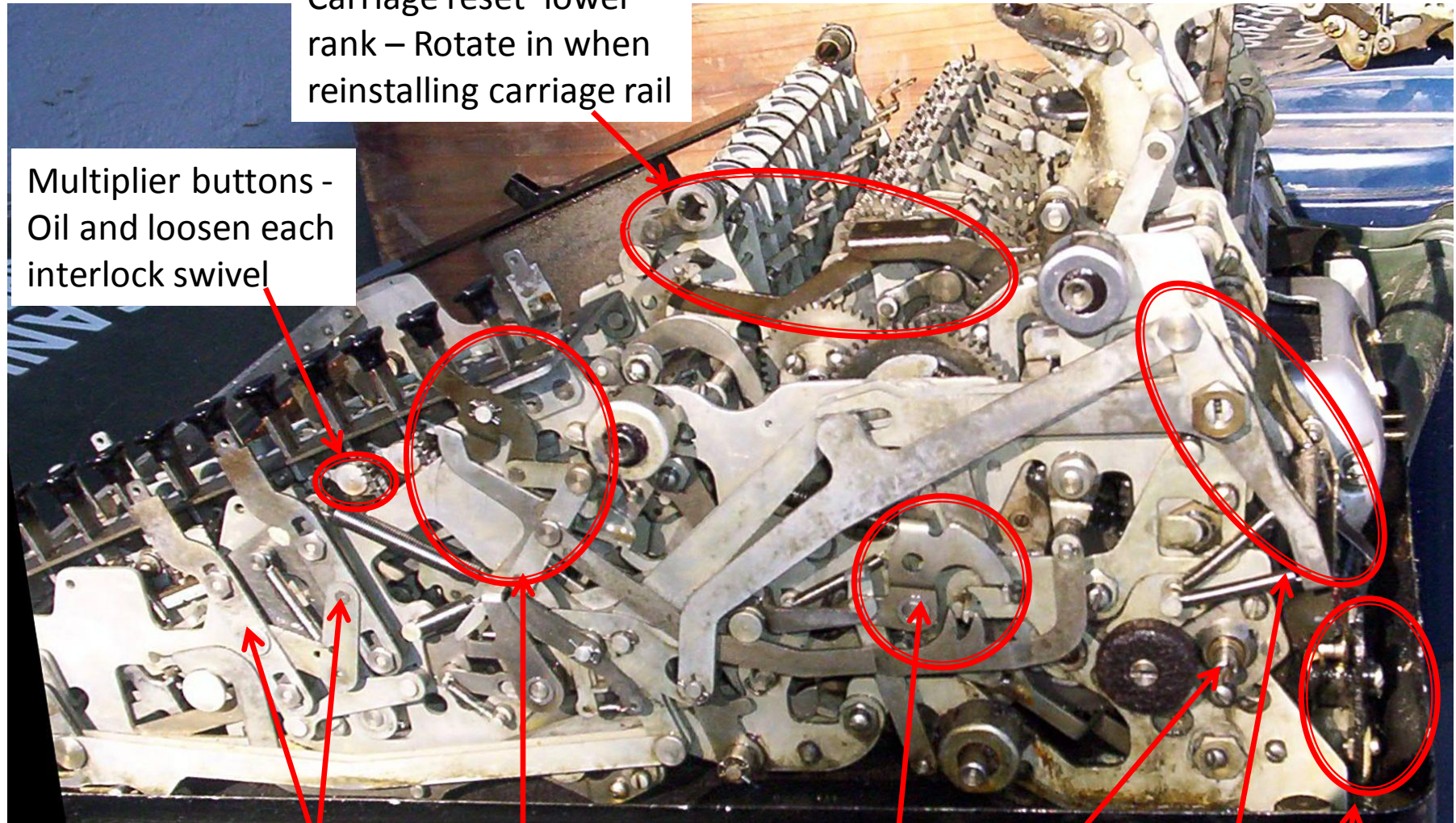
DIVISION CONTROL



Forward

DIVISION CONTROL

Rear



Carriage reset lower rank – Rotate in when reinstalling carriage rail

Multiplier buttons - Oil and loosen each interlock swivel

Carriage Shift Left or Right – Needs 2 springs

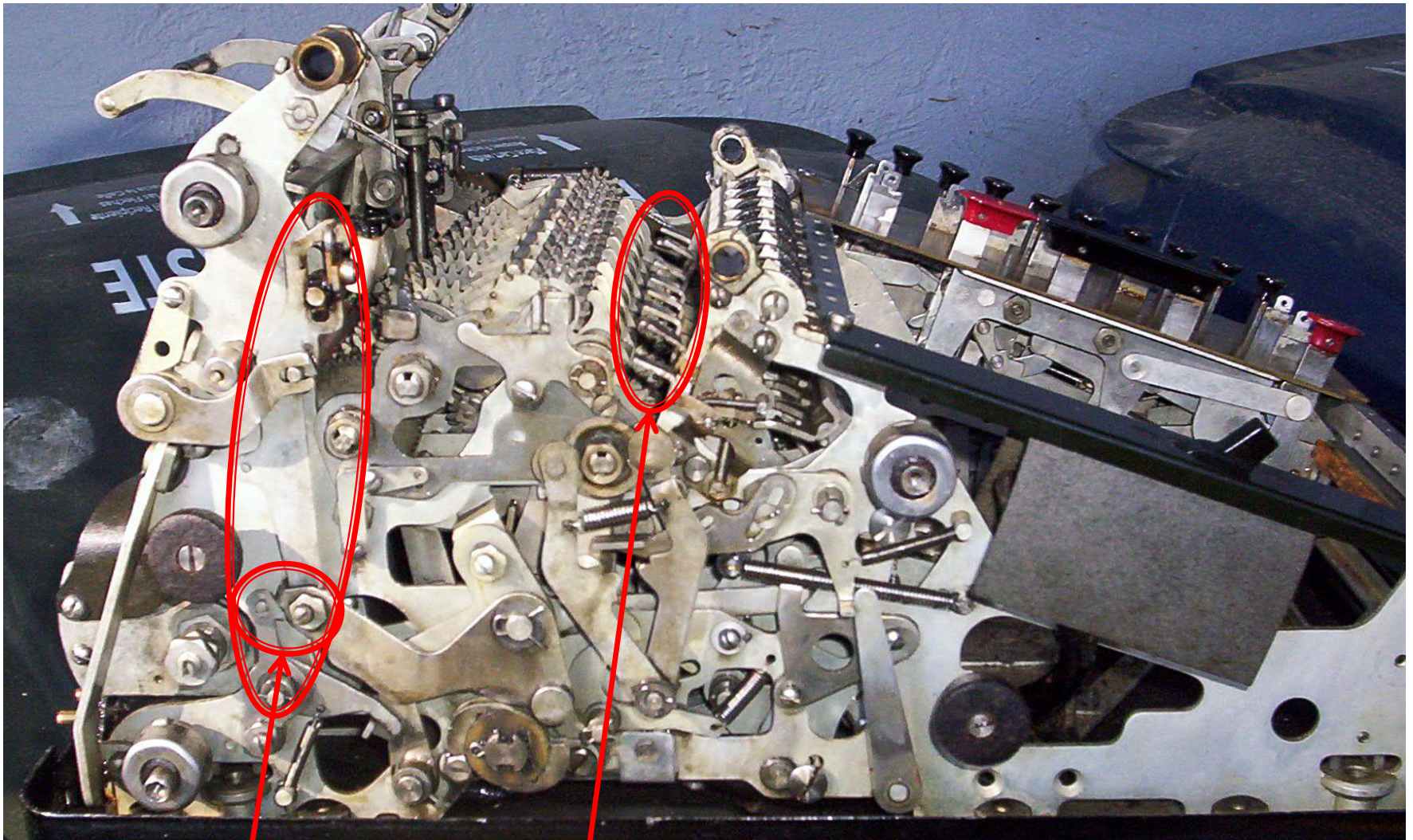
Carriage Reset Clutch control

On-Demand Motor Cam

Carriage Reset Cam Levers

To rotate gears by screwdriver

On-Demand Motor Relay

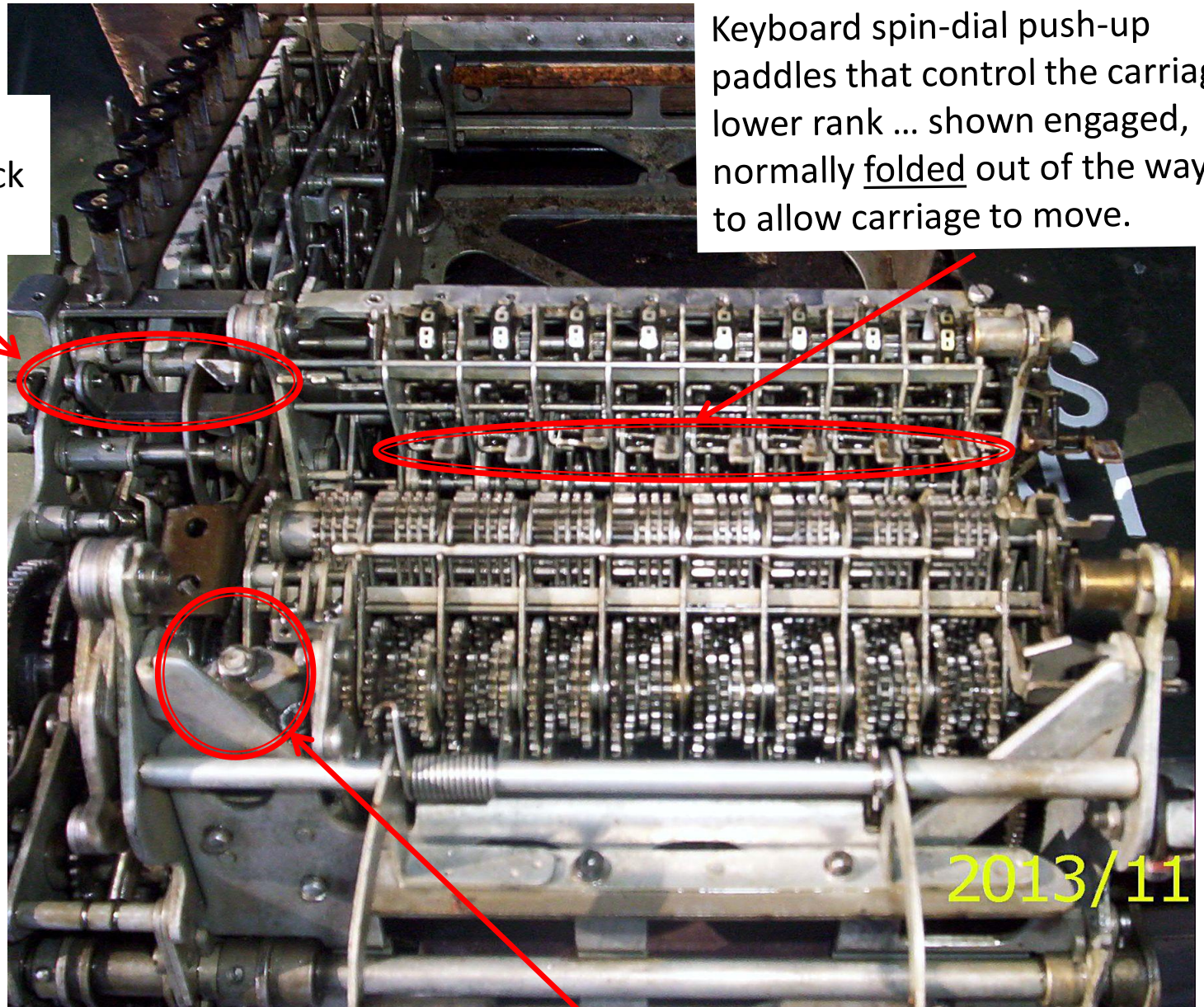


Carriage Reset latch  
... shown unlatched

Keyboard spin-dial push-up  
paddles that control the carriage  
lower rank ... shown engaged,  
normally folded out of the way

Multiplier Shaft -  
Controlled by black  
digit key rank

Keyboard spin-dial push-up  
paddles that control the carriage  
lower rank ... shown engaged,  
normally folded out of the way  
to allow carriage to move.



Vertical shaft that rotates into carriage  
latch bar to shift carriage left or right

Cleaning and Overhaul web site of Calculators:

<http://home.vicnet.net.au/~wolff/calculators/Tech/Overhaul/Overhaul.htm>

In November 2013, to dissolve the 75 years of clay-based caked oil:

- poured one cup of mineral spirits through gear box multiple times (but **not** on motor) into a pan, recirculating the solvent until it was dark dirty brown
- applied 91% isopropyl alcohol with a eyedropper (amazed at how it suddenly freed up frozen parts) – WD-40 oddly had absolutely no effect
- applied motor oil (but not Penzoil) at every accessible pivot and slide.
- applied white grease to powered gears and to the carriage rails.

Most (but not all) spin dials on the carriage became free. **Do not power up** until these remaining frozen spin-dials are operating freely ... or the machine will jam.

The clutch mechanism does not “catch”, perhaps from my oiling the clutch rod.

The divide key was successfully released which freed up the keyboard.

- Fortunately, the machine cycled to prevent the Divide key from being pressed
- This lets children push keys without locking up the entire keyboard again

## Marchant Calculator – Repair History

- 11/8/2013 Harry Briley Refurbished/Cleaned/Oiled – Power Tests
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