

# Frame

Freshmen Seminar 102

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# Brakes and Wheels



**Before  
(rear wheel)**

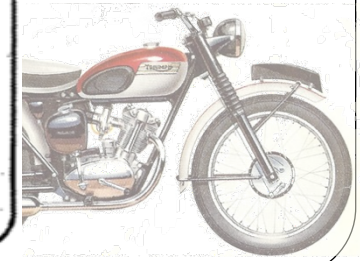
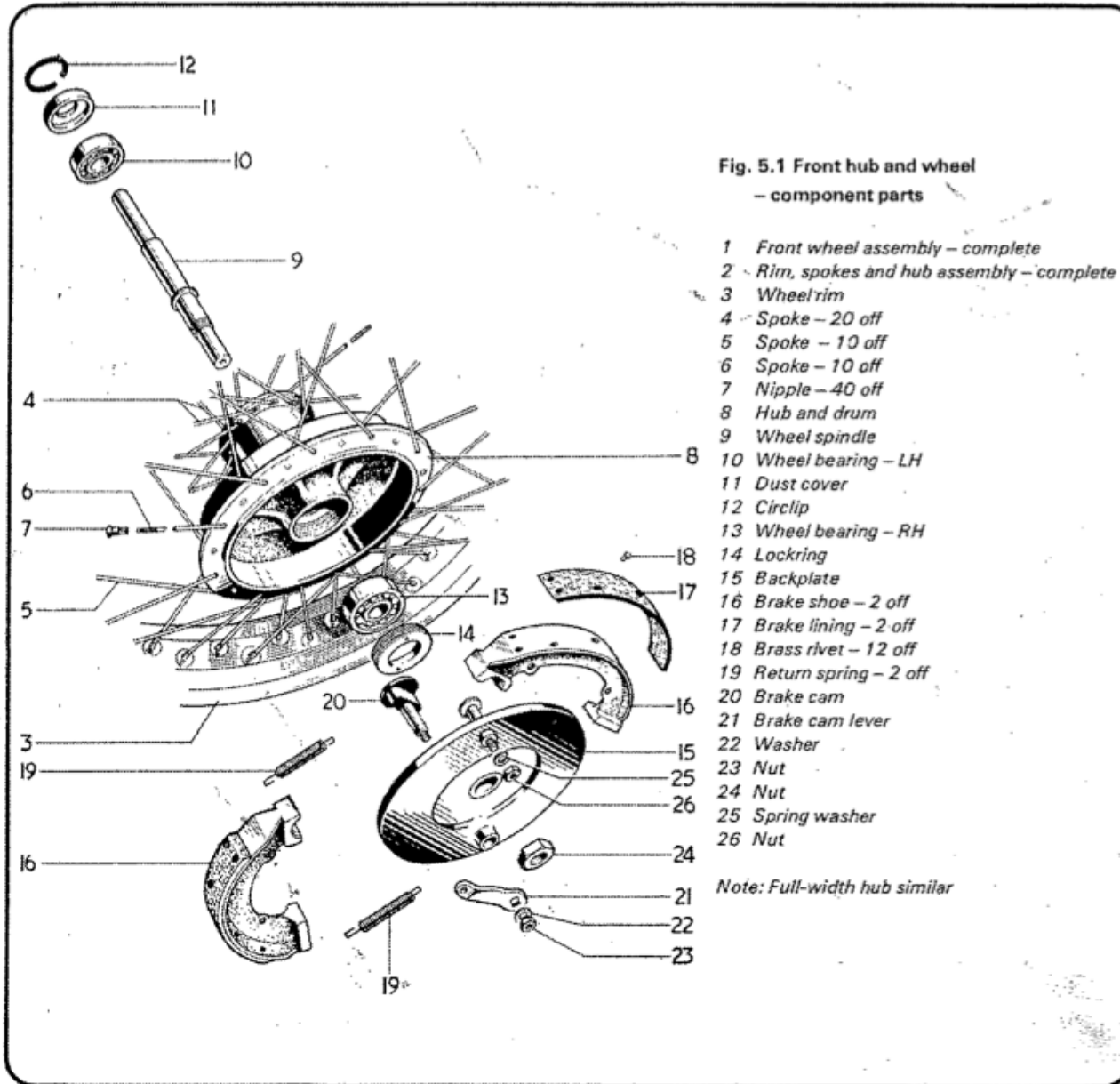


**After**

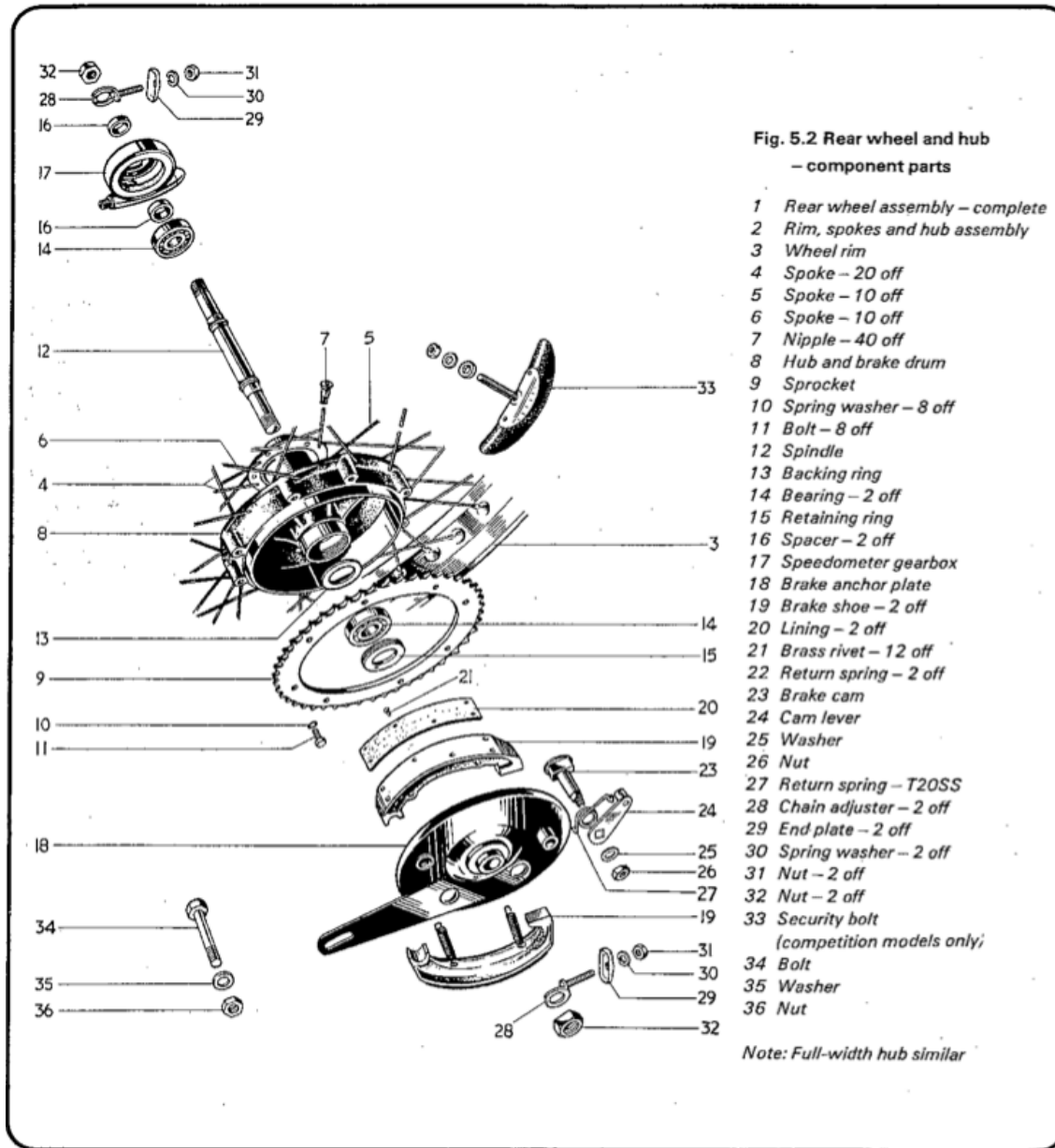




# Exploded Diagram for Front Wheel and Hub



# Exploded diagram for Rear Wheel and Hub

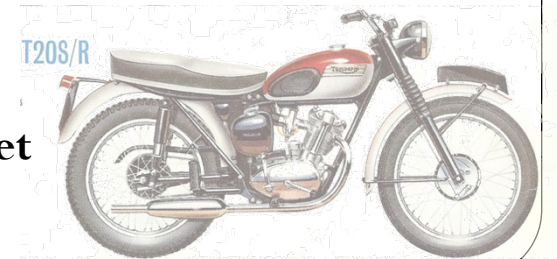


## Rear Wheel Sprocket



Original Sprocket

New Sprocket



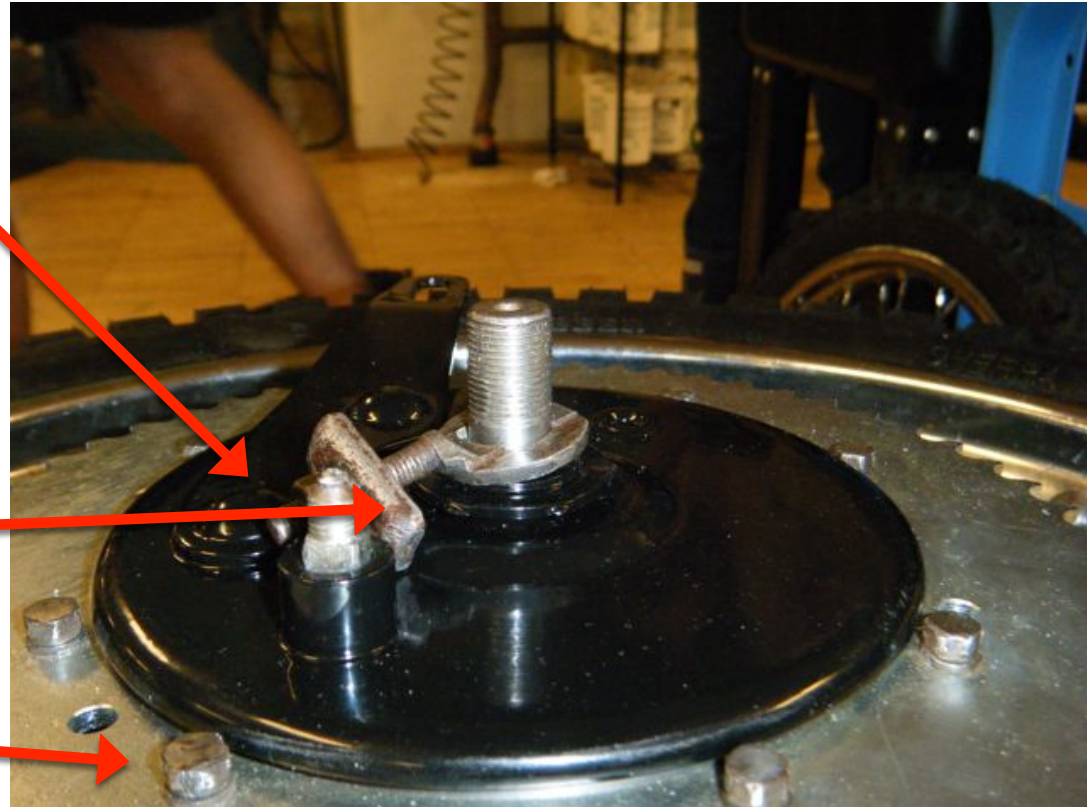


# Rear Wheel

**Break Anchor Plate**

**Chain Adjuster**

**Sprocket**



We are currently waiting for the speedometer to arrive, which will attach to the rear axel



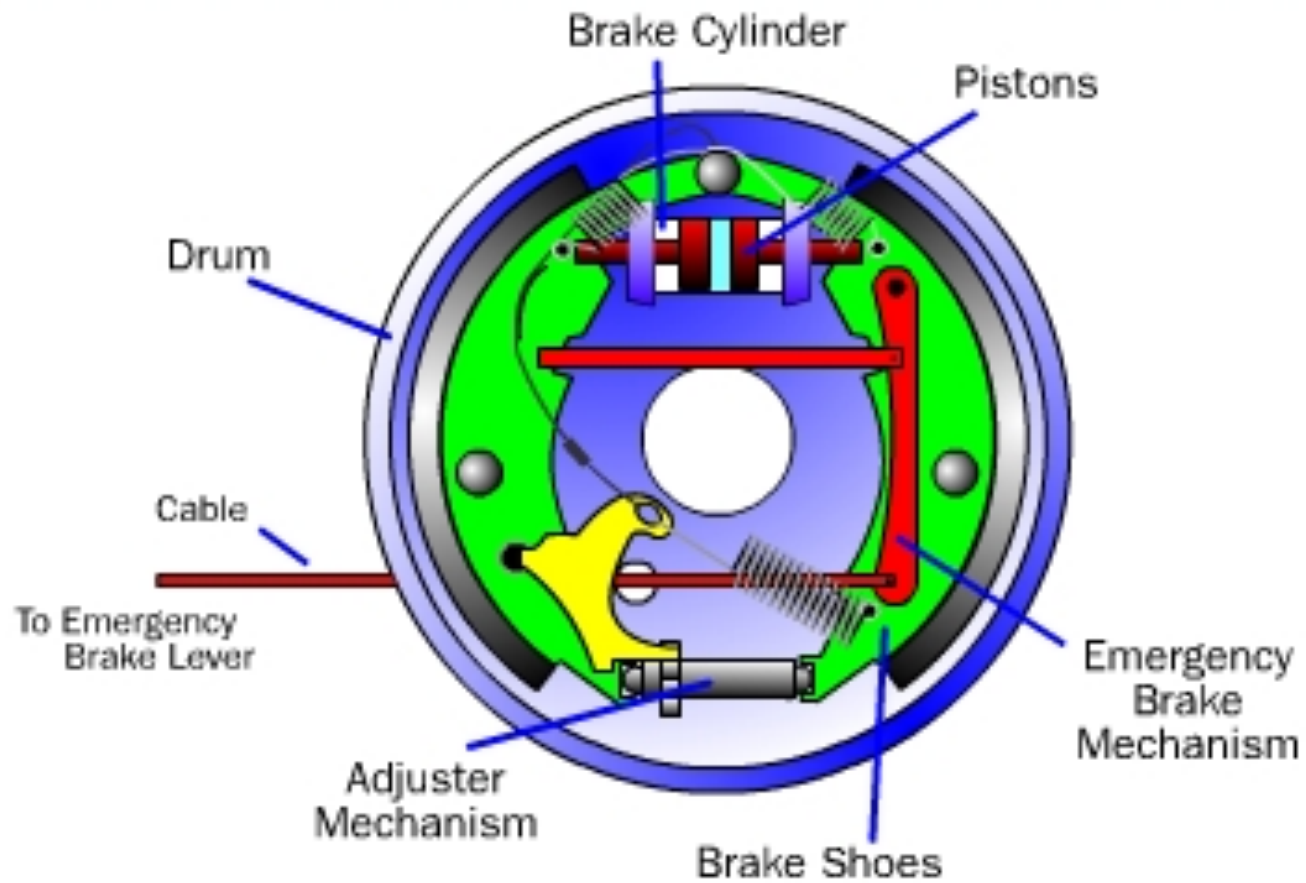


# Drum Brakes

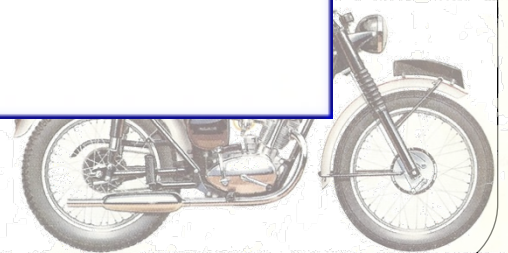
- Drum brakes get their name due to the components being housed in a round drum which rotate with the wheel.
- Inside of the drum are a set of shoes, so when the brakes are applied the shoes becomes forced against the drum and slow the wheel.
- The shoes are made of a heat-resistant friction material similar to what is used on the clutch.



# Drum Brake



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## Drum Brakes for our 1963 Tiger Cub

Front Wheel  
Drum Brake

Shoes

Rear Wheel Drum  
Brake

Heat Resistance  
Break Pads



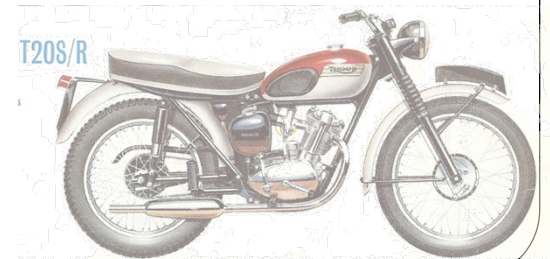
Return  
Spring

Brake  
Cam



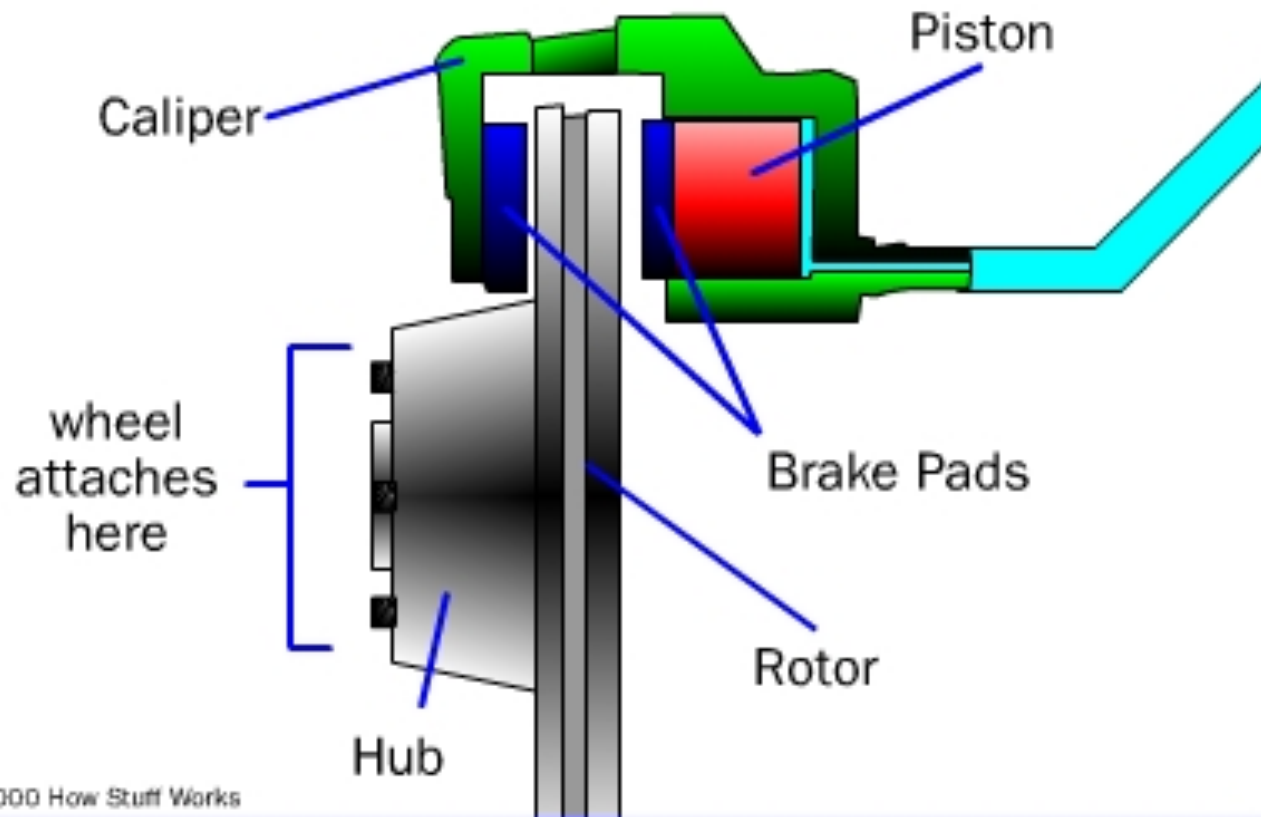
# Disk Brakes

- Disk brakes use a slim rotor and small caliper to stop and slow the wheels
- The caliper contains two brake pads, one on each side of the rotor that squeeze together when the breaks are activated.
- Disk brakes are more reliable and last longer because the rotor is on the outside of the bike and fully exposed to air, helping the disk brakes to cool down and not cause fading.

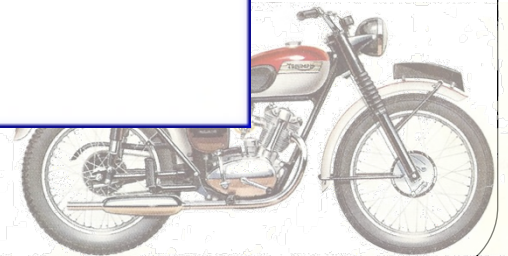




# How a Disc Brake Works



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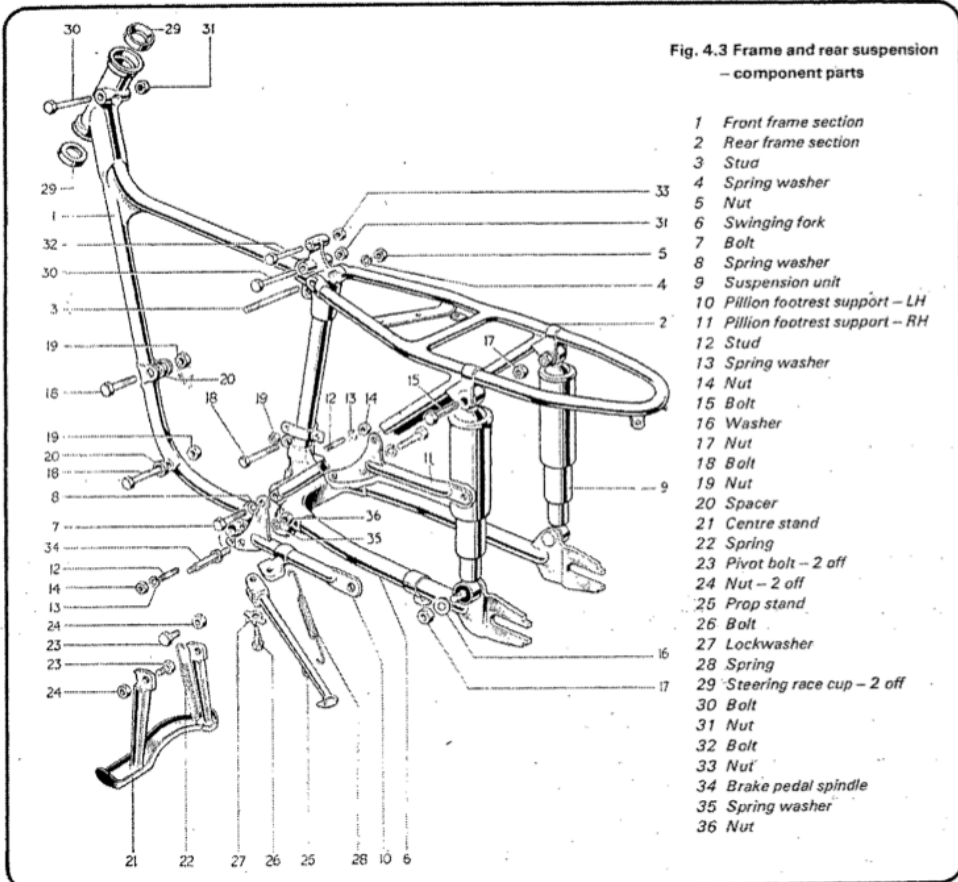


# General Frame



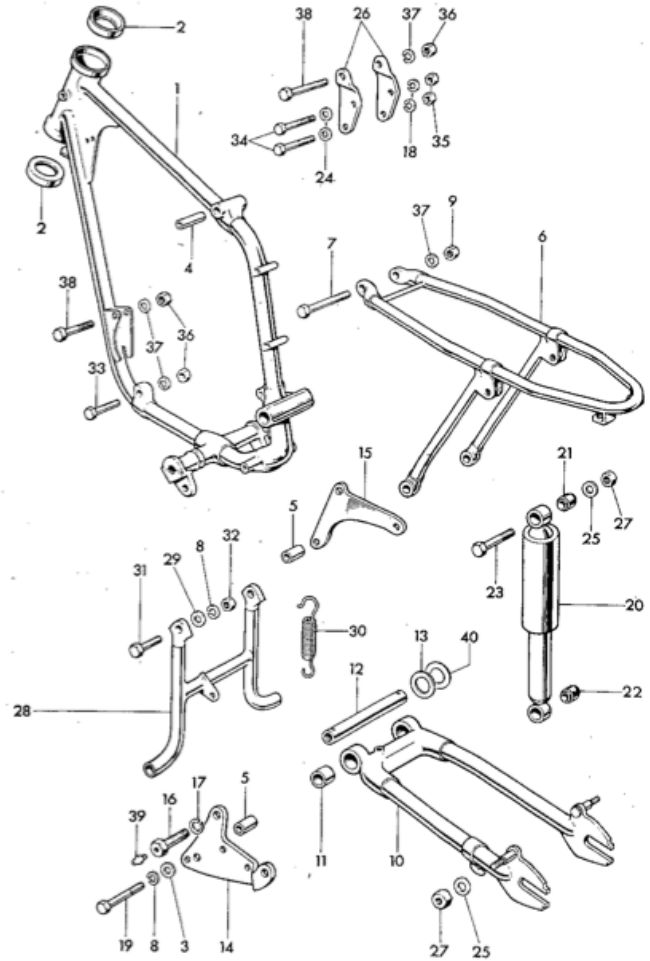






**Fig. 4.3 Frame and rear suspension – component parts**

- 1 Front frame section
- 2 Rear frame section
- 3 Stud
- 4 Spring washer
- 5 Nut
- 6 Swinging fork
- 7 Bolt
- 8 Spring washer
- 9 Suspension unit
- 10 Pillion footrest support – LH
- 11 Pillion footrest support – RH
- 12 Stud
- 13 Spring washer
- 14 Nut
- 15 Bolt
- 16 Washer
- 17 Nut
- 18 Bolt
- 19 Nut
- 20 Spacer
- 21 Centre stand
- 22 Spring
- 23 Pivot bolt – 2 off
- 24 Nut – 2 off
- 25 Prop stand
- 26 Bolt
- 27 Lockwasher
- 28 Spring
- 29 Steering race cup – 2 off
- 30 Bolt
- 31 Nut
- 32 Bolt
- 33 Nut
- 34 Brake pedal spindle
- 35 Spring washer
- 36 Nut



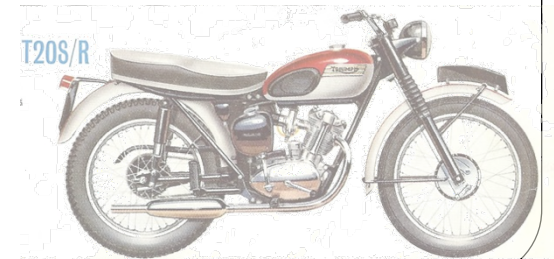
**Fig. 4.4 Frame – component parts (Bantam Cub and Super Cub models)**

- |                                   |                           |                              |                             |
|-----------------------------------|---------------------------|------------------------------|-----------------------------|
| 1 Front frame assembly            | 10 Swinging fork          | 20 Suspension unit – 2 off   | 30 Return spring            |
| 2 Cup – 2 off                     | 11 Bush – 2 off           | 21 Bush – 2 off              | 31 Bolt – 2 off             |
| 3 Washer                          | 12 Spindle                | 22 Bush – 2 off              | 32 Nut – 2 off              |
| 4 Hollow dowel                    | 13 Washer                 | 23 Bolt – 2 off              | 33 Bolt                     |
| 5 Pillion footrest spacer – 2 off | 14 Left footrest bracket  | 24 Washer – 2 off            | 34 Bolt – 2 off             |
| 6 Rear frame assembly             | 15 Right footrest bracket | 25 Plain washer – 4 off      | 35 Nut – 2 off              |
| 7 Bolt                            | 16 Hollow bolt – 2 off    | 26 Engine rear plate – 2 off | 36 Self-locking nut – 3 off |
| 8 Spring washer – 5 off           | 17 Spring washer – 2 off  | 27 Nut – 4 off               | 37 Spring washer – 3 off    |
| 9 Nut                             | 18 Spring washer – 2 off  | 28 Centre stand              | 38 Bolt – 2 off             |
|                                   | 19 Bolt – 2 off           | 29 Plain washer – 2 off      | 39 Grease nipple – 2 off    |
|                                   |                           |                              | 40 Shim – as required       |

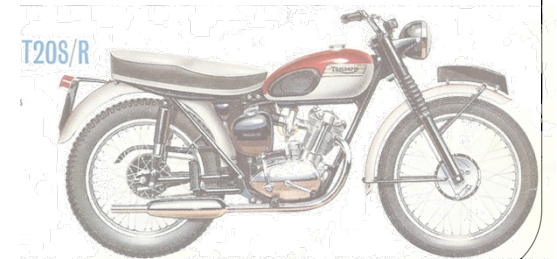


# Progress

- We spent the first two weeks degreasing and cleaning off various parts of the motorcycle
- We then sent various parts of the motorcycle off to be powder coated: including the rear and front frame assembly, and the swinging fork
- It took approximately six weeks for all of the parts to be powder coated and then returned to us. Upon return, we discovered a crack in the frame which Glen then welded together.
- We added two new kickstands to the frame to help support the bike better.



- In the past few weeks our group, in addition to the clutch group has been painting various parts of the motorcycle including the gas tank, license plate brace, and the oil tank cover.
- The painting process involves removing previous rust/ paint from the part, applying a primer coat, and then applying additional layers of paint until smooth.





# Suspension: Front Forks and Rear Cushions

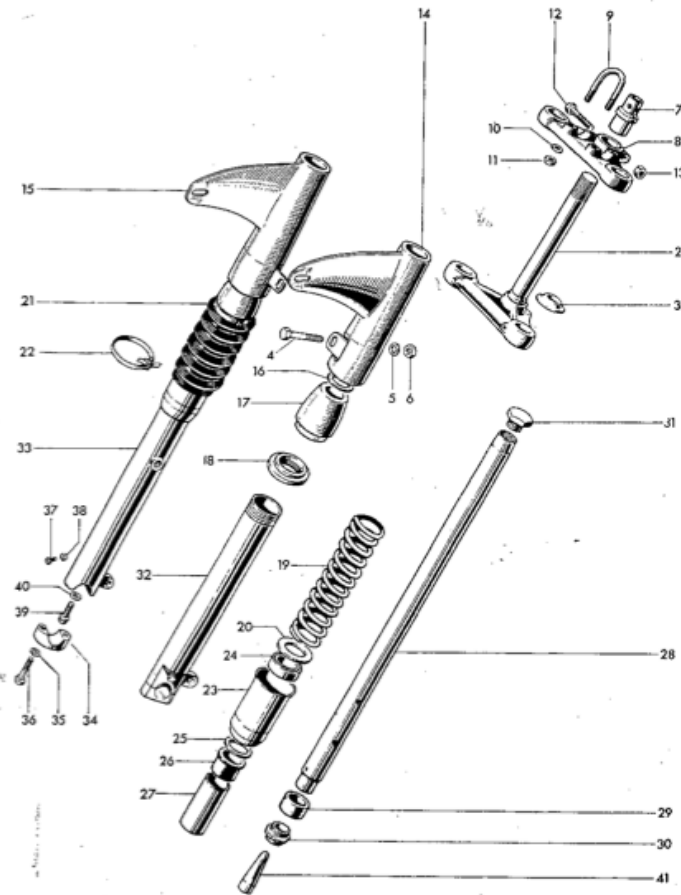
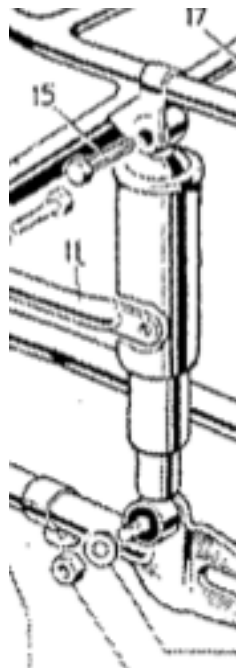


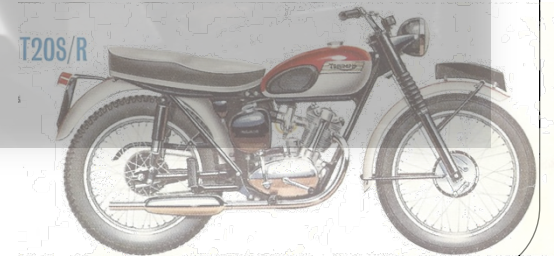
Fig. 4.2 Telescopic front forks – later 'heavyweight' type

- |                                |                              |                             |
|--------------------------------|------------------------------|-----------------------------|
| 1 Fork assembly                | 14 Fork shroud – LH          | 28 Stanchion – 2 off        |
| 2 Lower steering yoke and stem | 15 Fork shroud – RH          | 29 Lower bearing – 2 off    |
| 3 Bottom cone                  | 16 Cork washer – 2 off       | 30 Nut – 2 off              |
| 4 Pinch bolt – 2 off           | 17 Upper spring seat – 2 off | 31 Cap nut – 4 off          |
| 5 Washer – 2 off               | 18 Lower spring seat – 2 off | 32 Lower fork leg – LH      |
| 6 Nut – 2 off                  | 19 Fork spring – 2 off       | 33 Lower fork leg – RH      |
| 7 Fork stem sleeve nut         | 20 Washer – 2 off            | 34 Fork end cap – 2 off     |
| 8 Upper steering yoke          | 21 Telescopic gaiter – 2 off | 35 Spring washer – 4 off    |
| 9 'U' bolt – 2 off             | 22 Gaiter clip – 4 off       | 36 Bolt – 4 off             |
| 10 Washer – 4 off              | 23 Sleeve nut – 2 off        | 37 Drain plug – 2 off       |
| 11 Nut – 4 off                 | 24 Oil seal – 2 off          | 38 Washer – 2 off           |
| 12 Pinch bolt                  | 25 Washer – 2 off            | 39 Bolt – 2 off             |
| 13 Nut                         | 26 Upper bearing – 2 off     | 40 Aluminium washer – 2 off |
|                                | 27 Bush – 2 off              | 41 Restrictor – 2 off       |



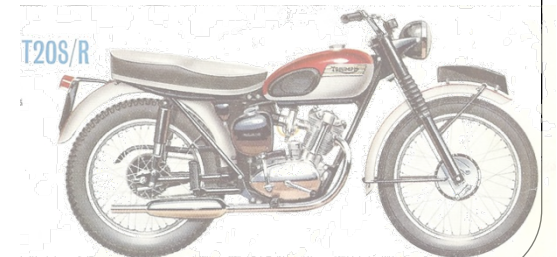
# Forks:

- Connects a motorcycles front wheel and axle to its frame
- Allows the bike to be steered via the handlebars
- Incorporates front suspension for best ride / handling
- Maintains best possible contact between road surface & wheel
- Telescopic forks:
  - Simple design
    - Fork Tubes contain all suspension components (coil springs, dampers, oil, air)



# Front Suspension

- Plays a major role in bike handling
  - Brake Dive:
    - Load transfer: excess weight on front wheel absorbed by suspension
    - Bike dives towards the ground with braking
    - If suspension bottoms out, suspension needs to be fixed or replaced



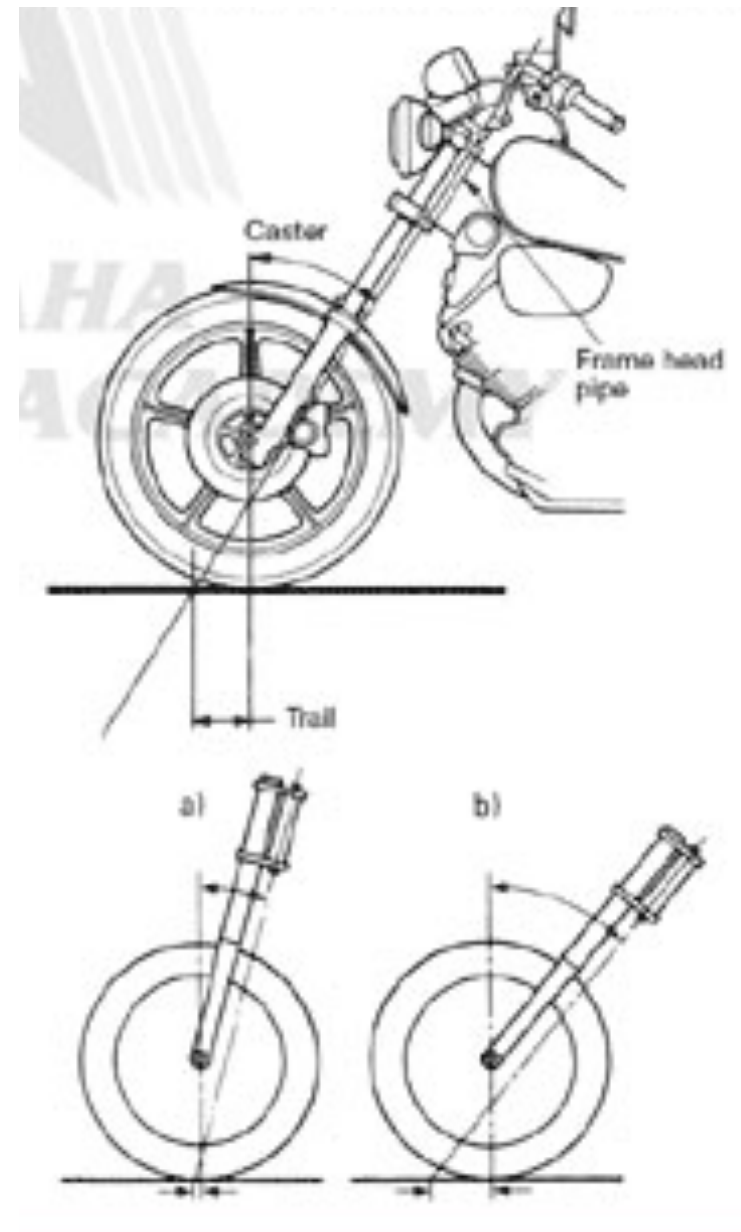
# Handling

- A bike's stability and handling depend on:
  - Wheel alignment
  - Wheelbase
  - Weight distribution
  - Center of gravity position
  - Type / performance of suspension
  - Size / performance of tires
  - Riding position
  
- Most important of all though: caster (rake) and trail



# Caster and Trail

- Caster angle (rake): angle formed by the intersection of a line following the forks and a vertical line passing the center of the front wheel axle
- Trail: Distance between the intersection of these two lines and the ground





T20S/R

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- When trail is large:
  - Better high speed stability, poor low speed stability
- Must decide on purpose of bike before setting trail





# Swing Arm

- Pivots vertically to allow rear cushions to better absorb bumps in road.
- Pair of parallel pipes connected to the main frame



# Rear Cushions



- Connected to rear swing arm and frame just under the seat
- Motorcycles nearly all use a shock absorber and a coil-over spring to smooth vibrations and offer a softer ride

