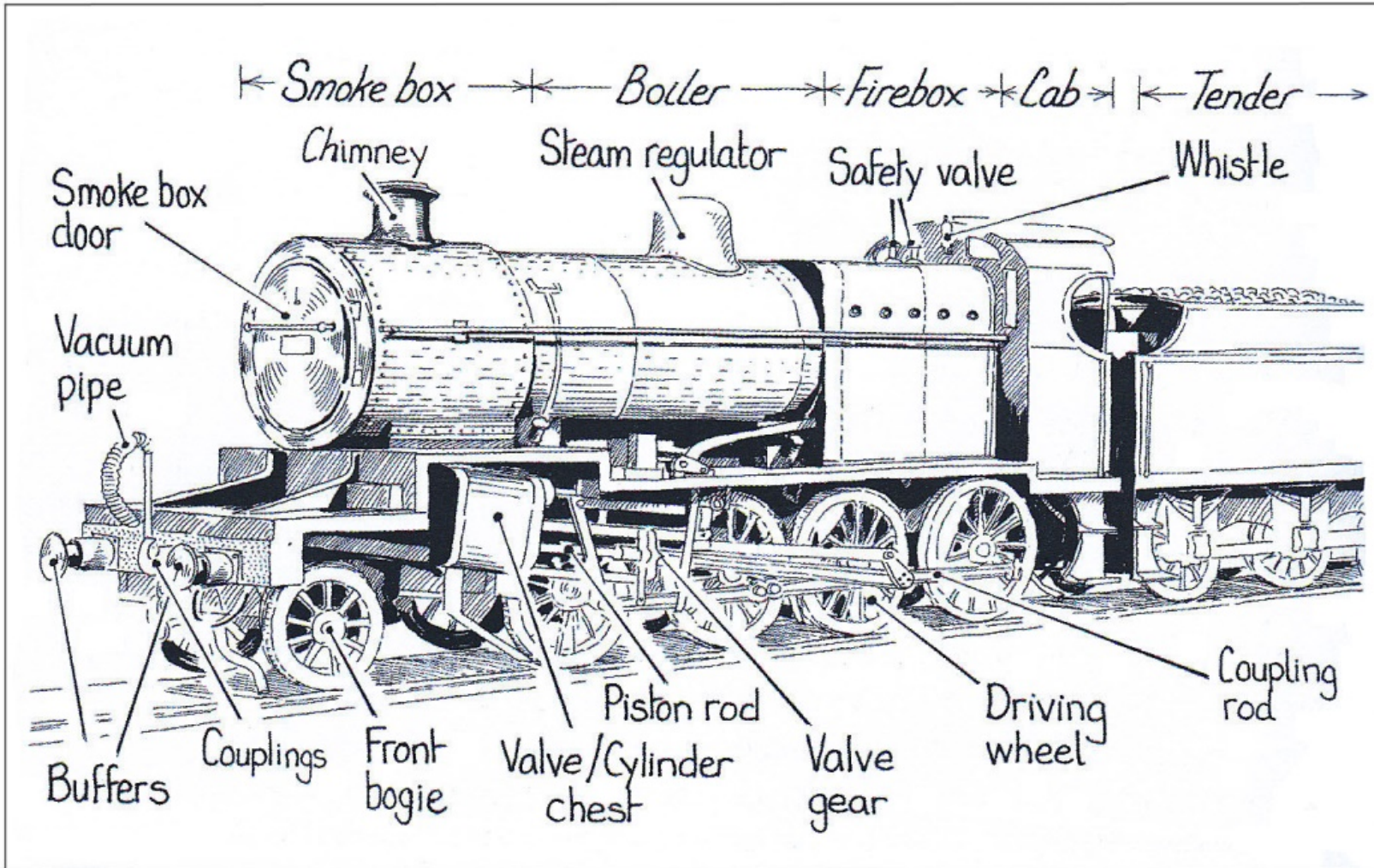


2a. Bluebell Railway Education Department



The main parts of a locomotive



Based on a Somerset and Dorset Joint Railway locomotive, built in 1925

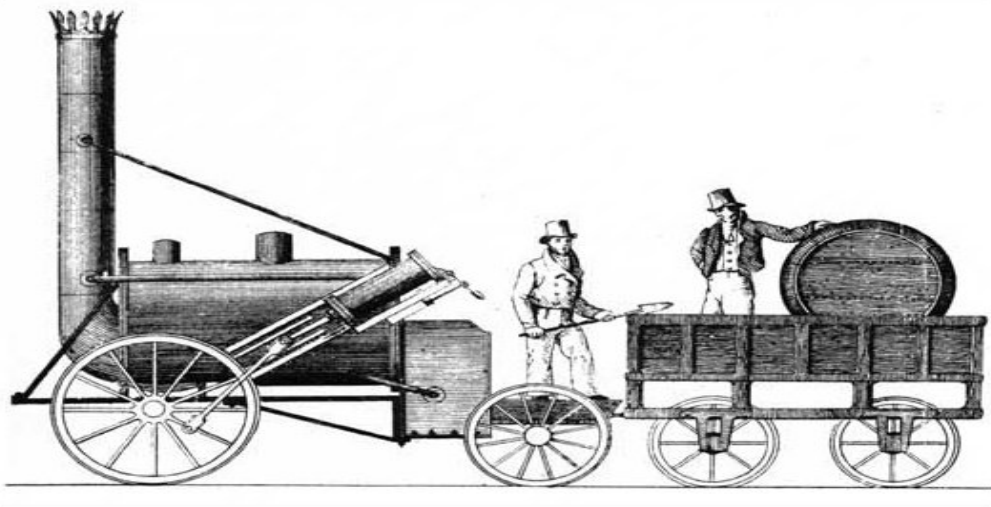
From the book "Steam Railways Explained", author Stan Yorke, with permission of Countryside Books



BLUEBELL RAILWAY EDUCATION DEPARTMENT

2b. The development of the railway locomotive

1. The steam locomotive is, in essence, a large kettle which heats water until it turns into steam, that steam is then used, under pressure, to move the engine and the train. One of the earliest and most successful locomotives was “The Rocket” used on the Liverpool and Manchester Railway which opened in 1830.



The Rocket
Wheel arrangement 0-2-2
Built 1829

2. This early design was rapidly improved upon and the locomotive soon assumed the shape that we recognise today. “Captain Baxter” was built in 1877 and can be seen today at the Bluebell Railway.



Dorking Greystone Lime Company No 3 “Captain Baxter”
Wheels 0-4-0T

Built 1877

3. As the years went by bigger and faster locomotives were developed to meet the needs of both passengers and freight as illustrated by this South Eastern & Chatham Railway engine which ran between London and the Kent coast.



South Eastern & Chatham Railway No. 263

Wheel arrangement 0-4-4T

Built 1905

4. As passenger traffic grew in the 20th century still larger and more powerful engines were required. This Southern Railway engine, built in 1936, was sent to Barry Scrapyard in South Wales following the end of steam on British Railways in 1968. It was rescued by the Bluebell and delivered to Sheffield Park Station in 1978, where it was restored to running order.



Southern Railway Class S15

Wheel arrangement 4-6-0

Built 1936

5. The last ever steam locomotive built for British Railways was a freight engine

Evening Star”, built at the Swindon Works in 1968. It had only a short working life before the end of steam on British Railways in 1968. The locomotive was however



preserved as part of the national collection at the National Railway Museum in York.

*British Railways 9F “Evening Star”
Wheel arrangement 2-10-0
Built 1960*

6. A few “special” locomotives were retained by the National Railway Museum following the withdrawal of steam in 1968 but most were scrapped immediately. Barry Scrapyard in South Wales however did not scrap its own allocation and some 200 of those stored there were later rescued for restoration, many of those are now running on heritage railways around the UK.

7. In recent years there has been revived interest in building new steam locomotives and the first of these, “Tornado” was constructed in 2008 and now operated widely around the UK.. It is seen below at Sheffield Park Station on the Bluebell Railway.



*Peppercorn A1 Pacific “60163 “Tornado”
Wheel arrangement 4-6-2
Built 2008*

8. In 2000 the Bluebell announced its intention to reconstruct a Brighton Works built H2

Atlantic locomotive based on a Southern Railway/British Railways period locomotive "Beachy Head", an engine that was cut up at Eastleigh Works in 1958, just before the Bluebell was formed.

6.



7. *Brighton Atlantic No.32424 "Beachy Head"*
Wheel 4-4-2 arrangement
Built 1911

9. Work on this project is progressing well at the Bluebell's locomotive works at Sheffield Park Station but no completion date has yet been set.

10. Further information about this project and our locomotives can be obtained from our historical website – www.bluebell-railway.co.uk



BLUEBELL RAILWAY EDUCATION DEPARTMENT

2c. Identifying the type of locomotive

1. There are two main types of standard gauge locomotives:-
2. **Tender engines** - these were mainly used on long distance services and have a separate vehicle (the tender) which is attached behind the locomotive. The tender runs on its own wheels and carries the coal and water which the engine needs to be able to operate.



3. **Tank engines** – these were mainly used on local short distance services and carry the coal and water behind the cab. The one on the left (below) has side tanks, the one the right has a saddle tank that is with the water tank sitting on top of the boiler.



4. The **driving wheels** -the bigger and more powerful the engine the more wheels it will have. Tender engines will generally have bigger wheels – which means that they can go faster. A passenger engine with 2 metre (six foot six inch) wheels is easily capable of speeds in excess of 80 – 90 miles per hour while pulling an express train. Freight engines of the same type can haul very heavy loads.

5. The **wheel arrangement** - the smaller wheels at the front of the engine are called carrying or guiding wheels, while the larger wheels are called driving wheels.

6. The following diagram shows an engine with two carrying wheels (one either side) and four driving wheels (two either side) and this engine would be known as a 2 – 4 – 0. The “0” indicates that there are no wheels behind the driving wheels (in all cases any wheels on the tender are not counted for this purpose).



7. A tank engine of this type would be shown as a 2 – 4 - 0T while a saddle tank engine would be **shown** as a 2 – 4 - 0ST.

8. There are other types of wheel arrangement and some of these are shown below.



0 – 4 – 0



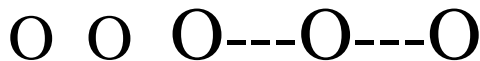
0 – 6 – 0



2 – 6 – 0



0 – 4 – 4



4 – 6 – 0



0 – 6 – 2



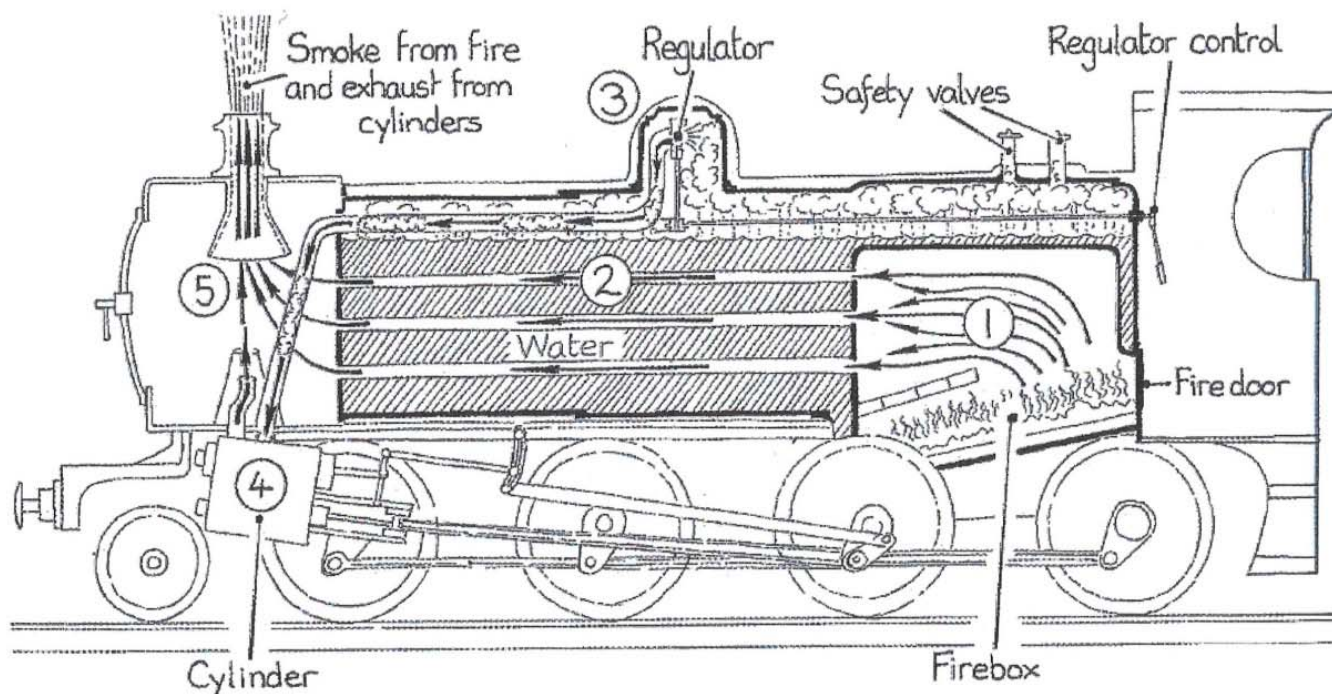
4 – 6 – 2



2 – 10 – 0

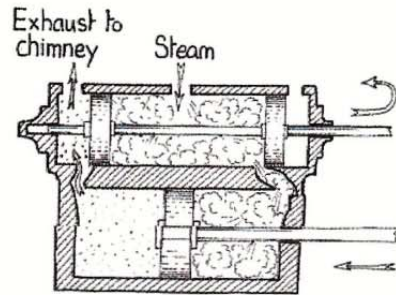
9. There are a number of engines in the locomotive shed at Sheffield Park Station and examples of many of the above wheel arrangements can be seen there while further information about our locomotives can be obtained from our historical website – www.bluebell-railway.co.uk

Cross-section of an earlier locomotive showing the basic parts.

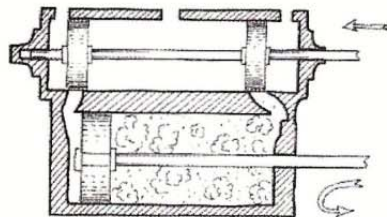


1. Hot air and smoke from the fire drawn into the smoke tubes.
2. This heats the water, producing steam which collects above the water level.
3. The steam escapes through the regulator valve, down into the cylinders.
4. The steam is used to push the piston to and fro before leaving
5. Exhaust steam from the cylinder shoots up the chimney, drawing the smoke from the fire with it.

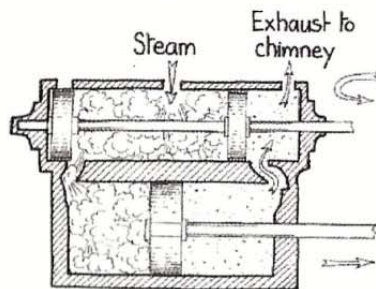
Diagrams showing the action of the valve and the piston



The valve alters the steam path to alternately push the piston forwards the back. Here the steam is pushing the piston along the cylinder to the left.



By moving the valve slightly it is possible to cut off the inlet port while still allowing the air and steam behind the piston to escape. The piston is now being pushed by the steam expanding within the cylinder.

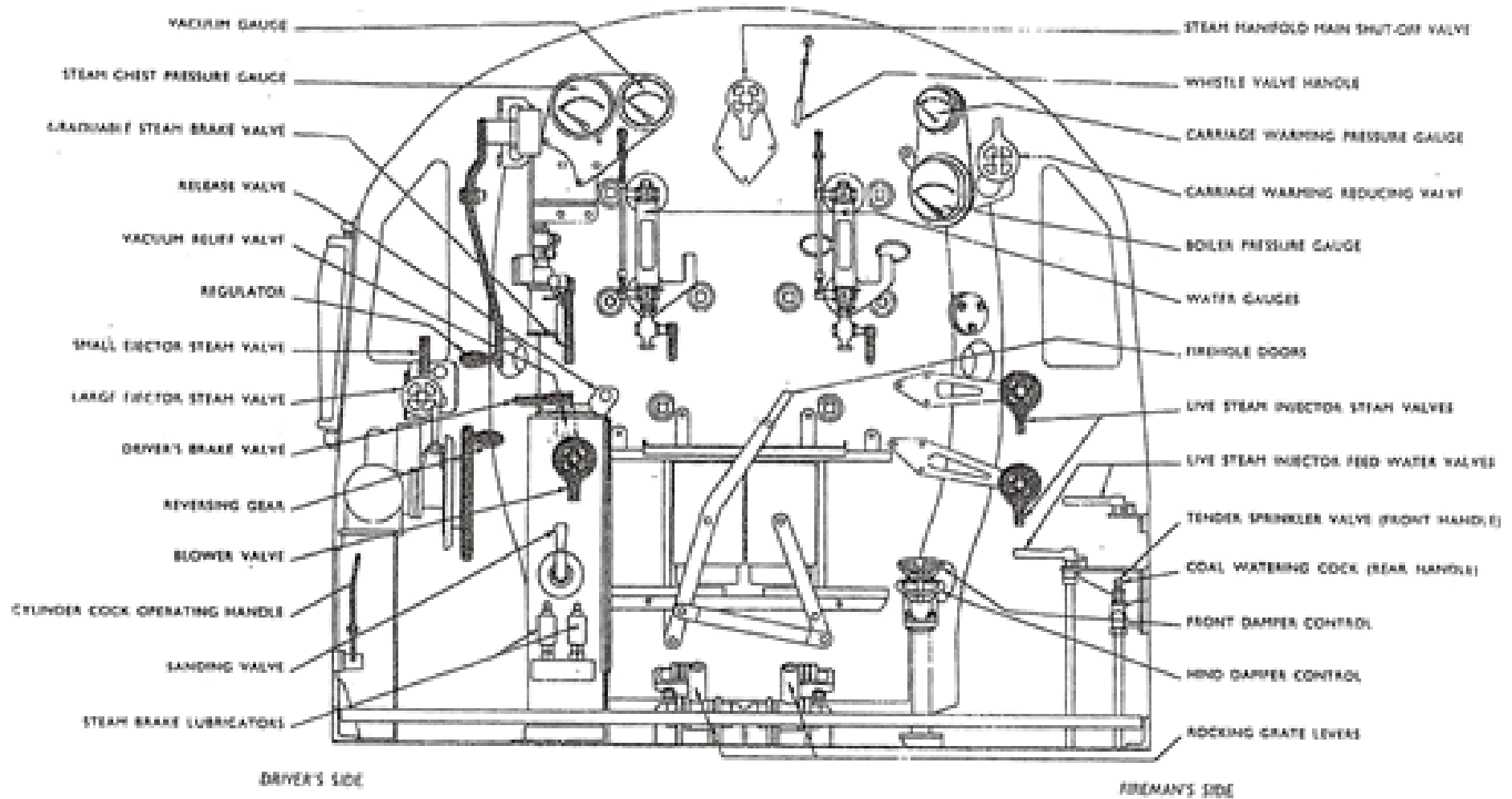


Finally, the valve moves right over and the sequence begins again but now the piston is being pushed to the right.

2f. BLUEBELL RAILWAY EDUCATION DEPARTMENT



Arrangement of Cab Fittings on a Standard Locomotive





2g. BLUEBELL RAILWAY EDUCATION DEPARTMENT

The Cab of Bluebell Locomotive 1638

