J. MACLEOD.

LOCOMOTIVE.

APPLICATION FILED DEC. 7, 1921.

1,438,319.

Patented Dec. 12, 1922.

4 SHEETS—SHEET 1.

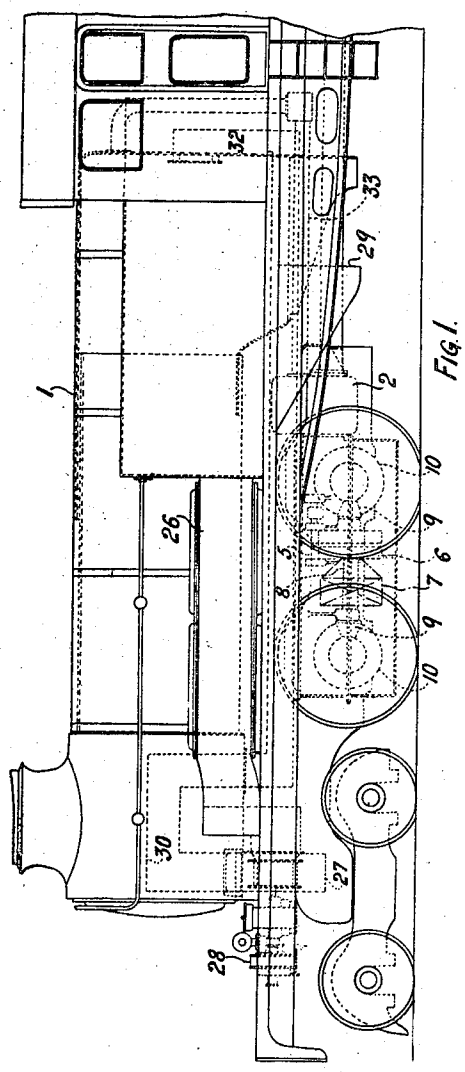



FIG. 1.

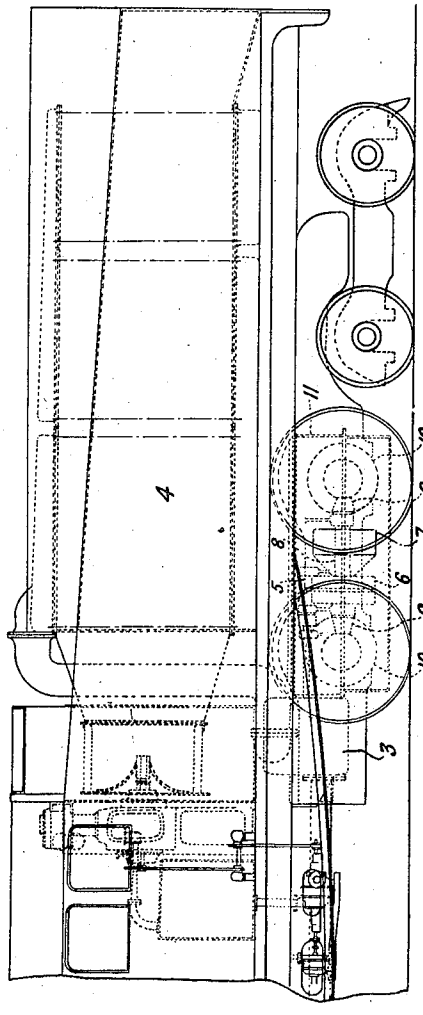



FIG. 1.

Inventor:
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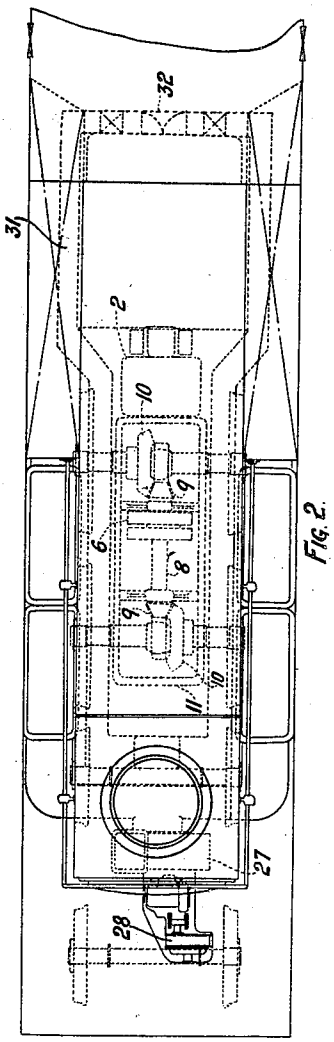



FIG. 2.

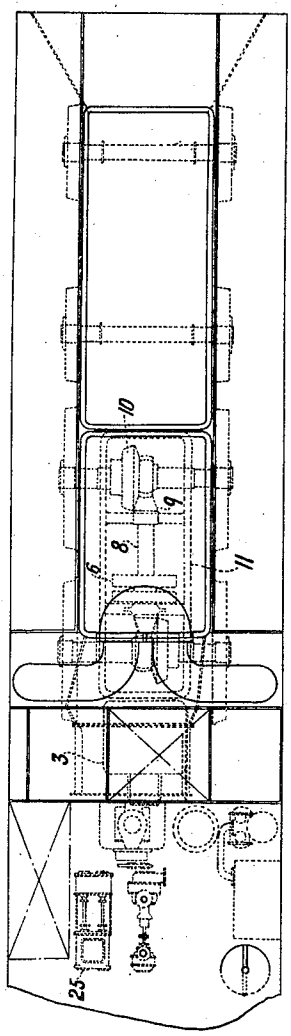



FIG. 2.

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4 SHEETS—SHEET 3.

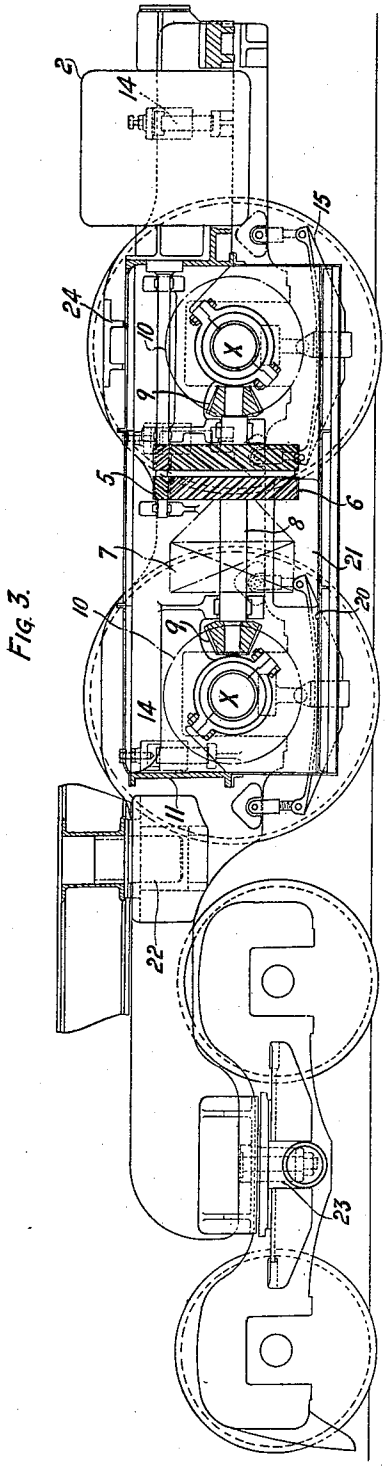


FIG. 3.

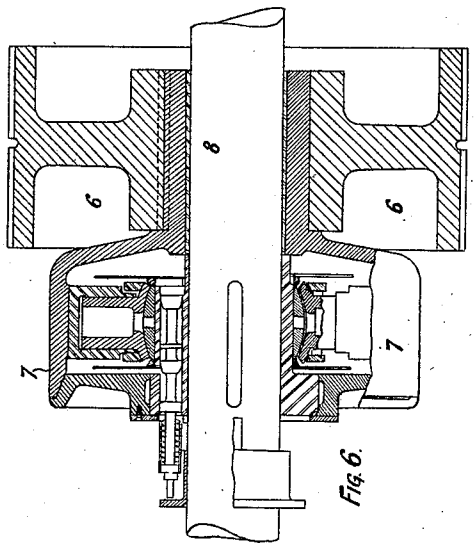


FIG. 6.

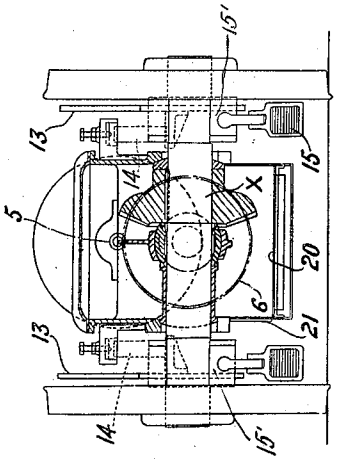


FIG. 4.

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4 SHEETS—SHEET 4.

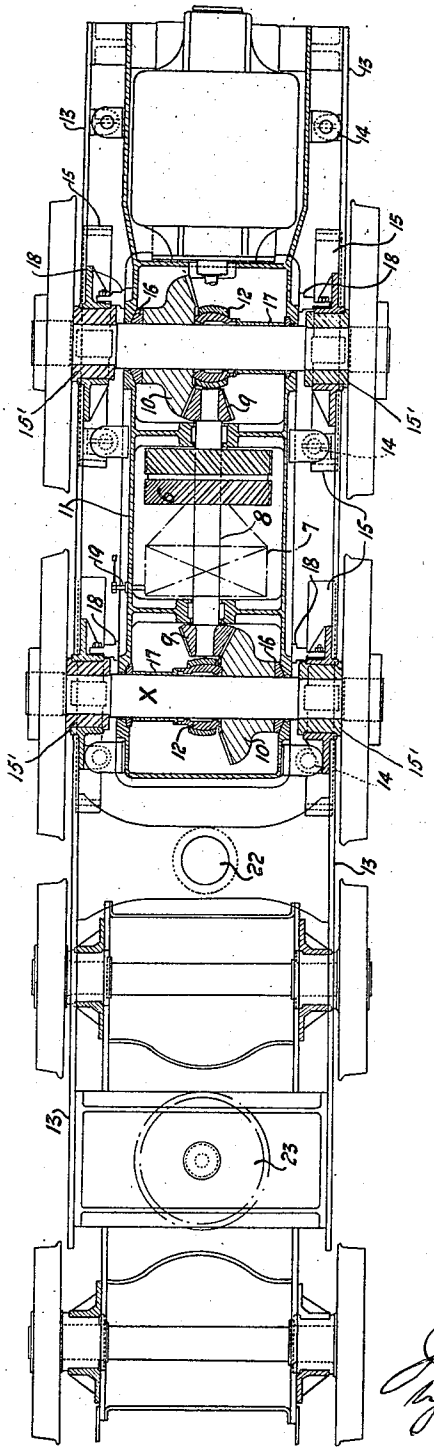


FIG. 5.

Inventor:
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by Kalar & Kalar,
Attorneys.

Patented Dec. 12, 1922. 1,438,319

# UNITED STATES PATENT OFFICE.

JAMES MACLEOD, OF GLASGOW, SCOTLAND, ASSIGNOR OF ONE-HALF TO HUGH REID, OF GLASGOW, SCOTLAND.

## LOCOMOTIVE.

Application filed December 7, 1921. Serial No. 520,627.

*To all whom it may concern:*

Be it known that I, JAMES MACLEOD, a subject of the King of the United Kingdom of Great Britain and Ireland, and residing at Glasgow, Scotland, have invented a certain new and useful Improvement in Locomotives, of which the following is a specification.

This invention relates to turbine-driven locomotives and aims at a construction in which transmission from the turbine to the driving axles of the locomotive is effected exclusively by means of rotary gear members.

A locomotive according to the invention includes two compound bogies each comprising a driving bogie and a leading or trailing bogie on each of which driving bogies is a turbine, a high-pressure turbine on one driving bogie and a low-pressure turbine on the other driving bogie.

Between each turbine and a countershaft fitted to the respective driving bogie is interposed a transmission mechanism comprising double helical gear pinions and gear wheels and a clutch device, and between each countershaft and the respective driving axle are interposed rotary gear members.

In the accompanying drawings Fig. 1 is an elevation of a locomotive according to the invention; Fig. 2 a plan thereof; Fig. 3 an elevation of one of the sets of transmission mechanism; Fig. 4 an end elevation of Fig. 3 and Fig. 5 a plan of Fig. 3. Fig. 6 is a detail view of a clutch device.

The locomotive shown is equipped with a boiler 1 from which steam is led through piping to a high pressure turbine 2, exhausting to the low pressure turbine 3 and thence to the condenser 4.

The power developed by the turbines 2 and 3 is transmitted by double helical gear pinions 5 and gear wheels 6 through clutch gears 7 to countershafts 8, and thence through bevel pinions 9 and bevel wheels 10 to the driving axles X of the locomotive. The gears are mounted within gear cases 11 centrally located relative to the driving axles X by means of spherical seated bearings 12. The weight of the gear cases 11 is transmitted to the bogie frames 13, through springs and brackets 14 and thence to the axle box bearings 15′ through springs 15, thus eliminating shock and vibrations and maintaining the gear wheels in correct pitch and centre for all movement of the driving axles of the locomotive.

The bevel wheels 10 are secured to the driving axles X by means of feathers or keys and located in position by means of spherical seated thrust bearings 16 and distance pieces 17 transmitting the axial thrust from the bevel wheels 10 to the gear cases 11 and thence through guides 18 to the bogie frames, thus permitting easy axial movement of the locomotive driving wheels and axles and maintaining the gear cases oil-tight. Clutch-operating shafts 19 are supported in bearings on the gear cases 11. Within the gear cases are oil strainers 20 forming false bottoms, through which the oil is strained before passing to the oil pump. A door 21 is provided in the bottom half of each gear case for removing the strainer plates for cleaning and inspection.

In the particular example shown, each compound bogie includes one driving bogie and one leading or trailing bogie, each driving bogie being centered at 22 and the leading or trailing bogie centered at 23, the compound bogie supporting the main continuous frame of the locomotive at 22 and 24.

Oil under pressure is supplied to the gear case bearings and gear wheels by means of an oil pump 25 and is cooled during circulation in an oil cooler 26 on the discharge side of the pump. 27 is a fan operated by an auxiliary turbine 28 to supply hot air under forced draught to the boiler furnace, the air entering the system at a trunk opening 29 when it is brought into contact with a spray of cold water, the spray-laden air being drawn through the oil cooler 26 so as to extract the heat from the oil and to become heated before entering the fan. The air is discharged by the fan through a heater constituted by trunks 30 surrounding the smoke box and is conveyed under pressure through trunks 31 to the furnace 32 and to the ash pan.

I claim:

In a locomotive, in combination, two compound bogies each including a driving bogie comprising a bogie frame and two driving axles, turbines, one on each driving bogie, transmission mechanism including countershafts, double helical gear pinions, gear wheels and clutches between said turbines

and said countershafts, and gearing comprising driving and driven elements between said countershafts and said axles, gear cases enclosing said transmission mechanism, spherically seated bearings centering said gear cases relatively to said axles, springs and brackets transmitting the weight of said gear cases to said bogie frames, axle box bearings, springs between said bogie frames and said axle box bearings, spherically seated thrust bearings and distance pieces for transmitting axial thrust from said driven elements to said gear cases, and guides between said gear cases and said bogie frames.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES MACLEOD.

Witnesses:

KATE FOTHERINGHAM,

ISABEL ROLLO.