

(No Model.)

C. J. MELLIN.
COMPOUND ENGINE.

No. 536,641.

Patented Apr. 2, 1895.

Fig. 1.

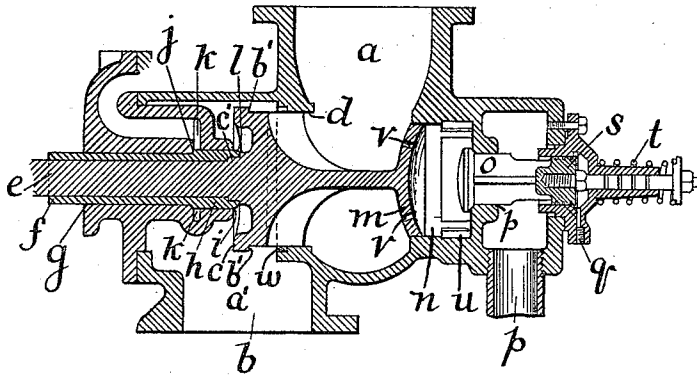


Fig. 2.

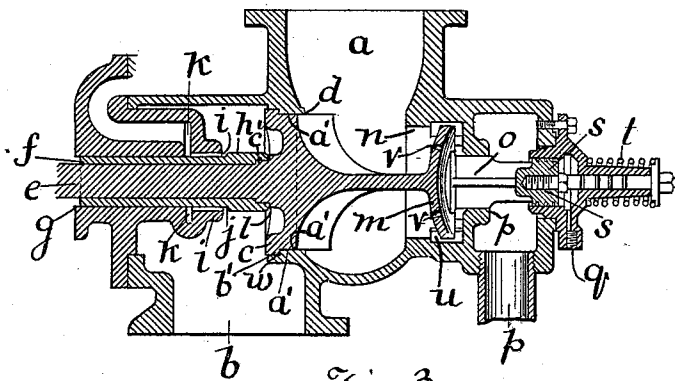
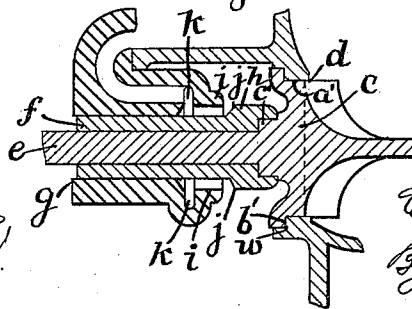


Fig. 3.



Witnesses.

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att'y.

UNITED STATES PATENT OFFICE.

CARL JOHAN MELLIN, OF RICHMOND, VIRGINIA, ASSIGNOR TO THE RICHMOND LOCOMOTIVE AND MACHINE WORKS, OF SAME PLACE.

COMPOUND ENGINE.

SPECIFICATION forming part of Letters Patent No. 536,641, dated April 2, 1895.

Application filed June 28, 1894. Serial No. 515,929. (No model.)

To all whom it may concern:

Be it known that I, CARL JOHAN MELLIN, a citizen of the United States, and a resident of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Compound Engines, of which the following is a specification.

My invention relates to compound locomotives and other engines having an intercepting valve for changing the action from compound to direct action of live steam in both cylinders for starting, and at other times, and it consists of improved devices for cushioning the intercepting valve as hereinafter described reference being made to the accompanying drawings, in which—

Figure 1, is a sectional elevation of the intercepting valve and its case including an emergency valve attachment, with the intercepting valve open as when the engine is working in the compound system, the emergency valve being closed. Fig. 2, is a similar section with the intercepting valve closed and the emergency valve open. Fig. 3, is a detail also in section showing like parts but drawn to a larger scale for greater clearness.

The valve case is connected to the exhaust pipe of the high pressure cylinder so that the steam is received at *a*, and to the supply pipe of the low pressure cylinder so that the steam is delivered thereto at *b*, the intercepting valve *c* being located in the passage *d*, between the receiver *a*, and the delivery *b*, said valve being normally held open as in Fig. 1, by the pressure of the steam flowing from the high to the low pressure cylinder.

The valve *c* has a stem *e*, working in a sleeve *f*, which is the live steam admission valve, said sleeve being fitted in the bore *g* of the cover of the case and having the enlarged head *h*, working in the bore *i* correspondingly larger than the bore *g*, wherein shoulder *j* of the sleeve, always subject to live steam admitted through port *k* when the throttle valve is open, normally tends to close the intercepting valve, but the area of the said shoulder is so limited that the live steam is normally overbalanced by the exhaust steam and the intercepting valve remains open while the engine is at work, or until pressure falls in the receiver *a*, below the normal amount when

the intercepting valve will be automatically closed and the shoulder *j* passing out of the end of bore *i*, admits live steam into the low pressure cylinder, the amount being limited by the limited size of the opening provided, so that the pressure in said cylinder will not be excessive, and sleeve *f*—*h*, being movable independently of the stem *e*, and the end *l*, having larger area than shoulder *j* undue pressure in the low pressure cylinder will automatically force the sleeve back and shut off the live steam in case the engine works so slow at starting that too great pressure might accumulate.

On the opposite side of the valve *c*, and of the receiver *a*, the said valve has a piston *m* working in a cylinder *n*, and behind this piston is the emergency valve *o*, which opens the receiver to exhaust through passage *p*, when it is desirable to change from compound to direct action while running, said valve *o* being subject to the control of the engineer to open it by steam admitted through passage *q* behind the piston *s*, the said passage being suitably connected with the boiler for the purpose.

The coiled spring *t* and the steam pressure on the inner end of valve *o*, close said valve when steam is shut off from behind piston *s*. The purpose of the piston *m* is to partly balance valve *c*, and insure quick closing of it when valve *o* is opened. The steam escapes past this piston *m*, in the cored enlargement *u* for exhaust through the emergency valve in which enlargement the piston comes to rest when valve *c* closes. The vents *v* in said piston permit equal pressure of exhaust steam on both sides so that it does not materially obstruct the opening of valve *c*, by the steam exhausting from the high pressure cylinder. Valve *c*, closes in the recessed seat *w*, which it enters before shoulder *j* escapes from cylinder *i*, so that live steam will not waste through valve *c* while closing. As thus far described the apparatus is substantially the same as represented in the Letters Patent granted to me May 8, 1894, No. 519,407, and is not claimed herein, the subject of this application being the intercepting valve provided with the cylindrical projection *a'* from the seat facing *b'* for closing in the cylinder

d, at or before the valve enters recess *w* and constituting a gas trap between valve face *b'* and the bottom of recess *w*, to check or cushion the valve more effectually in closing, also
5 the like trap *c'* formed by the recess in the head *h*, of the sleeve *f*, with a corresponding shoulder on the valve stem *e* for cushioning the valve on the opening side which cushions are of considerable importance owing to very
10 frequent fluctuations of the valve when the engine is laboring slowly as in starting a heavy freight train, the exhausts being then so infrequent that pressure falls in the receiver *a*, and the valve closes after every beat
15 and opens again with the next until by more frequent exhausts the pressure becomes sufficiently constant to keep said valve open.

I claim—

1. In a compound engine, the intercepting
20 valve having the cylindrical projection *a'* from the seat facing *b'*, in combination with the cylinder *d*, having the seat for said valve in the recess *w*, for cushioning the closing of the valve substantially as described.

2. In a compound engine, the combination 25 with the stem of the intercepting valve, of the live steam admission sleeve having the recess in the head, and said stem having the shoulder forming with said recess the cushion *c'* to the opening of said valve substantially as described. 30

3. In a compound steam engine, the combination of the intercepting valve having the cylindrical projection *a'* from the seat facing, the cylinder *d*, coacting therewith, and having 35 the seat for said valve in the recess *w*, the live steam admission sleeve fitted on the stem of the valve and having the recess in the head, and the shoulder on the stem of the valve forming with said recess the cushion *c'* substantially as described. 40

Signed at Richmond, in the county of Henrico and State of Virginia, this 14th day of May, A. D. 1894.

CARL JOHAN MELLIN.

Witnesses:

JALP L. TRIZZINI,
R. A. MILLER.