(No Model.)

G. A. COVYEOW.

STEAM ENGINE.

No. 493,250. Patented Mar. 14, 1893.

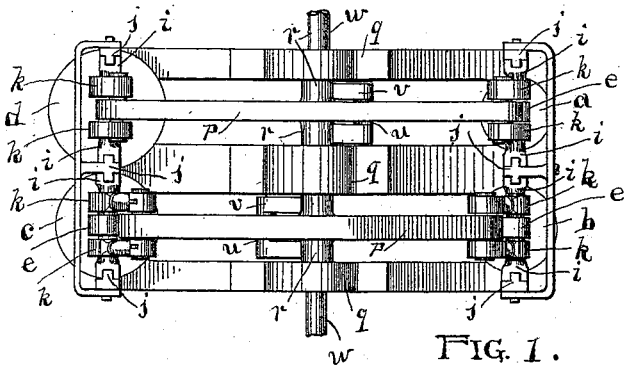

FIG. 1.

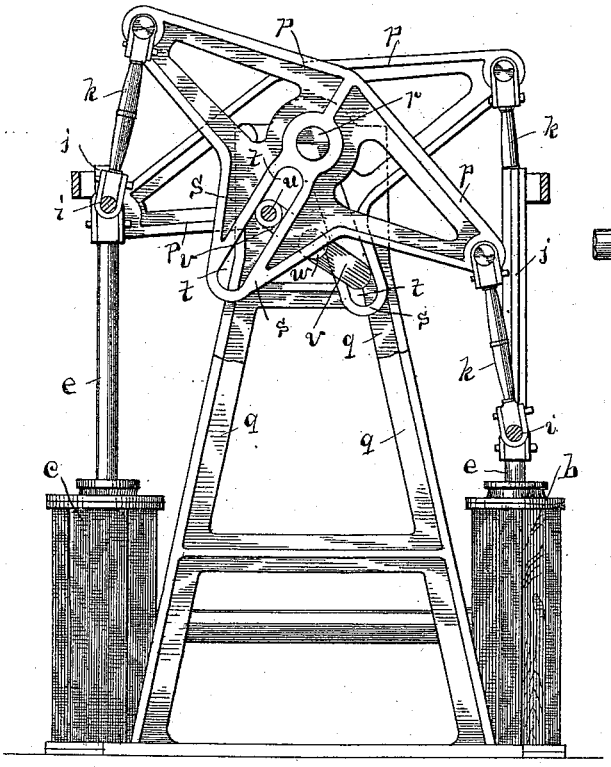

FIG. 2

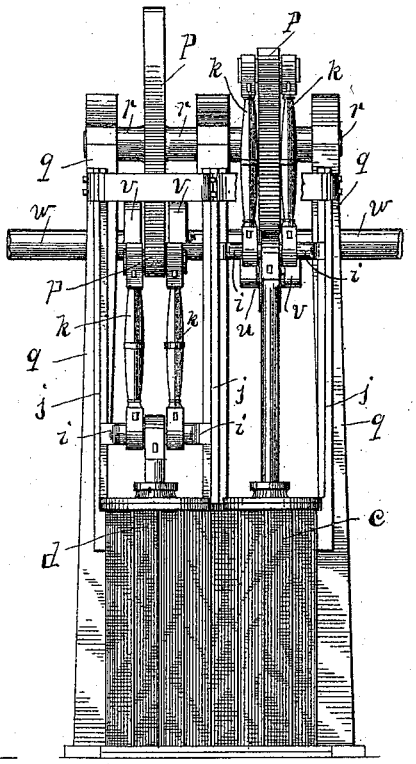

FIG. 3.

ATTEST

J. B. Kissinger.

Geo. P. Thomas.

INVENTOR

George A. Covyeow

By Jas. E. Thomas

Atty.

UNITED STATES PATENT OFFICE.

GEORGE A. COVYEOW, OF BAY CITY, MICHIGAN.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 493,250, dated March 14, 1893.

Application filed June 24, 1891. Serial No. 397,303. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. COVYEOW, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in steam engines, and pertains particularly to means for transmitting power from the connecting rod to the crank.

The objects of my invention are to provide a mechanism for transmitting power from the connecting rod, of a steam engine to its crank, whereby a great advantage will be obtained at a certain point of the movement of the crank.

Another object of the invention is to provide devices for transmitting the power from a quadruple expansion engine to the shaft, by means of two cranks only.

The invention consists in the combination, arrangement and construction of the parts together with their operation as I shall hereinafter more fully describe, and which will be also pointed out specifically in the claims of this specification.

My invention is illustrated in the accompanying drawings in which the same letters of reference will be found indicating the same parts throughout the several views.

Figure 1, represents a plan view of a quadruple expansion steam engine containing my improvement. Fig. 2, is a side view in elevation of the same, partly sectional. Fig. 3, is an end view of Fig. 2.

a, *b*, *c*, and *d*, are steam engine cylinders arranged to stand upon the corners of a quadrangle, and *e*, *e*, *e*, *e* are piston rods extending from the head of each of the cylinders respectively in the ordinary way. The outer ends of these piston rods are connected to cross-heads *i*, supported by ways *j*, and *k*, *k*, *k*, *k*, are connecting rods, each pivotally secured by one end to one of the cross-heads *i*, while the opposite ends of the rods are secured by suitable pivots to the opposite ends of the walking beams *p*. These walking beams *p*, are pivotally mounted in their longitudinal centers on suitable vertical supports *q*, by trunnions or shafts *r*, upon which they oscillate and each beam *p*, is provided with a centrally located extension *s*, preferably projecting downwardly as herein shown, and provided with a slot *t*, arranged to lie at a right angle with the longitudinal axis of the beam. Within these slots *t*, are arranged the wrists *u*, of the cranks *v*, which are mounted upon the shaft *w*, the cranks extending in opposite directions from the shaft, while the shaft is suitably mounted in boxes of the usual form supported upon the standards or supports *q*, and the shaft is also provided with suitable means for transmitting power therefrom to the machinery to be driven, such as the propeller or paddle wheels of a boat, or any other mechanism commonly driven by steam engines not however herein shown. The length of the slot *t*, is such as to permit the wrists of the cranks to travel the length thereof during each half revolution of the cranks.

The cylinders as herein shown are arranged as a quadruple expansion engine, steam being admitted from the boiler to the cylinder *a*, to be exhausted therefrom to the cylinder *b*, thence to the cylinder *c*, and again to the cylinder *d*, after the usual manner of engines of this class, any suitable valves, ports, &c. after any desired pattern or form being used to effect the proper admission and exhaust of the steam in the proper manner to effect the desired action upon the piston.

It will be noticed that when one of the wrists of the cranks is located in the outer or lower portion of the slot *t*, the wrist of the other or oppositely projecting crank will be located at the opposite or inner end of the other slot *t*, so that as the beams are caused to oscillate on their trunnions the wrist located nearest the trunnions or the inner portion of the slot will be acted upon by the walking beam with great leverage for a portion of its revolution, while the opposite wrist acting upon the outer or lower portion of the slot is moved over a greater distance and operates to complete the revolution of the shaft, each wrist being acted upon by the inner portion of the slot alternately. It will also be noticed as shown in Fig. 2, that when one of the cranks is located so as to lie on a direct line of movement of one of the slots or "on a

center" the other crank will be located on an angle in relation to the other slot so that this crank will then operate to revolve the shaft, whereby one or the other of the cranks will always be in a position to be operated by the oscillation of the beams. By this construction also a great saving of room is obtained in operating the shaft of a propeller or the shaft of a side wheel boat as the parts are so arranged and located that the entire four cylinders and the walking beams are located within a greatly reduced space, both in height and transverse dimensions and less mechanism is required to operate the directly connected cranks than with engines of the ordinary type.

Of course it will be understood that while I have described the cylinders as arranged as a quadruple expansion engine, live steam can be used in each cylinder separately if desired, as any particular manner of using the steam forms no part of the invention which pertains chiefly to the construction and operation of the walking beams; and while it is preferable to provide two walking beams with the four cylinders and two cranks mounted upon the same shaft, two cylinders with one walking beam and one crank upon the shaft are equally capable of use in the same manner, depending of course upon the motion of the fly wheel or other machinery driven thereby for carrying the crank over the centers.

Having described the construction and operation of my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam engine, the combination with the walking beam having a central pivotal bearing and a centrally located transverse slot, of the cylinders, pistons working in said cylinders, connecting rods pivotally connected to the opposite ends of said walking beam, and the shaft located transversely with the said walking beam and provided with a crank having its wrist located within, and arranged for sliding in the said transverse slot, substantially as set forth.

2. In a steam engine the combination with the walking beams arranged parallel with each other and supported by central pivotal bearings, and each beam provided with a centrally located transverse slot *t*, of the steam cylinders *a*, *b*, *c*, and *d*, each having its connecting rod pivotally secured to one end of the said walking beams, and a shaft *w*, provided with cranks *v*, extending in opposite directions from the shaft and having wrists *u*, located within the said slots *t*, substantially as set forth.

In testimony whereof I hereunto affix my signature in presence of witnesses.

GEORGE A. COVYEOW.

Witnesses:
J. H. BYRNE,
T. G. HALL,
LOFTUS E. DANCEY.