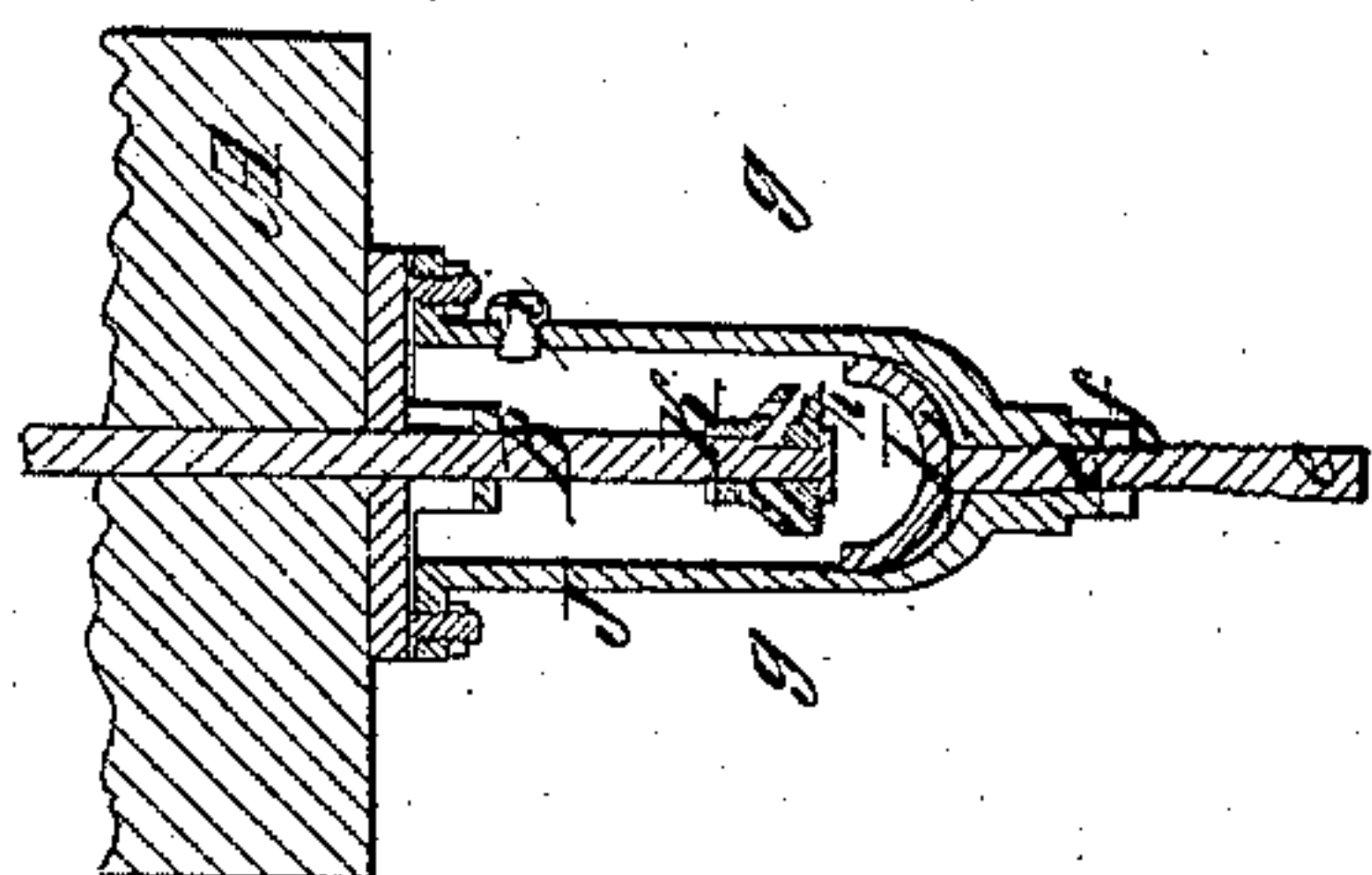
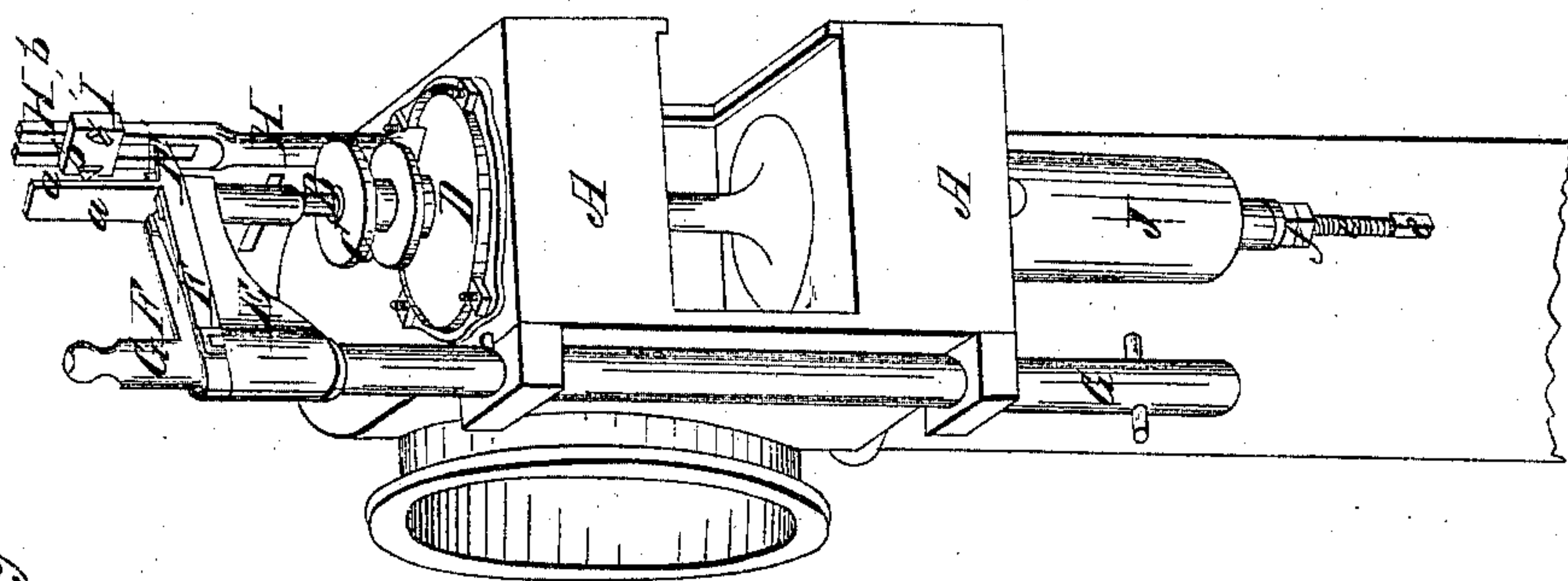


*F. E. Sickels,*  
*Steam-Engine Valve-Gear.*  
*N<sup>o</sup> 2,631.      Patented May 20, 1842.*

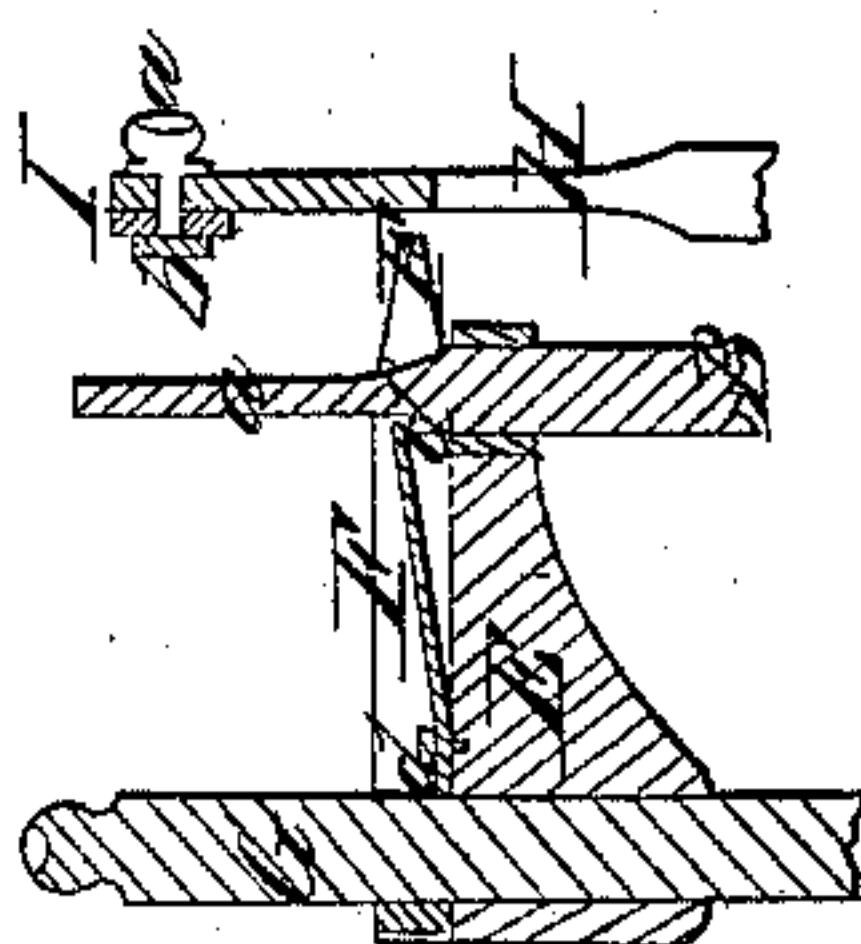
*Fig. 4.*



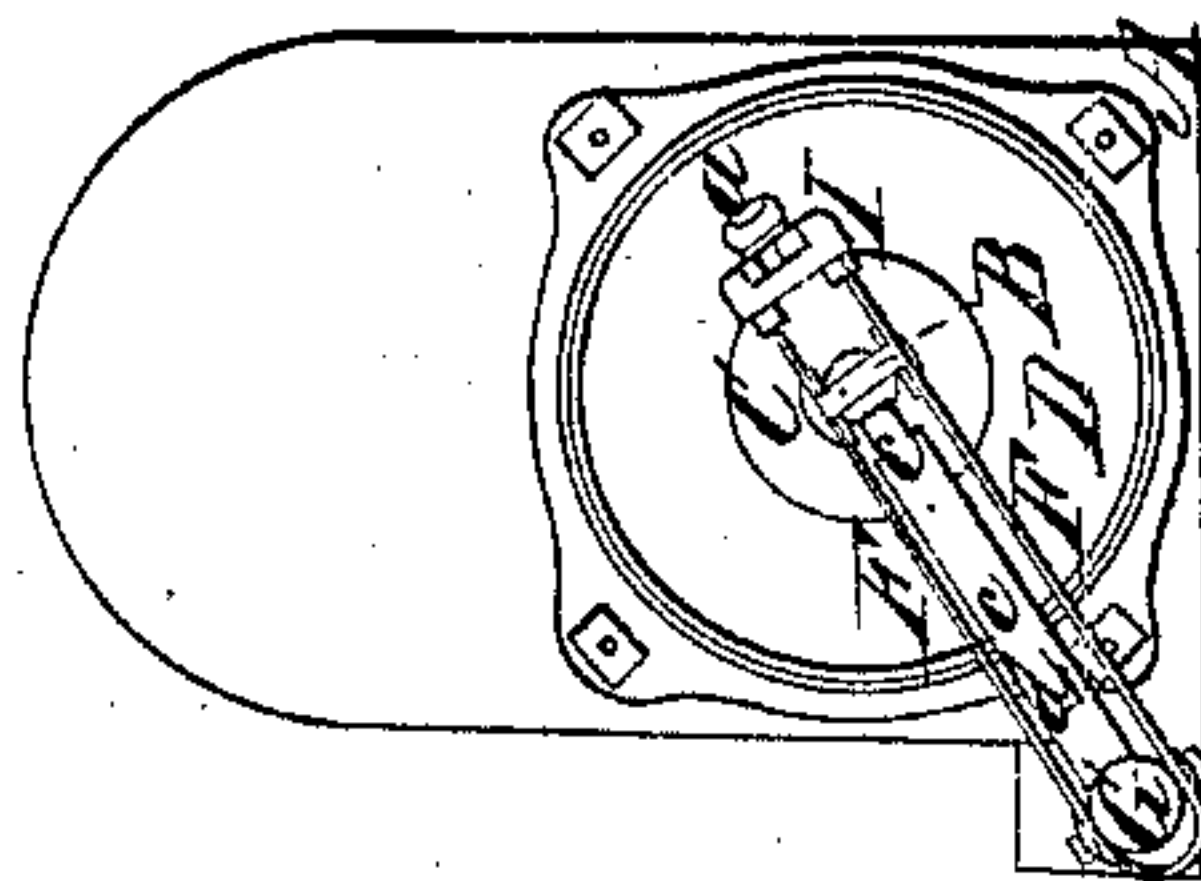
*Fig. 1*



*Fig. 2.*



*Fig. 3.*





# UNITED STATES PATENT OFFICE.

F. E. SICKELS, OF NEW YORK, N. Y.

## MANNER OF CONSTRUCTING THE APPARATUS FOR LIFTING, TRIPPING, AND REGULATING THE CLOSING OF THE VALVES OF STEAM-ENGINES.

Specification of Letters Patent No. 2,631, dated May 20, 1842.

*To all whom it may concern:*

Be it known that I, FREDERICK ELSWORTH SICKELS, of the city of New York, in the State of New York, have invented certain improvements in the manner of constructing and arranging the apparatus for lifting and tripping the valves of steam-engines and by which the steam can be more readily cut off at any desired part of the stroke than by the means heretofore adopted, and also an improved water-reservoir and plunger, which serve to prevent the slamming of the valves in closing and consequently to preserve them in good working order for a great length of time.

In the accompanying drawing A A, Figure 1, represent a valve box, containing the puppet valves which are to be lifted and closed, the construction of this part being such as is well known to engineers and machinists. B, is the valve stem, passing through a stuffing box C, on the bonnet D, of the valve box. The valve stem is to be raised by the lifter E, which is acted on in the usual way. F, F, is a spring which is attached to the shaft G, of the lifter, and the outer ends F', of which embrace the sides of the valve stem B. The upper end of this stem is flattened, or has projecting edges, or feathers, *a, a*, which when the valve is being lifted rest upon the upper edges of the spring F, F, where said feathers terminate; but when this spring is opened, the stem will be no longer sustained by it, and it will consequently descend, and the valve, or valves, attached to it will be closed.

By means of the apparatus which I have devised the spring F, may be opened, and the stem B, with its valves, may be tripped at any time during the ascent or descent of the lifter, and the steam may consequently be cut off at any part of the stroke of the piston. To effect this, there is a standard H, rising vertically from the valve box, or bonnet, C, so as that its upper, flat end shall be nearly in contact with the outer ends of the spring F, F. This standard sustains an adjustable sliding piece I, which may be shifted to any desired height, and then held in place by means of a set screw *a'*. Upon the face of this sliding piece there are two projecting, wedge-formed pieces, or inclined planes, *b, b*, which serve to open the ends F', of the springs, and thus to liberate the

stem B. In the position in which the piece I, is represented in this figure the ends of the spring F, would catch against the outsides of the pieces *b, b*, in ascending, and they would be separated; but in descending, the ends of said springs would catch against the insides of the wedges or planes *b, b*, and they would consequently be forced inward, and would not be opened; but, were the sliding piece I, with its wedges or inclined planes reversed, the spring would then not be opened by the ascent, but would be opened by the descent of the stem. When the stem is liberated or tripped at its greatest rise, the steam will be cut off at half stroke; when tripped at one half its rise in ascending, the steam will be cut off at one fourth of the stroke, and when at that same point in descending, it will be cut off at three fourths of the stroke; and so on of any intermediate point. The face of the standard H, may be graduated, so as instantaneously to set the cut off at any required point, by means of the set screw.

In order to cause the stem B, to descend instantaneously, when the spring F, F, is opened, I cause a spring to bear upon it, which spring is situated on the upper side of the lifter, to which it is attached by one end, while its other end bears upon the stem.

In Fig. 2, which is a vertical passage of a portion of water sufficient to allow of the descent of the plunger, while it shall be so obstructed as to take off the force of the blow of the valve. I have, in fact, essayed the action of the plunger, and of the parts within which it operates, in different forms, and in all with good effect; that which I have represented being one of the best. An opening, furnished with a stopper, may be made through the reservoir, as at *i*, to supply water when requisite. By means of this apparatus the valves may be made to shut so silently as scarcely to be heard, while the retardation is so perfectly graduated as not to be accompanied by any sensible loss of time, as it takes place in the last moment of their descent only.

Having thus fully described the nature of my improvements in the apparatus for lifting and tripping the valves of steam engines, and of thereby cutting off the steam at any required part of the stroke; and also of my improved apparatus for regulating



the closing of the valves; what I claim therein as new, and desire to secure by Letters Patent, is—

1. The manner in which I have combined  
5 and arranged the valve stem B, the spring F, on the lifter, the adjustable sliding piece I, with its wedges, or inclined planes, and their immediate appendages, so as to coöperate with each other, and to effect the tripping of the valves, and the cutting off of  
10 the steam, substantially in the manner set forth.

2. I also claim the manner of regulating

the closing of the valves, and of effectually preventing them from slamming, by means 15 of a water reservoir, furnished with a piston, or plunger, attached at the lower end of the valve stem, and operating within an adjustable cup, or secondary reservoir, so as to effect the purpose intended, upon the 20 principle, and substantially in the manner, herein described and made known.

FREDERICK ELSWORTH SICKELS.

Witnesses:

W. J. HASKETT,

WM. M. B. SICKELS.