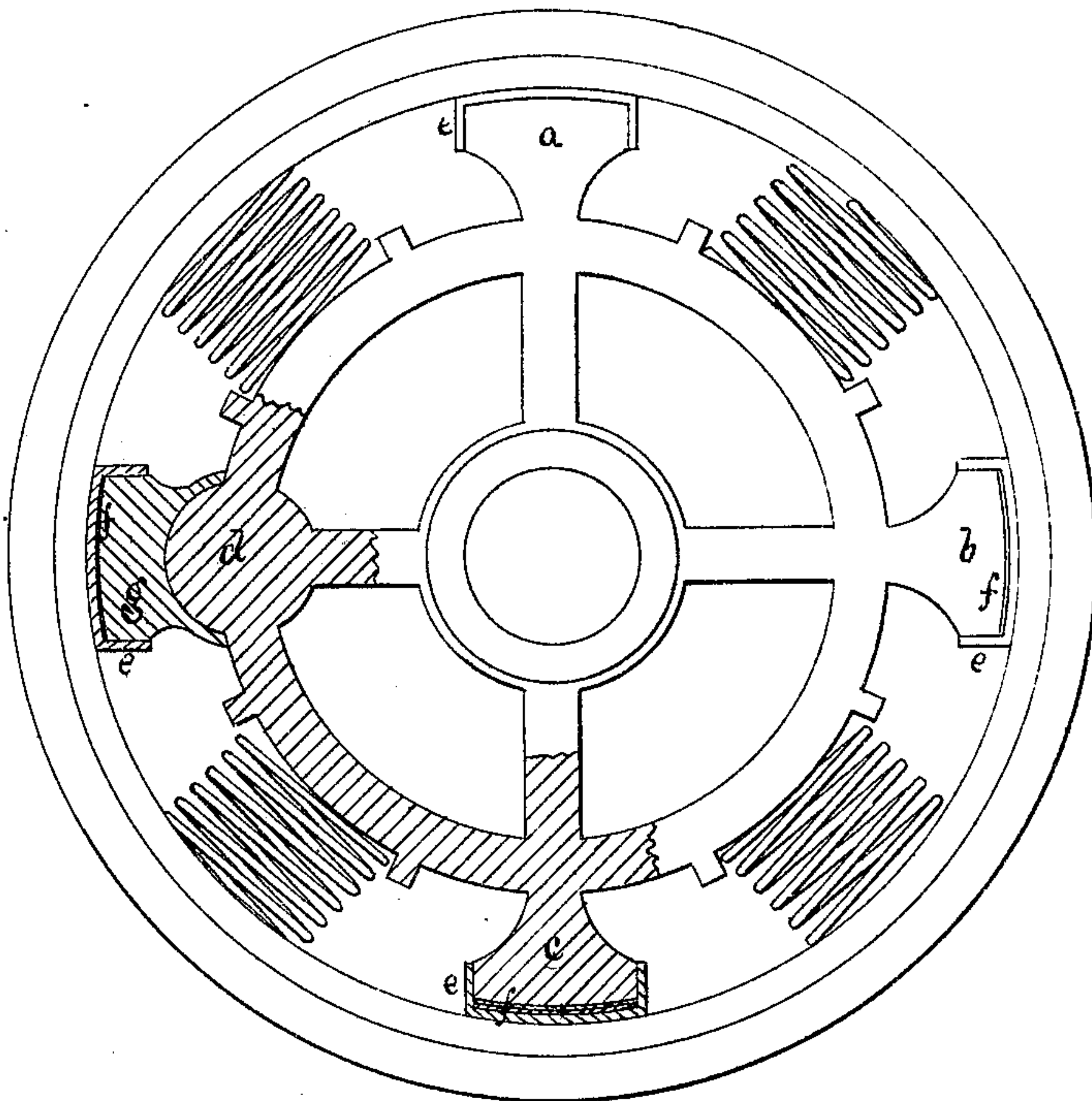


H. S. HOPKINS.  
Improvement in Pistons.

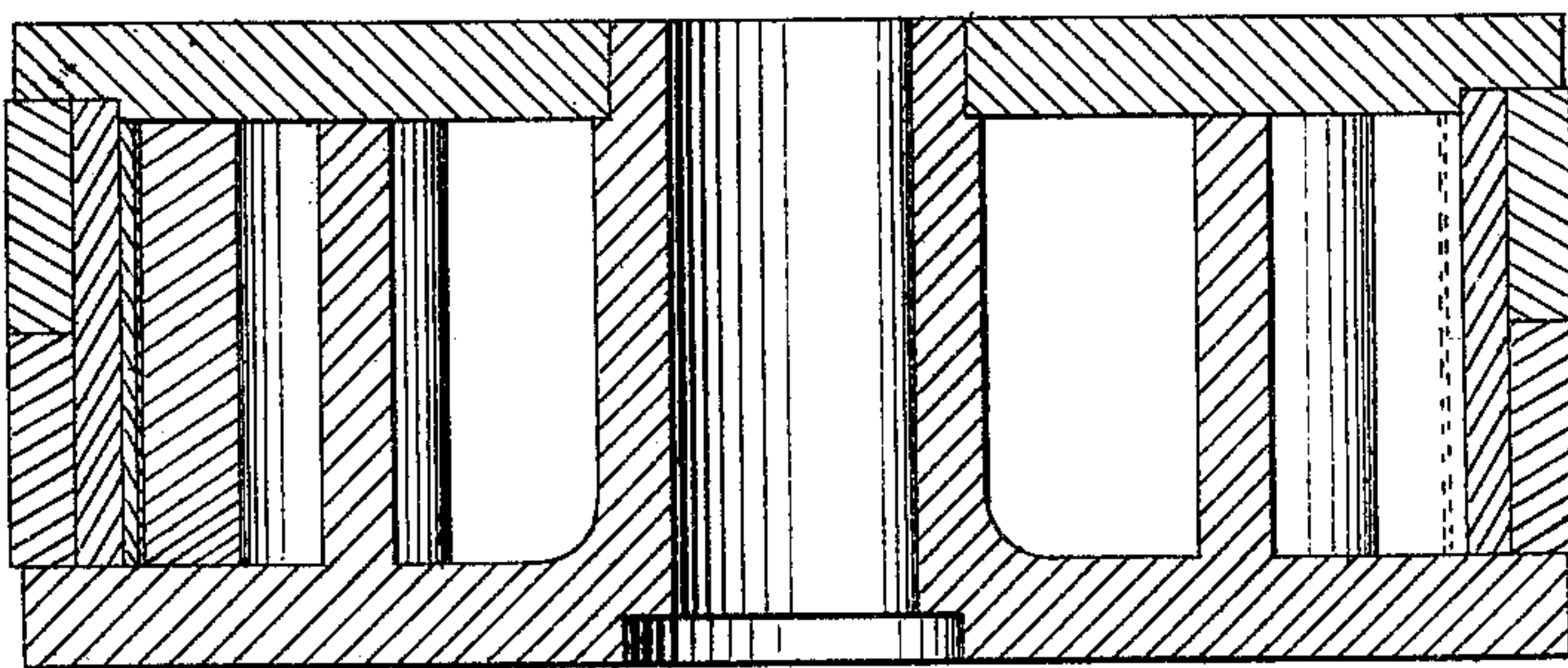
No. 126,548.

Patented May 7, 1872.

*Fig. 1.*



*Fig. 2.*



*Witnesses:*

*W. B. Crosby*  
*J. Fowler*

*Inventor:*

*Henry S. Hopkins*  
*By his Attor.*  
*Crosby & Gould*



# UNITED STATES PATENT OFFICE.

HENRY S. HOPKINS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF  
AND SEWALL, DAY & CO.

## IMPROVEMENT IN PISTONS.

Specification forming part of Letters Patent No. 126,548, dated May 7, 1872.

*To all whom it may concern:*

Be it known that I, HENRY S. HOPKINS, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Engine-Cylinder Piston; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention relates to the detail of construction and arrangement of pistons for engine-cylinders, by which they are readily adjusted after wear in such cylinders, so as to be brought back to a central location therein. In engines with vertical cylinders there is little or no tendency for the piston to lose its concentric adjustment; but in inclined and horizontal cylinders gravity causes the piston to wear most on the lower side; and all well-constructed engines are made with some provision by which the engine attendant can from time to time bring back the piston to its normal and desirable condition of concentricity in its cylinder. Though means for this adjustment are numerous, and some of them efficient, yet I have designed an extremely simple and effective means that may be either embodied in new pistons, or in old ones may be made to take the place of faulty or complex devices, one merit of my invention being that while the means are cheap they are also so simple that they may anywhere be found and applied without recourse to machine-shops, and by the engine attendant. In my invention the piston or packing rings are pressed outward equally in every direction, the means for centralizing the piston in the cylinder being independent of and not coupled with the means for keeping the packing-rings pressed outward; hence, in my piston there is not, as in many, an extra spring-stress added to the weight of the piston to wear downward on the cylinder.

A piston embodying my invention is shown in Figure 1 in plan, with the follower removed; and with the follower in place, is seen in section, in Fig. 2. The front disk, the hub, and the spider are, as is usual, all made in one casting, to which the follower is secured by bolts,

the packing-rings being located between the front disk and the follower.

At *a*, *b*, and *c* the arms of the spider are shown as in a piston designed, at the outset, to receive my means for centralizing the piston, while at *d* is represented one of the ways in which my means may be applied to an old piston; the ends of the arms *a*, *b*, and *c* are made concentric with the axis of the piston, but of less diameter than the bore of the inner packing-ring, so as to admit, between said ends and ring, pieces *e*, of metal, in the form shown, the wings of said pieces extending around the ends of the arms. When the piston wears downward, so as to leave a vacant space between the end of the upper arm and its clasp *e*, the attendant brings back the piston to its central position by taking off the follower, and inserting between the clasp *e*, surrounding the lower arm, one or more filling-pieces, *f*, of such thickness as may be needed, such pieces being of tin-plate, sheet-iron, or brass, but preferably of steel. As the rings wear and move outward under the stress of the springs—which are compressed as they are inserted—leaving openings between the ends of arm *a* and the clasps *e*, these openings are to be supplied with the filling-pieces described, care being taken, by accurate measurement, to centralize the piston by the introduction of filling-pieces of the thickness required. The wings of the clasps prevent the filling-pieces from moving out of place laterally, and they are confined longitudinally between the piston-disk and follower. Any kind of springs may be used to insure contact between the packing-rings and the interior of the cylinders; but I greatly prefer large springs of coiled wire, preferably of steel, and tempered in form, and retained in place by stops cast on the spider, as shown, for such springs are very enduring, and can be easily made by most engine attendants; and there are but few situations where the material is not attainable; for, though steel-wire is preferable, other wire will answer quite well. When a piston is not made to receive the clasps *e*, then resort may be had to the expedient shown at the left of Fig. 1, where is shown a piece, *g*, which is made to fit the clasp *e*, and to extend

from it to some part of the spider. The piece *g* is shown as fitting upon a boss on the spider, designed to receive one of the bolts which hold the follower, which prevents lateral movement of piece *g*; but if such bosses do not exist, then, by means of dowel-pins or other devices, the intermediate pieces *g* may be held from lateral motion.

I claim—

In combination with pistons for engine-cylinders, the clasps *e*, arranged, substantially as described, for reception of filling-adjusters *f*, for the purpose specified.

Witnesses: HENRY S. HOPKINS.  
FRANCIS GOULD,  
M. W. FROTHINGHAM.