

J. H. KEETER.
SAFETY STUFFING BOX.
APPLICATION FILED MAY 19, 1908

911,047.

Patented Feb. 2, 1909.
2 SHEETS—SHEET 1.

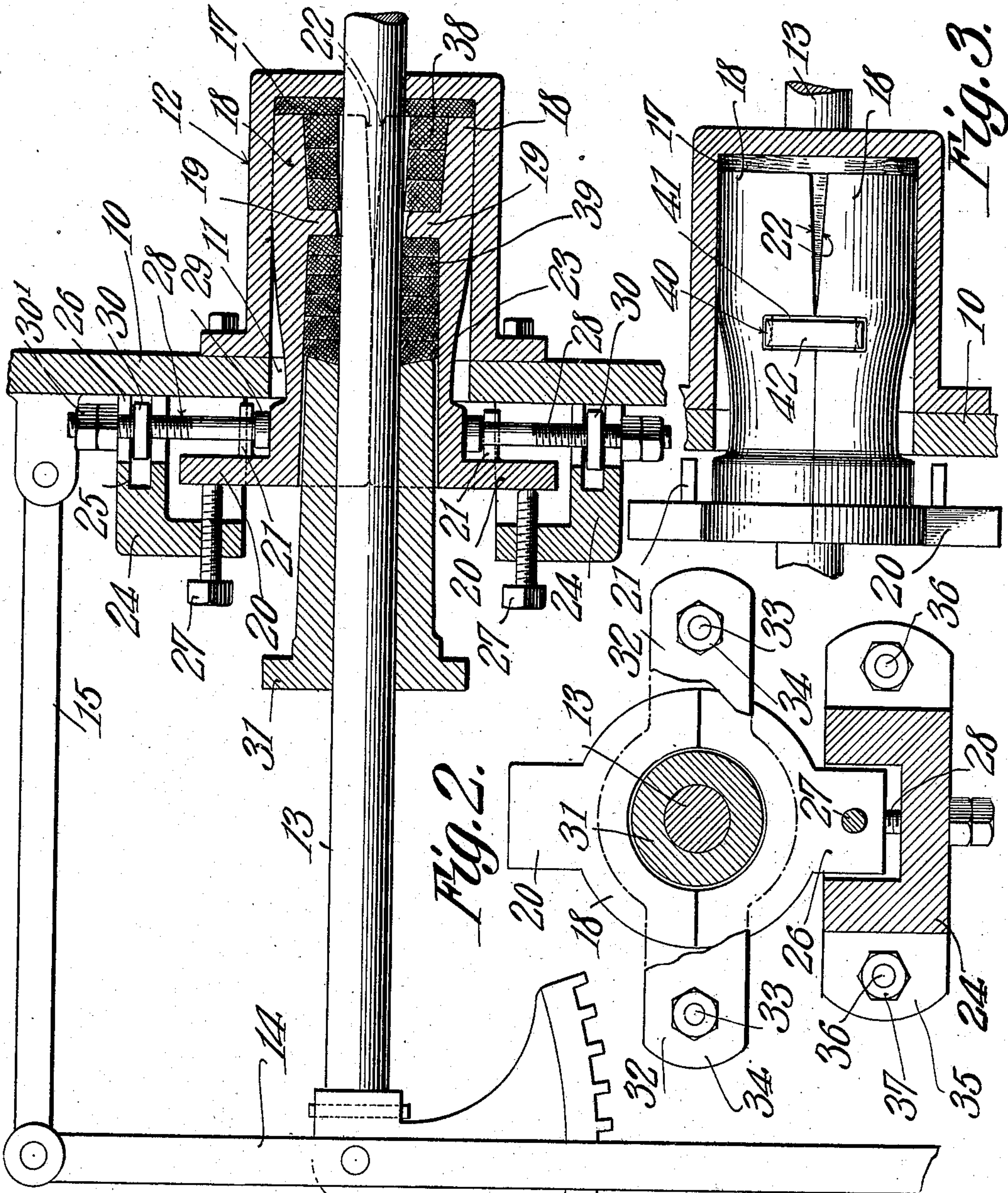


Fig. 2.

Fig. 3.

Fig. 1.

Witnesses

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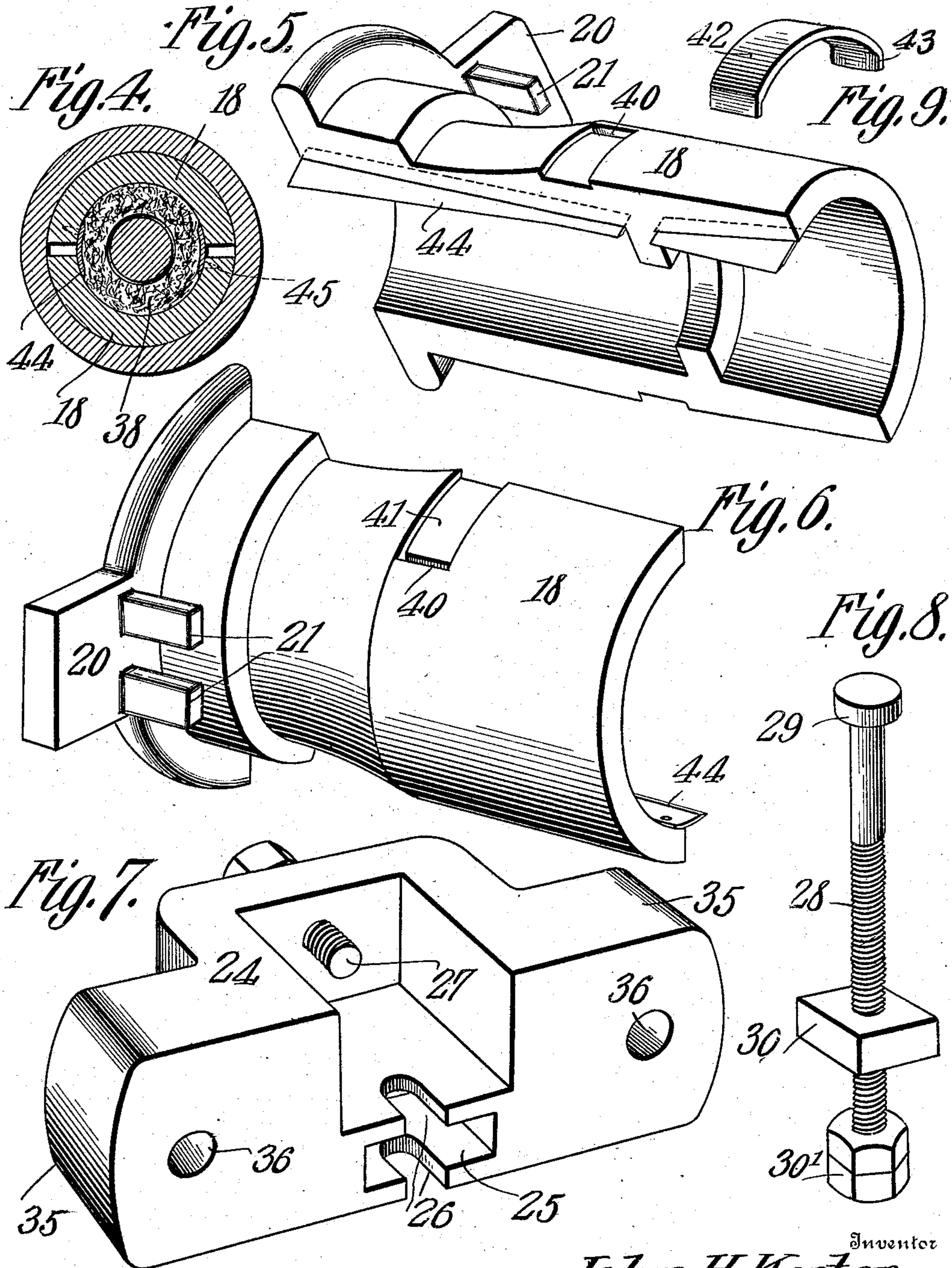
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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN H. KEETER, OF SPENCER, NORTH CAROLINA.

SAFETY STUFFING-BOX.

No. 911,047.

Specification of Letters Patent.

Patented Feb. 2, 1909.

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To all whom it may concern:

Be it known that I, JOHN H. KEETER, a citizen of the United States, residing at Spencer, in the county of Rowan and State of North Carolina, have invented a new and useful Safety Stuffing-Box, of which the following is a specification.

This invention relates to stuffing-boxes, and more especially to a peculiar type of stuffing-box which is preferably termed a safety stuffing box.

The principal object of this invention is to provide a stuffing-box of the character described adapted for use on the throttle valve stem of locomotive engines. Locomotive engines are frequently delayed by reason of the valve stem packing blowing out or becoming so injured as to permit the free escape of steam around the throttle valve stem. When this occurs it is necessary to draw the fire, often amounting to one or one and one-half tons of coal and allow the steam to run down before the box can be repacked. This is not only an expensive operation, entailing as it does the loss of considerable coal, but involves serious delay inasmuch as the lowering of the steam frequently uncovers the crown sheet of the engine fire-box. It then becomes necessary, there being no steam with which to run the pump, to fill the boiler by hand with buckets. This of course is a slow and tedious process, and, as stated above, the principal object of the invention is to obviate the delays and expense resulting from this occurrence.

Another object of the invention is to provide a means whereby any valve stem or rod may readily be repacked without the operation of the engine ceasing.

With these and other objects in view the invention consists of a stuffing-box containing two sets of packing, one of which is normally inactive and which may be placed in active position, and when in this position will permit the removal and replacement of the other.

The invention further consists in certain novel details of arrangement and combinations of parts, hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings like characters of reference indicate like parts in the several views, and; Figure 1 is a longitudinal section of the device as applied to the throttle valve of an engine. Fig. 2 is a partial

front elevation of the device, certain parts being broken away and others shown in section. Fig. 3 is a detail longitudinal section of the device with what is termed a segmental liner in side elevation with the cover plate removed. Fig. 4 is a sectional view on the line A—A of Fig. 1. Fig. 5 is a perspective view of one of the segmental portions of the liner, the view being taken from the interior. Fig. 6 is a similar perspective view taken from the exterior. Fig. 7 is a view of one of the box-shaped lugs. Fig. 8 is a view of the headed bolt and collar. Fig. 9 is a perspective view of the clip for holding the segmental portions together.

It is to be understood that while in the present embodiment of the invention the same is shown as applied to a throttle valve stem or rod, it is equally applicable to any other valve stem or rod, such as piston rods or the like, and, further, while the stuffing-box in the present instance is shown as extending to the inside of the boiler the device is equally applicable to a stuffing-box located wholly on the exterior. With this in mind, the numeral 10 here indicates the back head of a boiler provided with an opening therethrough. Upon the inner side of the back head 10 is securely bolted a stuffing-box 12 and a valve stem or rod 13 passes through the stuffing-box and extends to the throttle valve, usually located in the dome to control the flow of steam to the dry pipe. This valve stem, in the present invention, is operated by the usual throttle lever 14, connected to the throttle link 15. In the device here shown the throttle valve stem 13 has mounted thereon a quadrant 16 which is arranged for engagement with the ordinary throttle lever latch. Surrounding said rod at the inner end of the stuffing-box there is preferably provided a gasket 17 of any of the ordinary packing materials. Carried in the stuffing-box is what is termed a split liner, the different portions being segmental in cross section. Each of these portions is indicated by the numeral 18. The segments 18 are each provided with an internal segmental rib 19 extending transversely thereof and arranged to closely embrace the rod. It is to be understood that while these ribs 19 closely embrace the rod, at no time should they come quite in contact therewith. Each of the segments 18 is further provided with an ear 20 extending laterally therefrom on that part of the segment which projects out

of the stuffing-box. These ears are each provided with a pair of rectangularly disposed arms 21 arranged in spaced relation. The edges of the segments 18 are cut away
 5 as indicated at 22 to form a tapering end to the segment, that is to say, the extreme end of each of the segments occupies less of the arc of a circle than the median portion. This taper takes place from a plane near the ribs
 10 and extends to the inner end. From a plane at or near the ribs the outer end of the exterior surface is beveled or turned down to a frusto-conical shape to permit the segments to rock in the stuffing-box. This is best shown
 15 in Fig. 1 and indicated by the numeral 23.

Lugs 24 are provided of an equal number to the segments 18. These lugs are recessed interiorly so that the lug is box-shaped, and they are so arranged as each to embrace
 20 one of the ears 20. Each of these lugs is provided with a recess 25 in the back wall thereof, and a pair of slots 26 are arranged to afford communication to said recess when the box-shaped lug 24 is in the position
 25 shown in Fig. 1. These slots 26 are provided with open ends as best seen in Fig. 7. Each of the lugs 24 is threaded to receive a set screw 27, which is arranged to contact with the ears embraced by the lugs and force the
 30 liner segment inward against the gasket 17. Each of the lugs 24 further carries a bolt 28 provided with a head 29. The bolt 28 lies between the arms 21, and the head 29 lies behind those arms. Each of these bolts
 35 carries a collar 30 arranged to lie in the recess 25 and held from movement therein. To accomplish this purpose the collar is preferably made square as is also the recess 25. This collar is threaded to form a nut so that the
 40 rotation of the bolt 28 will cause the same to move to or from the valve stem or rod. In order to rotate the bolt or nut there is provided a thumb nut 30', and it is found that a simple way of forming the nut 30' is to use a pair
 45 of standard hexagonal nuts jammed tightly together. A gland 31 of the usual form is held upon the valve stem 13 to project within the recesses of the segmental liner 18. This gland is provided with suitable lugs 32 hav-
 50 ing perforations therethrough to receive bolts 33, usually and preferably set bolts, whereon are mounted nuts 34 arranged to hold the gland in proper position. The box-shaped lugs 24 are also provided with ears 35 having
 55 perforations therethrough to receive bolts 36 whereon are mounted nuts 37 arranged to hold the box-shaped lugs 24 in proper position on the back head 10 of the boiler.

A packing 38 of any desired kind is held
 60 between the segments 18 and the valve stem or rod 13. This packing, under normal conditions, is loose on the rod 13 and may be slightly spaced therefrom. In any event no pressure is exerted on the packing in nor-
 65 mal condition and consequently no wear takes

place in the packing 38. This packing is held in position by the annular ribs 19 and by reason of the close proximity of these ribs to the rod 13, the packing is prevented from being blown out under conditions to be later
 70 explained. Other packing 39 is held between the inner end of the gland 31 and the segmental ribs 18. In the normal condition the packing 39 is firmly pressed against the rod 13 by the action of the bolt 28 upon the
 75 segmental liner portion 18, these bolts under the condition described forcing the outer end of the liner segment inward. The packing 39 is further held by the gland 31 and constitutes an ordinary means for preventing the
 80 passage of steam through the stuffing-box while the packing 38 previously described constitutes the emergency packing to prevent the escape of steam from the stuffing-box when the packing 39 is blown out or re-
 85 moved. In order to properly hold the segmental portions 18 of the liner together, each portion is recessed as shown at 40, and a rabbet 41 extends from the recessed portion to the edge of the segment. Clips 42 are ar-
 90 ranged to lie in the rabbets and are provided with inwardly bent legs 43, which penetrate the recesses 40. In order to prevent the packings working between the separated edges of the liner segments, there are pro-
 95 vided crescental cover plates 44 each attached to one of the segments as at 45 and overlapping the adjacent segment edge.

In the operation of the device let it be supposed that it is desired to remove and re-
 100 place the packing 39. The engineer or other attendant preferably begins by slightly loosening the bolt 27 so that the pressure thereof against the ear 20 will not be too great. He does not however loosen these
 105 bolts sufficiently to permit the segments 18 being blown out of the stuffing-box 12 or to have any great amount of movement therein, but just barely enough to prevent cut-
 110 ting or binding of the end of the bolt and the ear 20. He then turns the bolt 28 until the various segment ends are moved outward and the inner ends forced inward to bring the packing 38 into close engagement with the valve stem or rod 13. The emergency
 115 packing is thus brought into use and the steam is cut off at the inner end of the packing and prevented from reaching as far as the segmental ribs 19. When this is done the nuts
 120 34 on the outside of the lugs 32 of the gland 31 may be removed and the gland drawn out along the rod or valve stem 13. Access may then be had to the packing 39 and this may be removed with the usual tools made for
 125 that purpose. The box may then be repacked and the gland replaced. The bolts 28 are then turned in the opposite direction and force the other end of the segmental portions of the liner inward and thus frees the
 130 emergency packing 38 while at the same time

compressing the usual ordinary packing 29. The bolts 27 are then tightened and the segmental portions of the liner forced firmly against the gasket 19, and the parts are in
5 proper condition for ordinary service.

It will be noted that by the peculiar disposition of the packing 38 there is no tendency for that packing to wear and inasmuch as it is only in use a short time while the
10 other packing is being replaced, the emergency packing will last almost indefinitely. If, however, it becomes necessary to replace the emergency packing the same may be done when the engine is dead in the round-house
15 or the shop without waste of time on the road, and loss of coal and other expense.

In assembling or disassembling this device it is to be noted that the box-shaped lugs 24 may be readily placed in position or removed by simply removing the nut 37 from
20 the bolt 36. The lugs may then be lifted off as the slotted openings 26 will free the bolt 28 and permit this in a ready and expeditious manner.

Attention is called to the fact that the crescental liner plate 44 exercises a peculiar action on the packings, as well as prevents the same working between the edges of the liner segment. When the segments are open the
30 packing is held in substantially an oval or elliptical shape as seen in Fig. 4. By reason of the peculiar shape of the cover plates 44, when the edges of the segments are brought together the packing is held in substantially
35 a circular form and is thus forced with an even pressure at all points against the rod or valve stem.

It will now be obvious that this device may be used equally well on any rod or valve stem
40 where it is desired to prevent the escape of steam and where it may be convenient to re-pack the stuffing-box without stopping the engine or closing the valve.

It is obvious that minor changes may be made in the form and proportions of the device for use in the various adaptations thereof without departing from the material principles of the same. It is not therefore desired to confine the invention to the exact
50 form herein shown and described, but it is wished to include all such as properly come within the scope of the invention.

Having thus described the invention what is claimed as new, and desired to be secured
55 by Letters Patent, is:—

1. In a device of the kind described, a stuffing-box, a normally active packing, and a normally inactive emergency packing held therein.

60 2. In a device of the kind described, a stuffing-box, a rod passing therethrough, a packing normally held close on the rod, and a packing normally held free on the rod.

3. In a device of the kind described, a stuffing-box, a rod passing therethrough, a pack-

ing normally held close on the rod, a packing normally held free on the rod, and means to force the packing into close engagement with the rod.

4. In a device of the kind described, a stuffing-box, a rod passing therethrough, a packing normally held free on the rod, a second packing normally held in close contact with the rod, and means to force the first mentioned packing into close engagement with
75 the rod and permit the withdrawal of the last mentioned packing.

5. In a device of the kind described, a stuffing-box, a rod passing therethrough, a split liner spaced from the rod, the parts being arranged for rocking movement in the box, packing held at each end of the liner, and means to rock the liner part and bring the packing at either end into close engagement with the rod.
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6. In a device of the kind described, a stuffing-box, a rod passing therethrough, a split liner spaced from the rod at each end, the parts being arranged for rocking movement in the box and each provided with an annular rib on the interior arranged to closely embrace the rod, packing held between the liner and rod, means to rock the liner part and bring the packing at either end into engagement with the rod, and means to retain the
95 packing in the split liner.

7. In a device of the kind described, a stuffing-box, a rod passing therethrough, a split liner spaced from the rod at each end, the parts being arranged for rocking motion in
100 the box and each provided with an annular rib on the interior arranged to closely embrace the rod, and an ear projecting laterally from the part and held exterior of the box, packing held between the liner and rod, means to adjust the position of the liner longitudinally of the box, means to rock the liner part and bring the packing at either end into close engagement with the rod, and means to retain the packing in the split liner.
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8. In a device of the kind described, a stuffing-box, a rod passing therethrough, a gasket surrounding the rod at the inner end of the box, a segmentally split liner spaced from the rod at each end, the segments being arranged for rocking motion in the box and each provided with an annular rib on interior arranged to closely embrace the rod and an ear exterior of the rod having a bolt head receiving means, packing held between the
120 liner and rod on each side of the rib, a bolt held to contact with the ear and force the liner against the gasket, other bolts held to engage the bolt head engaging means on the ears, to rock the liner parts and bring the
125 packing at either end into engagement with the rod, and means to retain the packing in the split liner.

9. In a device of the kind described, a stuffing-box, a rod passing therethrough, a

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split segmental liner spaced from the rod at each end, the segments being arranged for rocking motion in the box, and each provided with an annular rib on the interior arranged to closely embrace the rod and an ear exterior of the box having a pair of bolt engaging arms thereon, packing held between the liner and rod on either side of said rib, a bolt arranged to contact with the ear and force the liner inward, other bolts held to engage the arm on the ear and rock the liner part and bring the packing at either end into close engagement with the rod, a gasket held between the liner and the inner end of the box, and a gland to retain the packing in the liner.

10. In a device of the kind described, a stuffing-box, a plate attached thereto, a rod extending through the stuffing-box, a gasket surrounding said rod at the inner end of the stuffing-box, a segmentally split liner for said stuffing-box arranged to bear against the gasket and comprising a plurality of parts each provided with a segmental rib extending transversely thereof and arranged to closely embrace the rod, and an ear projecting laterally therefrom exterior of the stuffing-box having a pair of rectangular disposed arms, and having the edges tapered from a plane near the ribs to the end and the outer end of the exterior surface beveled to permit the segments to rock in the stuffing box, packing held between the liner and rod, means to force the liner inward longitudinally of the box, means to rock the liner segments, and means to hold the packing within the liner.

11. In a device of the kind described, a stuffing box, a plate attached thereto, a rod extending through the stuffing-box, a gasket

surrounding said rod at the inner end of the stuffing box, a segmentally split liner for said stuffing-box arranged to bear against the gasket and comprising a plurality of parts each provided with a segmental rib extending transversely thereof and arranged to closely embrace the rod, and an ear projecting laterally therefrom exterior of the stuffing box having a pair of rectangularly disposed arms, and having the edges tapered from a plane near the ribs to the end and the outer end of the exterior surface beveled to permit the segments to rock in the stuffing-box, a box-shaped lug held to embrace each of said ears and provided with a recess and a pair of open ended slots leading therefrom in the back wall thereof, a set screw carried by each of the lugs to contact with the ear and force the liner inward, a headed adjusting bolt extending through the slots and recess and having the head in engagement with the arms on said ear, a collar nut on said bolt held from turning in said recess, a thumb nut fixed on said bolt, a gland arranged to extend within said liner, packing normally loose in said rod held in the liner end of said liner behind said ribs, other packing normally tight on said rod held between the gland and liner segment ribs, crescental cover plates attached to an edge of one of the liner segments and freely slidable on the adjacent edge of the adjacent segment, and means to hold said lugs and gland in position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN H. KEETER.

Witnesses:

C. E. S. COYLE,
JAS. M. WARNER.