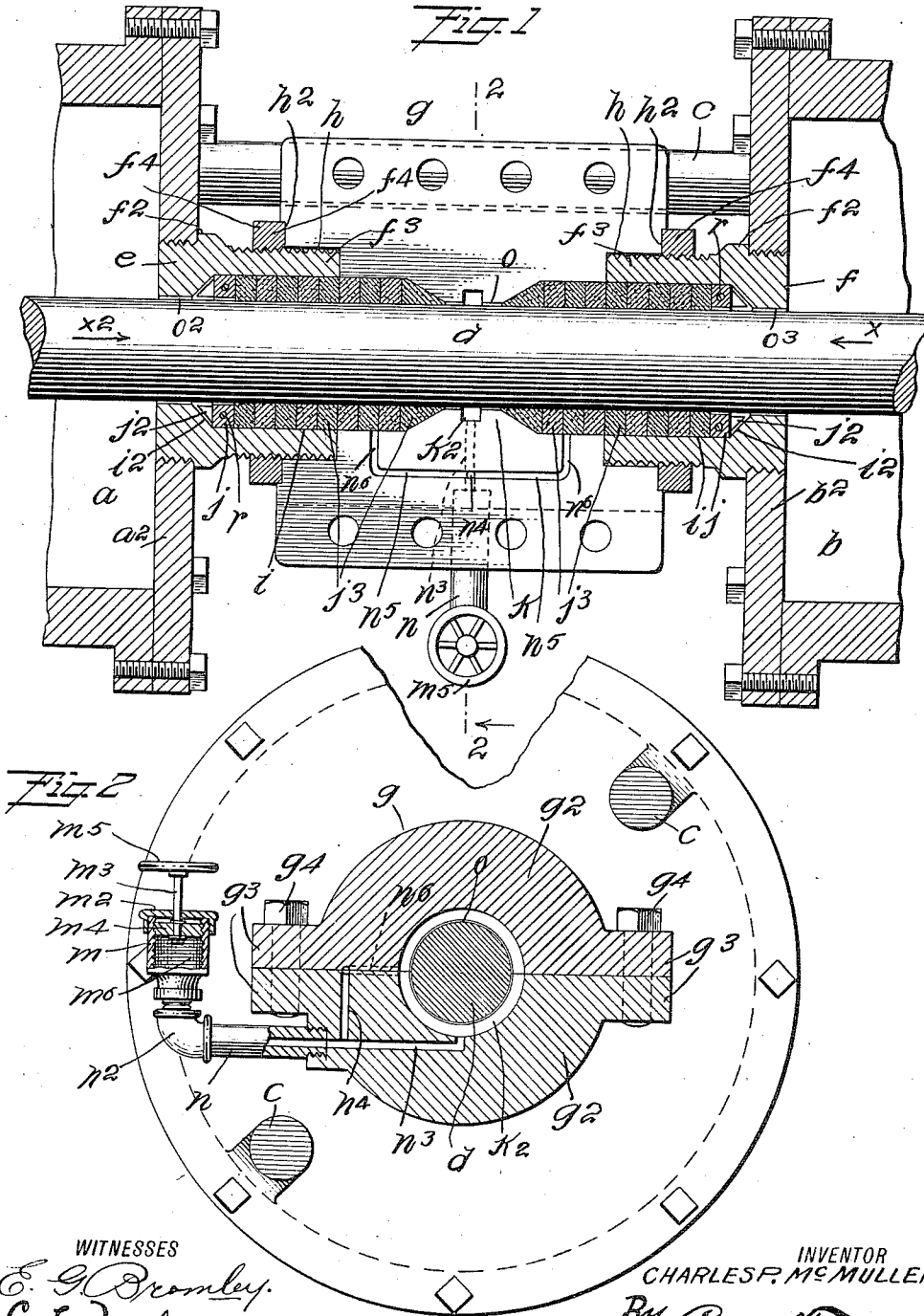


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APPLICATION FILED JAN. 23, 1911.

1,006,114.

Patented Oct. 17, 1911.  
2 SHEETS—SHEET 1.



WITNESSES  
E. G. Bromley.  
C. E. McCreany.

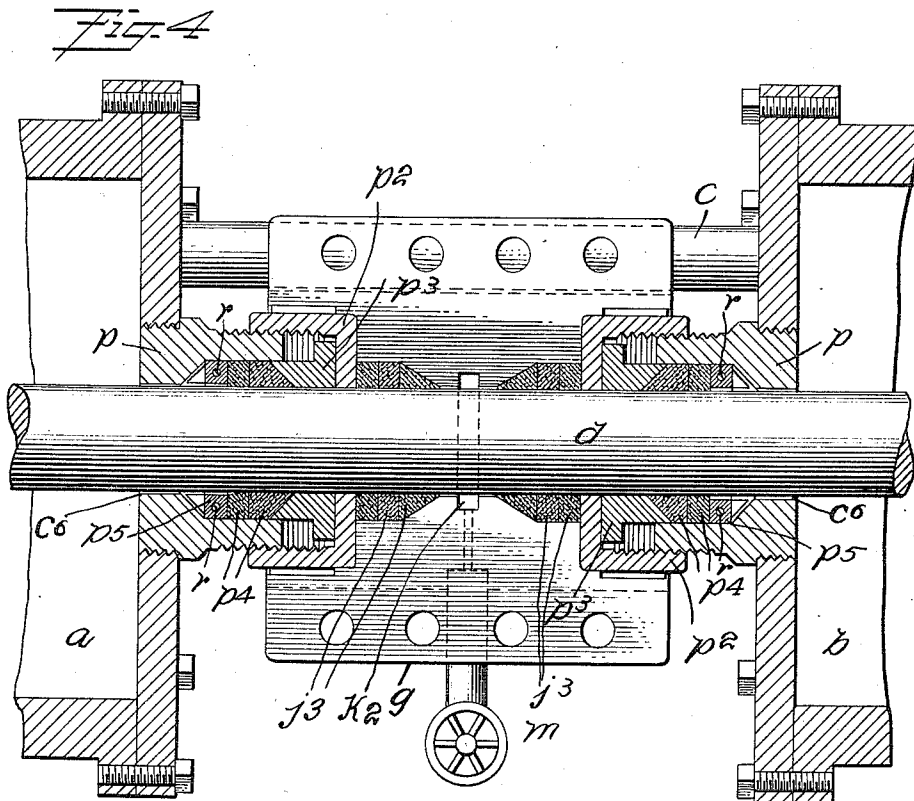
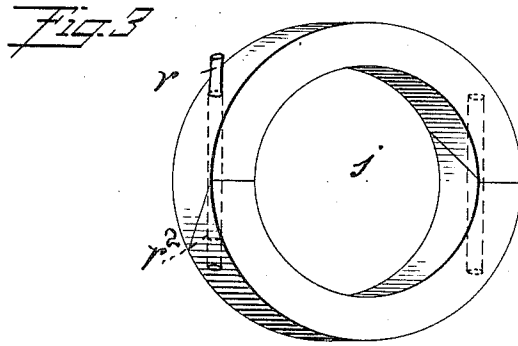
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# UNITED STATES PATENT OFFICE.

CHARLES P. McMULLEN, OF NEW YORK, N. Y.

## PISTON-ROD PACKING.

1,006,114.

Specification of Letters Patent.

Patented Oct. 17, 1911.

Application filed January 23, 1911. Serial No. 604,069.

*To all whom it may concern:*

Be it known that I, CHARLES P. McMULLEN, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Piston-Rod Packing, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to means for packing and lubricating piston rods and other rods and shafts, and the object thereof is to provide an improved construction of this class particularly designed for use in connection with the piston rod of the steam cylinder and air cylinders of an air brake apparatus used in connection with a locomotive and a steam driven air pump; a further object being to provide a construction of this class that can be easily installed for packing piston rods of the class specified, and which will prevent the same from being cut or injured by dust, sand, cinders or any other substance that may collect thereon; a further object being to provide improved means for lubricating packings of this class whereby grease, oil or other lubricating material such as black lead, flake graphite, or other granulated or finely divided lubricating substances, may be forced into the packing box so as to maintain the same, together with the packing therein thoroughly lubricated at all times; and with these and other objects in view the invention consists in a packing box and packing constructed and operated as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a longitudinal sectional view showing a part of the steam cylinder and a part of the air cylinder of an air brake apparatus used in connection with a locomotive and showing my improved packing box and packing in section; Fig. 2 a transverse section on the line 2—2 of Fig. 1; Fig. 3 a view of a packing ring which I employ; and, Fig. 4 a view similar to Fig. 1 but showing a modification.

In the drawing forming part of this specification, I have shown at *a* the air pressure

cylinder, and at *b* the steam cylinder of an air brake apparatus such as is usually employed in connection with locomotives and railway trains, and the cylinders *a* and *b* are shown as rigidly connected by rods *c* which, in practice, may be formed in connection with the heads *a*<sup>2</sup> and *b*<sup>2</sup> of said cylinders, or may be secured thereto in the usual or any desired manner. I have also shown at *d* the piston rod which reciprocates in the cylinders *a* and *b*, and this rod is provided at its opposite ends with pistons movable in said cylinders, said pistons being not shown.

In the practice of my invention, I provide two packing box members *e* and *f* which are secured in the heads *a*<sup>2</sup> and *b*<sup>2</sup> of the cylinders *a* and *b* and through which the rod *d* passes, and, in practice, these packing box members are screwed into the heads of the cylinders and are preferably provided with annular shoulders *f*<sup>2</sup> which abut against said heads, and the projecting ends *f*<sup>3</sup> thereof are threaded throughout their lengths and mounted thereon are set nuts *f*<sup>4</sup>. I also provide a packing box or case *g* divided centrally and longitudinally into two separate similar parts *g*<sup>2</sup>, as shown in Figs. 1 and 2, and said parts *g*<sup>2</sup> are provided at their opposite sides with projecting flanges *g*<sup>3</sup> through which are passed bolts or screws *g*<sup>4</sup>, whereby said parts are connected, and said packing box or case is mounted centrally on the rod *d* between the packing box members *e* and *f*, and the adjacent ends of said packing box members fit in annular recesses *h* formed in the ends of the box or case *g*, and the ends of said packing box or case are also provided with annular recesses *h*<sup>2</sup> in which the set nuts *f*<sup>4</sup> are partially countersunk when in operation, as clearly shown in Fig. 1.

Formed in the packing box members *e* and *f* and in the opposite end portions of the packing box or case *g* are annular packing chambers *i*, the end walls *i*<sup>2</sup> of which in the packing box members *f* are beveled outwardly, and the end walls *i*<sup>3</sup> of which in the packing box or case *g*, are beveled inwardly, as clearly shown in Fig. 1, and placed in the outer end portions of the packing chambers *i* are metallic packing rings *j*, which, in the construction shown, are provided on their outer sides with projections *j*<sup>2</sup> beveled to correspond with the beveled walls *i*<sup>2</sup> at the outer ends of the packing chambers *i*, and said packing chambers be-

tween the rings  $j$  and the inner ends thereof are filled in with annular packing rings  $j^3$  preferably composed of fibrous material saturated with a preservative compound, whereby said packing rings  $j$  are retained in operative condition at all times. My invention, however, is not limited to the exact construction of the packing rings  $j^3$ , or the material thereof, but I prefer that said packings or packing rings be made of fibrous material and that they be saturated with a preservative and lubricating substance.

The central part of the packing box or case  $g$  is provided with an inwardly set annular portion  $k$  in which is formed an annular lubricating chamber  $k^2$ , and, in practice, I connect with one side of said box or case, a lubricating cylinder  $m$  having a detachable cap  $m^2$  through which passes a rod  $m^3$  with the inner end of which is connected a piston  $m^4$ . The outer end of the rod  $m^3$  is provided with a handle ring or similar device  $m^5$ , and the inner wall of the cylinder  $m$  is threaded as shown at  $m^6$  and the piston  $m^4$  is correspondingly threaded, and by turning the rod  $m^3$  piston  $m^4$  may be forced inwardly into said cylinder or moved outwardly according to the direction in which said rod is turned. The cylinder  $m$  is connected with the box or case  $g$  by means of a pipe  $n$  having an elbow  $n^2$ , and formed in one side portion of the box or case  $g$  is a bore or passage  $n^3$  which communicates with the annular chamber  $k^2$ , and in the form of construction shown, a supplemental bore or passage  $n^4$  leads from the bore or passage  $n^3$  to the face of that part of the box or case with which the cylinder  $m$  is connected, and the adjacent faces of the parts  $g^2$  of the box or case  $g$  are provided with longitudinal passages  $n^5$  having inwardly directed members  $n^6$  which communicate with the packing chambers  $i$ , and by means of this construction lubricating material placed in the cylinder  $m$  may be forced into the annular chamber  $k^2$  in the packing box or case  $g$ , and into the packing chambers  $i$ , as will be readily understood. My invention, however, is not limited to the exact method of connecting the lubricating cylinder  $m$  with the box or case  $g$ , nor to the exact formation of the bores or passages  $n^3$ ,  $n^4$  and  $n^5$ , as herein shown and described, and various modifications of these features of the construction may be made as will be readily understood.

The central part of the box or case is slightly larger than the rod  $d$  whereby an annular space  $o$  is formed between said central part of the box or case and said rod, and through which lubricating material forced into the annular chamber  $k^2$  is free to pass into the packing chambers  $i$ , and between the packing members  $e$  and  $f$  and said rod  $d$  are similar annular spaces  $o^2$  and

$o^3$  through which air and steam may pass into the packing chambers  $i$  and operate on the packing rings  $j$  as hereinafter described. With this construction, when the rod  $d$  moves in the direction of the arrow  $w$  steam is forced through the annular space  $o^3$  into the corresponding packing chamber  $i$ , and this steam operates on the ring  $j$  in said chamber, and said ring is forced against the adjacent packing rings or material  $j^3$ , and said packing rings or material are compressed in said chamber, and when the said rod moves in the direction of the arrow  $w^2$  air is forced in through the annular space  $o^2$  and operates on the adjacent packing ring  $j$  in the corresponding packing chamber  $i$  and the packing rings or material  $j^3$  in said chamber are compressed, as will be readily understood, and this operation causes a continuous expansion and contraction of said packing rings or material in said chambers, and said packing rings or material being saturated with lubricating material at all times, are kept in proper operative condition, and a thorough and effective packing of the rod  $d$  is thus produced.

By means of the construction herein described, the said nuts  $f^4$  being adjustable into different positions on the packing box members  $e$ , it will be understood that the box or case  $g$  may be made of different lengths and may thus be adapted for use in connection with apparatus of this class in which the distance between the cylinders  $a$  and  $b$  varies, and while I have shown and described my improvement as applied particularly to air brake apparatus, it will be understood that the use of my invention is not limited to the use of this form of apparatus, and my improvement may also be applied to the packing and lubrication of piston rods and other shafts used in connection with other forms of construction, and may also be applied to rotary shafts, if desired. With this construction I can also force into the annular chamber  $k^2$  and the packing chambers  $i$ , a packing material such as finely divided fiber, granulated or finely divided graphite or other substances, which substances would be saturated with oil or grease, and in this way the packing rings or material  $j^3$  may be reinforced at any time and the packing chambers  $i$  may thus be filled to their capacity with packing material under pressure at all times without disturbing or disconnecting any of the parts of the apparatus.

One of the packing rings  $j$  is shown in Fig. 3 and these packing rings are divided or consist of two separate parts to facilitate the assembling thereof together with the other parts of the apparatus on the rod  $d$ , and the packing rings or members  $j^3$  may also be similarly formed.

It will also be seen that with the construc-

tion shown and described, the rod  $d$  is fully protected at all times between the cylinders  $a$  and  $b$  and no dust, grit, cinders or other material can collect thereon, and any kind  
 5 or class of lubricating material may be employed, and while I have shown and described the preferred form of my improvement, it will be understood that changes therein and modifications thereof may be  
 10 made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages, and in Fig. 4 I have shown my improvement applied to the cylinders of a well known  
 15 form of air brake apparatus involving a steam driven air pump and complete stuffing boxes connected with each of the cylinders, the air pump being not shown. In this form of construction, the cylinders  $a$   
 20 and  $b$  are each provided with a stuffing box consisting of parts  $p$  screwed into the heads of the cylinders, gland members  $p^2$  screwed onto the parts  $p$ , and followers  $p^3$  mounted in the gland members  $p^2$ ; and these packing  
 25 boxes, in the form of construction shown, are provided with fibrous packings  $p^4$  and a floating ring  $p^5$ , and between the parts  $p$  and the rod or shaft  $d$  are annular spaces  $c^0$  as in the construction shown in Fig. 1.

30 When my improvement is applied as shown in Fig. 4, the box or case  $g$ , only half of which is shown in said figure, is so formed, at its opposite ends, to receive the adjacent end portions of the stuffing boxes connected  
 35 with the cylinders  $a$  and  $b$ , and in this form of construction the box or case  $g$  is provided centrally with the annular chamber  $h^2$  and the lubricating cylinder  $m$  in communication with said annular chamber, as shown  
 40 in Figs. 1 and 2, and the box or case  $g$  is also provided in its opposite end portions with the packings  $j^3$  as in Fig. 1. It will be understood that the floating packing rings  $p^5$ , in this form of construction, are constructed the same as and operate the same  
 45 as the packing rings  $j$  shown in Figs. 1 and 3, but the packing rings  $p^5$  may or may not be composed of separate parts, and when said packing rings are composed of separate  
 50 parts, said parts may be connected by dowel pins  $r$  which are passed through holes  $r^2$  in the separate parts of said rings, said holes being shown in Figs. 1, 3 and 4.

With the form of construction shown in  
 55 Fig. 4, my invention is not limited to the particular style or construction of the packing boxes connected with the cylinders  $a$  and  $b$ , and said packing boxes may be of any desired, or of the usual construction, the  
 60 object of this figure and the description thereof being to illustrate and describe the method of applying my improved packing box and packing to forms of construction already in use, in which the cylinders  $a$  and  
 65  $b$  are provided with complete packing boxes

through which the rod or shaft  $d$  passes, and while I have shown and described a particular form of packing, including the floating rings  $j$ , and the packing rings or material  $j^3$  composed of fiber or similar material, it will be understood that my invention is not limited to this particular form and construction of packing rings or packing material.

Having fully described my invention, 75 what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with an apparatus involving two cylinders axially connected and having a piston rod or shaft movable  
 80 through the adjacent ends thereof, of a packing apparatus detachably mounted on and entirely inclosing said piston rod or shaft between said cylinders, said packing apparatus consisting of packing box members  
 85 connected with the heads of said cylinders and a packing box divided longitudinally into two separate similar parts, and the end portions of which inclose said packing box members.

2. The combination with an apparatus involving two cylinders axially connected and having a piston rod or shaft movable  
 90 through the adjacent ends thereof, of a packing apparatus detachably mounted on and entirely inclosing said piston rod or shaft  
 95 between said cylinders, said packing apparatus consisting of packing box members connected with the heads of said cylinders and a packing box divided longitudinally into  
 100 two separate similar parts, and the end portions of which inclose said packing box members, said packing box and packing box members being provided with packing chambers in which are placed packing material, and  
 105 said packing box being provided with a central annular lubricating chamber in communication with said packing chambers, and means for forcing lubricating material into said central annular lubricating chamber.

3. The combination with an apparatus of the class described, involving two cylinders mounted axially and the adjacent heads of which are rigidly connected, said heads being  
 110 also provided with packing box members, and a piston shaft movable through both of said packing box members and said heads, of a packing device detachably  
 115 mounted on and entirely inclosing said piston rod between said packing box members and also partially inclosing said packing box members, said packing device involving a casing divided centrally and longitudinally into two similar parts whereby said  
 120 packing device may be placed in position or removed without disconnecting said cylinders or otherwise interfering with the apparatus of which said cylinders form a part.

4. The combination with an apparatus of the class described, involving two cylinders 130

mounted axially and the adjacent heads of which are rigidly connected, said heads being also provided with packing box members, and a piston shaft movable through both of said packing box members and said heads, of a packing device detachably mounted on and entirely inclosing said piston rod between said packing box members and also partially inclosing said packing box members, said packing device involving a casing divided centrally and longitudinally into two similar parts whereby said packing device may be placed in position or removed without disconnecting said cylinders or otherwise interfering with the apparatus of which said cylinders form a part, said casing being provided centrally thereof with an annular chamber and at each side thereof with packing chambers in communication therewith, and means for forcing material into said annular chamber and said packing chambers.

5. The combination with an apparatus of the class described, involving two cylinders mounted axially and the adjacent heads of which are rigidly connected, said heads being also provided with packing box members, and a piston shaft movable through both of said packing box members and said heads, of a packing device detachably mounted on and entirely inclosing said piston rod between said packing box members and also partially inclosing said packing box members, said packing device involving a casing divided centrally and longitudinally into two similar parts whereby said packing device may be placed in position or removed without disconnecting said cylinders or otherwise interfering with the apparatus of which said cylinders form a part, said casing being provided centrally thereof with an annular chamber and at each side thereof with packing chambers in communication therewith, and means for forcing material into said annular chamber and said packing chambers, said packing chambers being in communication with corresponding packing chambers in said packing box members.

6. The combination with an apparatus of the class described, involving two cylinders mounted axially and the adjacent heads of

which are rigidly connected, said heads being also provided with packing box members, and a piston shaft movable through both of said packing box members and said heads, of a packing device detachably mounted on and entirely inclosing said piston rod between said packing box members and also partially inclosing said packing box members, said packing device involving a casing divided centrally and longitudinally into two similar parts whereby said device may be placed in position or removed without disconnecting said cylinders or otherwise interfering with the apparatus of which said cylinders form a part, said casing being provided centrally thereof with an annular chamber and at each side thereof with packing chambers in communication therewith, and means for forcing material into said annular chamber and said packing chambers, said packing chambers being in communication with corresponding packing chambers in said packing box members, and said packing box members being provided with set nuts which operate in connection with the opposite ends of said casing.

7. The combination with an apparatus of the class described, said apparatus involving two cylinders mounted axially, and the adjacent heads of which are rigidly connected, said heads being also provided with packing box members, and a piston shaft movable through both of said packing box members and said heads, of a packing device detachably mounted on and entirely inclosing said rod between said packing box members, said device involving a casing divided centrally and longitudinally into two similar parts whereby said packing device may be placed into position or removed without disconnecting said cylinders or otherwise interfering with the apparatus of which said cylinders form a part.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 21st day of January 1911.

CHARLES P. McMULLEN.

Witnesses:

C. E. MULREANY,  
E. G. BROMLEY.