No. 676,118. Patented June 11, 1901.

F. C. BILLINGS.

SAFETY VALVE.

(Application filed July 12, 1900.)

(No Model.)

Fig. 1.

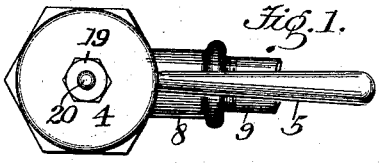

Fig. 2.

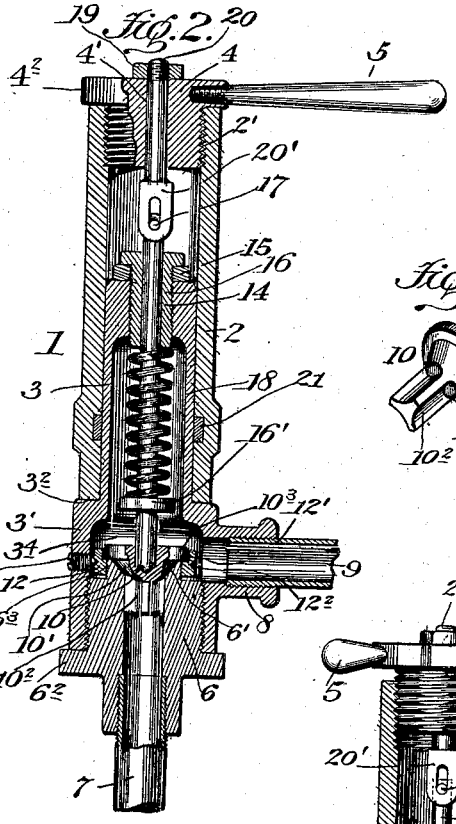

Fig. 3.

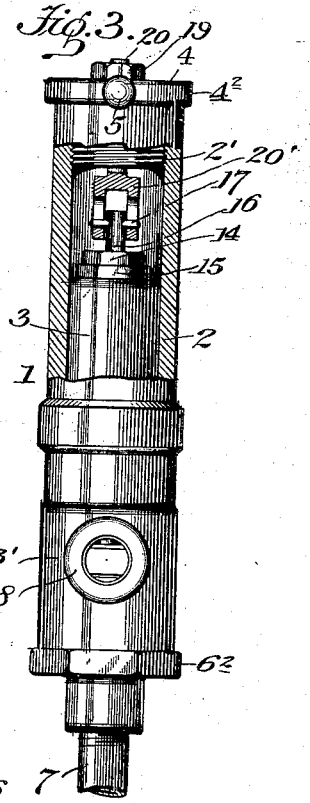

Fig. 5.

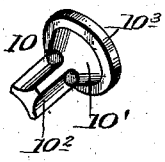

Fig. 4.

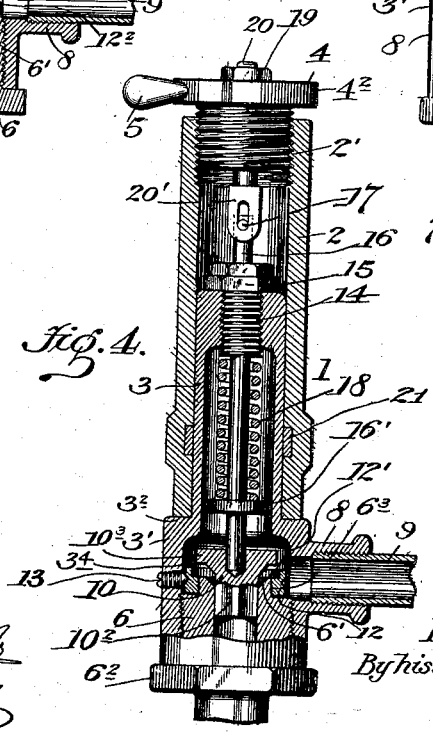

Fig. 6.

Witnesses:-

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UNITED STATES PATENT OFFICE.

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SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 676,118, dated June 11, 1901.

Application filed July 12, 1900. Serial No. 23,292. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC C. BILLINGS, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification.

My invention relates to safety-valves; and it has for its object a simple and compact construction of such a valve whereby it may be readily controlled by the engineer to relieve the pressure in the pressure-generator when desired.

In the accompanying drawings, in which like numerals designate like parts throughout the several views, Figure 1 is a plan view of my improved safety-valve. Fig. 2 is a longitudinal vertical section showing the valve closed. Fig. 3 is a side elevation, partially in section. Fig. 4 is a view similar to Fig. 2, showing the valve opened. Fig. 5 is a perspective view of the valve-plug. Fig. 6 is a perspective view of a ring for adjusting the valve-plug.

Referring to the drawings, the numeral 1 designates, in a general way, the barrel of my improved safety-valve, which consists of a sleeve 2, threaded near one end at 2′, and a tubular body portion 3, enlarged at one end at 3′ and having a shoulder 3^2, constituting a seat for the sleeve 2, which fits tightly over the reduced portion 3 and makes a tight joint with said shoulder 3^2 and a chamber 3^4. Threaded into the upper end of sleeve 2, or it may be connected in other ways, if desired, is a head 4, having a perforation 4′ and a flange 4^2, and to this flange is secured a handle 5 for manipulating the same, or said head may have a form suitable to be grasped by a wrench, as shown at 4^3, Fig. 1. At its lower end the enlarged part 3′ of the tubular body portion 3 is threaded to receive a perforated head 6, provided with a valve-seat 6′ at one end and with a flange 6^2 near its opposite end, which flange fits with a tight joint against the end of the enlarged portion 3′, and to this head is connected a pipe 7, leading to a pressure-generator of any desired kind. Threaded into an elbow 8, projecting from the enlarged and chambered part 3′, is a blow-off pipe 9, which constitutes the only outlet for the escape of pressure, and located in the valve-seat 6′ is a valve-plug 10, having a conical face 10′, a fluted stem 10^2, and a flanged head 10^3. At its upper end the head 6 is reduced and externally threaded at 6^3, and on this part 6^3 a ring 12, rabbeted at 12′ to receive the flange 10^3 of the valve-plug 10, is placed, as shown in Fig. 2, and this ring is locked against movement by a conically-pointed screw 13, inserted in the enlarged part 3^2 of the tubular body portion 3, said screw entering any one of a series of recesses 12^2 in the periphery of the ring.

Frequently it happens that the valves stick in their seats, and should this occur in the present construction by withdrawing the screw 13 and inserting a pritchel or other small tool through the opening vacated by the screw into one of the recesses 12^2 the ring 12 may be adjusted to free the valve from its seat and also by contact with the flange 10^3 of the valve to keep it from such close engagement with said seat that its efficiency will be affected.

Fitted in a threaded bore of the part 3 is a gland 14, secured by a jam-nut 15, and passing through this gland is a rod 16, inserted in a socket of the valve-plug 10 at its lower end and provided with a collar 16′, intermediate its length, and with a pin 17 at its upper end. Surrounding the rod 16 and bearing at one end against the collar 16′ thereof and at its opposite end against the gland 14 is a coiled spring 18, which normally keeps the valve-plug 10 tightly forced against its seat.

Passing through the perforation 4′ of head 4 and secured to said head by a nut 19 is a rod 20, having a slotted stirrup 20′ at its lower end, through which the pin 17 passes for coupling said rod to the rod 16, connected to the valve. To preserve a fluid-tight joint between the parts, a packing-ring 21 is set into the sleeve 2, as shown in Figs. 1 and 4.

My invention operates as follows: Under normal conditions the spring 18, through the devices described, holds the valve-plug 10 tightly against its seat; but should the pressure in the generator increase above the safety limit the valve will be forced from its seat against

the stress of the spring 18 to permit the excess of pressure to pass off through the pipe 9, and when this action of the valve takes place the pin 17 travels in the slots of the stirrup 20'. Should the engineer be suspicious that the pressure is exceeding a safe limit and that the valve fails to act, by grasping the handle 5 and turning the head 4 he can compress the spring 18 and relieve the valve-plug of its pressure, thereby permitting the steam to blow off through pipe 9 until normal pressure, as denoted by the pressure-gage, is reëstablished, and then by reversing the movement of the screw-threaded head the spring will be released and allowed to press the valve-plug to its seat.

Changes may be made in many of the parts, and the invention is not limited to the precise details shown and described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a safety-valve, the combination with the barrel, of a valve-plug, means for holding the valve-plug to its seat, and a device mounted for turning movement on the barrel and operatively connected with said valve-holding means to relieve the pressure of the same on the valve-plug.

2. In a safety-valve, the combination with a tubular body portion, of a sleeve upon said body portion, said sleeve being screw-threaded, a head in threaded engagement with said sleeve, a valve-plug, a valve-seat in the tubular body portion and means to hold said valve-plug to its seat, said means being operatively connected with said head whereby the pressure of said means upon the valve-plug is relieved by turning said head.

3. In a safety-valve, the combination, with a tubular body portion having a reduced stem, of a head connected to said tubular body portion and having a valve-seat; a valve-plug fitting the valve-seat; a sleeve fitted over the stem of the body portion and having a screw-thread; a threaded head connected with said sleeve; and means controlled by said head to hold the valve-plug to its seat.

4. In a safety-valve, the combination, with a tubular body portion having a reduced stem; a head having a valve-seat movably connected with said tubular body portion; a pressure-pipe communicating with a perforation in said head; a valve-plug located in the valve-seat; a rod having a collar and engaging the valve-plug; a spring located between said collar and the end of the reduced portion of the tubular body portion; a sleeve surrounding said reduced portion; a head movably mounted in the sleeve; and means connecting said head with said rod.

5. In a safety-valve, the combination, with a barrel, of heads at each end of said barrel, one of said heads communicating with a pressure-generator; a valve-seat in said last-named head; a valve-plug having a fluted stem and a flanged head seated in the valve-seat; a rod engaging said valve-plug; a spring for normally keeping the valve-plug closed; and means for withdrawing said rod against the action of the spring.

6. In a safety-valve, the combination, with a tubular body portion having a reduced stem, of a head fitted in said body portion and carrying a valve-seat; a valve-plug having a conical surface fitted in said valve-seat; a rod engaging the valve-plug and having a collar; a gland threaded into the reduced stem of the body portion; a coiled spring between said gland and the collar of the rod; a sleeve surrounding the reduced stem of the tubular body portion; a head threaded to said sleeve; and means for connecting said head with said rod.

7. In a safety-valve, the combination, with a tubular body portion having a stem of reduced diameter, of a head threaded upon said body portion and carrying a valve-seat; a flanged valve-plug fitting in said valve-seat; a rabbeted ring surrounding said valve-plug and secured to the head; a rod having a collar; a gland threaded into the upper end of the tubular body portion; a coiled spring located between said gland and the collar on the rod; a sleeve surrounding the reduced part of the tubular body portion; a head threaded to said sleeve; and a rod carried by the head and having a slotted stirrup connected with the first-named rod.

8. In a safety-valve, the combination, with a tubular body portion having a reduced stem, of a head threaded into said tubular body portion and having a valve-seat; a valve-plug having a flanged head, a conical face and a fluted stem; a ring threaded upon said head; a rod engaging the valve-plug and having a collar; a coiled spring surrounding the rod and bearing against the collar at one end; a gland fitted into the reduced part of the body portion and against which the other extremity of the coiled spring bears; a sleeve surrounding the reduced stem of the tubular body portion and having an internal screw-thread at its upper end; a head having an external screw-thread fitted in said sleeve; a rod having a slotted stirrup connected to said head; and a pin connecting said rod and the first-named rod.

9. In a safety-valve, the combination with a barrel, a valve-seat and a valve-plug, of a rod, and spring for holding said valve-plug to its seat, a slotted rod engaging the first-named rod, and a threaded head engaging said slotted rod.

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