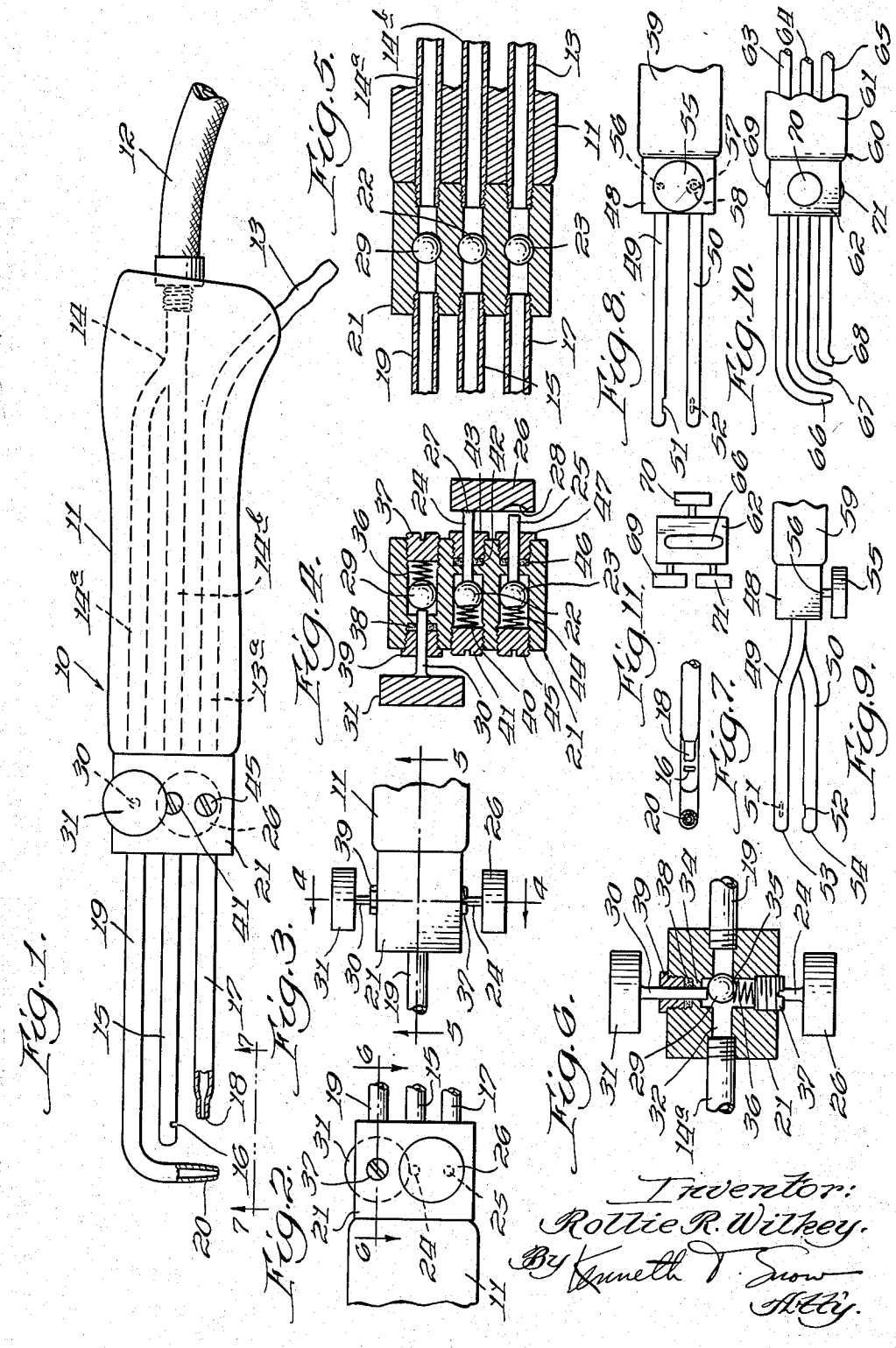
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SPOT REMOVING GUN

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SPOT REMOVING GUN

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5 Claims. (Cl. 299—144)

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This invention relates to a new and improved spot removing gun for fabric articles or the like.

The fabric and clothes cleaning industry have experimented with numerous devices and fluids to effect removal of spots. It has been found that certain spots are removable by one fluid and still other spots will become permanently fixed by that same cleaning fluid. Further it is known that cleaning fluids leave rings unless the excess fluid is immediately removed by rubbing or other drying means.

It is therefore a principal object of the present invention to provide a spot removing device effective regardless of the type of spot.

An important object of this invention is the provision of means in a spot removing gun for fabrics for spreading in minute quantities moisture particles under pressure to the area of the spot and simultaneously drying the same area with hot air under pressure.

Another important object of this invention is to supply a combination hot air and moisture dispensing gun for removal of fabric spots.

A further important object of this invention is to provide a single operating member for a hot air valve and a moisture valve and incorporating therein a time delay means to insure the initial dispensing of the hot air prior to the dispensing of moisture and also to insure continued operation of the hot air after the moisture valve is closed.

Still another object is the provision of means in a spot removing gun for dispensing a separate hot air under pressure to effect complete drying of the fabric at the area of the spot to avoid the formation of rings.

Another and still further important object is to provide a nozzle for spot removing guns in which a hot air under pressure is utilized to spread a fine spray of moisture under pressure to the area of a fabric containing the spot.

Another important object of this invention is to supply a dual nozzle for a spot removing gun in which the nozzle openings are longitudinal narrow slots and the hot air nozzle in the bottom is arranged to spread the offset and side dispensing moisture.

Other and further important objects of this invention will become apparent from the disclosures in the following specification and accompanying drawing.

In the drawing:

Figure 1 is a side elevational view of a spot removing gun of this invention.

Figure 2 is a partial view of the rear side of the gun of Figure 1.

Figure 3 is a partial top plan view of the gun of Figures 1 and 2.

Figure 4 is a sectional view taken along the line 4—4 of Figure 3.

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Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a sectional view taken on the line 6—6 of Figure 2.

Figure 7 is a view of the underside of the nozzle of the gun as shown in Figure 1 and viewed along the line 7—7 of Figure 1.

Figure 8 is a side elevational view of a modified spot removing gun with portions thereof broken away.

Figure 9 is a top plan view of the gun of Figure 8.

Figure 10 is a side elevational view of a still further modified form of spot removing gun and having portions thereof broken away.

Figure 11 is an end elevational view of the gun of Figure 10 as viewed along the line 11—11 of Figure 10.

As shown in the drawings:

The reference numeral 10 indicates generally a spot removing gun for use on clothing or fabrics or the like. The gun 10 has a handle 11 and a source of hot air under pressure 12. The hot air under pressure is preferably supplied through a flexible tubing so that the gun may be portable. The gun 10 also contains a source of moisture under pressure 13 wherein there is shown a fitting for a rubber hose or other flexible hose attachment. The moisture under pressure entering through the fitting 13 passes forwardly to the nozzle through a tubular passage designated by the numeral 13*a*.

In connection with the hot air under pressure there is shown a fork 14 for dividing the hot air source into two passages, an upper tubular passage 14*a* and a lower tubular passage 14*b*.

As shown in Figure 1 the nozzle part of the gun includes several tubular members. The center of these nozzle tubes designated by the numeral 15 is for the discharge of a stream of hot air from the supply passage 14*b*. This discharge tube 15 includes an arcuately shaped slot constituting a nozzle 16. The nozzle slot 16 is located in the under side of the tube 15 just short of the outer end of the closed outer end of the tube. The lower of the several nozzle tubes is designated by the numeral 17 and is for the purpose of discharging moisture under pressure from the supply tube 13*a*. As discussed in this application it should be understood that the moisture may be either water in its regular form or steam. In the tube 17 the nozzle is shown at 18 and is in the outer end of the tube in axial alignment therewith so that the moisture under pressure is delivered axially out of the tube. An examination of the drawings shows that the arcuate shaped slot 16 is disposed immediately above and just slightly outwardly of the end of the nozzle 18 in the tube 17, so that the air under pressure discharging through the arcuate slot 16 from

the tube 15 will depend and impinge downwardly onto the moisture under pressure being discharged through the nozzle 18 and the flow of moisture under pressure will be deflected downwardly by the hot air under pressure so that the moisture under pressure is spread in a fan shape and reduced to very fine particles as it is directed to a spot on a fabric.

As further shown in Figure 1 the top nozzle tube 19 is a continuation of the hot air passage 14a and has its outer end turned downwardly as shown at 20 forming a nozzle wherein the hot air under pressure is directed downwardly in the same manner as the hot air and moisture from the tubes 15 and 17. However, the nozzle 20 of the tube 19 is spaced outwardly beyond the end of the discharge of the tubes 15 and 17 and does not coact immediately with either of these streams. The hot air under pressure discharging from the nozzle 20 is primarily for the purpose of effecting a drying of the fabric area where the spot has been previously removed by the hot air and moisture under pressure. As best shown in Figure 7 there is shown the underside of the three-pronged nozzle of the gun as shown in Figure 1. The relative discharging positions of the nozzles 16, 18 and 20 is adequately shown, and the enlarged arcuate slot 16 is directly above the discharge of the nozzle 18 to effect a spreading of and a downward deflecting of the moisture from the tube 17.

As best shown in Figures 1 to 6 inclusive a valve housing 21 is disposed intermediate the handle 11 and the three discharge tubes 15, 17 and 19. The valve housing 21 contains means, hereafter to be described, to vary the amount and time at which the nozzle tubes shall be directly connected to the hot air and moisture under pressure coming from the sources 12 and 13. In other words, there is provided a valve means intermediate the tubular passages 14a and 19, and 14b and 15, and 13a and 17. Each of these valve means is positioned within the valve housing 21 and is provided with separate control means so that an operator of the spot removing gun may selectively discharge hot air and/or moisture at his pleasure.

As shown in Figures 4 and 5 a ball valve 22 controls the passage of hot air under pressure from the tube 14b to the tube 15, which as previously stated forms a part of the nozzle of the gun 10. A ball valve 23 similarly performs the function of controlling the passage of moisture under pressure from the tube 13a to the tube 17. A valve stem or rod 24 is mounted for lateral sliding movement in the valve housing 21 and is for the purpose of rocking the ball valve 22 from its valve seat to cause an opening between the passages 14b and 15. Similarly a valve stem or rod 25 is mounted in the valve housing 21 for lateral sliding movement to rock the ball valve 23 to open the passage between the moisture tubes 13a and 17.

As shown in Figure 4 a single actuator button or knob 26 is adapted to control the lateral sliding movement of the stems 24 and 25. The stem 24 is fixedly attached to the valve button 26 by means of welding or the like 27. A depression or hollow 28 in the under or inner side of the valve button 26 is for the purpose of obtaining a lost motion for contacting of the stem 25. In other words, inward movement of the valve button 26 by an operator will immediately and initially cause a rocking of the ball 22 from its valve seat and thus a simultaneous opening of the air under pressure through the arcuate or fan shaped nozzle 16. However, the actuation of the valve stem 25 to cause rocking of the ball valve 23 is delayed for an amount of time equal to the depth of the depression 28. As soon as the movement of the button 26 has progressed to a point where the innermost point of the depression contacts the outer end of the stem 25, thereafter continued inward movement will cause a rocking of the ball valve 23 to permit discharge of moisture through the nozzle 18. The purpose of delaying action of the moisture valve is two-fold. First, the delay permits the air under pressure to get a good start and when the moisture is dispensed it insures that the moisture will be immediately directed to the spot area. Second, the delay permits a final cleanout by suction of the tube 17 after the moisture ball valve 23 is back in its seated position. It will of course be realized that in addition to the air commencing operation before the moisture the air will continue to be discharged to a period of time subsequent to the stopping of operation of the moisture discharge and thus as the hot air under pressure being discharged from the fan shaped nozzle 16 it pulls with it any remaining moisture that may be lodged in the tube 17 from the valve housing 21 to the nozzle 18. This, of course, insures a clean moisture tube when the gun is again put into use.

As best shown in Figures 4, 5 and 6 a third ball valve 29 is employed in the valve housing 21 for the purpose of controlling the flow of hot air under pressure from the tube 14a to the discharge nozzle tube 19. A valve stem 30, similar to the valve stems 24 and 25, is arranged and constructed to rock the ball 29 from its valve seat. An integral operating button 31 is shown fixed to the outer end of the stem 30. As shown in Figure 5 there is a longitudinal passage of relatively small diameter designated by the numeral 32 within the valve housing 21 for joining the tubes 14a and 19 which threadedly engage the block of the valve housing 21. A lateral or transverse passage 33 of somewhat larger diameter is shown as crossing the valve housing 21 and intersecting the passage 32. A restricted shoulder at 34 is located within the lateral passage 33. A seat 35 formed for the ball valve 29 at the intersection of the passages 32 and 33 is disposed within the longitudinally extending passage 32. A spring 36 is adapted to urge the ball 29 back toward a valve seat 35 after the ball has been rocked from its seat by the stem 30. As will be evident the hot air under pressure normally holds the ball on the seat 35 in the same manner as a check valve. A screw plug 37 holds the spring 36 in engaging position with the ball valve 29. On the other side of the ball 29 a stem packing 38 surrounds the stem or rod 30 and a packing bushing 39 threadedly engaged with the housing 21 holds the packing snugly in engagement with the operating rod or stem and prevents passage of fluid laterally outwardly from the valve housing 21. As shown, the packing 38 rests on the shoulder 34 on its one side and is maintained in such position by the abutting engagement of the packing bushing 39.

Similarly to the operation of the valve means for the control of the passage of fluid from the tube 14a to the tube 19 the other ball valves 22 and 23 have similar control means. As shown in Figure 4 a spring 40 holds the ball valve 22 in normal seat engaging position and a plug 41, screwed into the housing 21, holds the spring in

operating position. A packing 42 surrounds the valve stem or rod 24 and a bushing 43 maintains the packing in and around the stem 24 by reason of a bushing 43. Similarly a spring 44 is adapted to hold the ball 23 in seat engaging position and the spring 44 is held in position by screw plug 45 similar to the plugs 37 and 41. A packing 46 is disposed about the valve stem or rod 25 and a bushing 47 holds the packing in stem engaging position.

In operation the gun 10 is held in an operator's hand and placed so that the discharging portions of the nozzle as shown in Figures 1 and 7 will be directed downwardly onto a spot on a piece of cloth or fabric. The moisture either in the form of steam or water is dispensed from the tube 17 and is sprayed onto the spot area in finely divided particles under extremely high pressures by reason of the pressure within the moisture itself and also that pressure obtained from the hot air under pressure discharging from the nozzle 16. The operator aims the nozzle discharge means at the spot area and then depresses the operating button 26 which immediately causes a lateral shifting movement of the stem 24 and a rocking of the ball 22 from its seat in the longitudinal passage in the valve housing 21. As the ball 22 is rocked from its seat, hot air under pressure is permitted passage through the valve housing 21 so that it immediately discharges through the fan shaped nozzle 16 and is directed to the spot area. Continued and further depression of the operating button 26 by the operator eventually causes a lateral shifting movement of the valve stem 25 and a rocking of the ball 23 from its valve seat in the longitudinal passage in the valve housing 21. The rocking of this ball valve 23 opens the passage from the tube 13a to the tube 17 and thus permits the discharge of moisture under pressure from the nozzle end 18. It is this combination of elements namely the moisture under pressure and the hot air under pressure and the spreading of the moisture into finely divided particles by the hot air over the spot area that causes removal of spots in garments or other fabrics or the like. This procedure is continued and the valve button 26 continues to be depressed until the spot is entirely removed whereupon the operator relieves his manual exertion on the button 26 thus initially causing a stopping of the flow of moisture under pressure and finally a stopping of the flow of hot air under pressure. Thereafter, the operator depresses the button 31 which causes a lateral movement of the valve stem 30 and a rocking of the ball valve 29 to permit discharge of hot air under pressure from the nozzle 20 of the tube 19. The impinging of the hot air under pressure from the nozzle 20 onto the surface of the fabric which has just had a spot removed with a combination of moisture and air is for the purpose of effecting a quick drying of that area to insure the absence of rings or moisture spots which could and would result if the area were not to be dried immediately. With the aid of this auxiliary hot air under pressure the absence of rings is a certainty. It should of course be understood that the nozzle 20 and the tube 19 are merely auxiliary to the normal operation of the gun and that the operator, after he becomes adept at controlling the single actuator button 26 may accomplish the same result of directing solely hot air under pressure to the spot area after the spot has been removed merely by controlling the amount of depression of this actuator button 26. In other words the air may be dispensed through the fan-shaped nozzle 16 without the passage of any moisture through the nozzle 18 by holding the valve button 26 so that the ball 22 is rocked from its seat, but in such a position that the stem 25 is not moved and the ball 23 remains seated.

As best shown in Figures 8 and 9 the modified valve housing 48 is provided with a tube 49 carrying hot air under pressure and a tube 50 carrying moisture under pressure to the nozzle ends thereof. The tube 49 is provided with a longitudinally extending slot 51 in the bottom thereof and substantially at the outermost end. The tube 49 is a closed end tube and thus the hot air under pressure is discharged through the longitudinally extending slot 51. Similarly the tube 50 is a closed end tube and is provided with a longitudinally extending slot 52 in the inner side of the tube thus constituting a nozzle which would discharge moisture or steam under pressure to one side thereof. The outer end of the tube 49 is designated by the numeral 53 and similarly the outer end of the tube 50 is designated as 54. The outer ends 53 and 54 are offset as shown in Figure 9 so that the air stream coming from the longitudinally extending bottom slot 51 can spread the moisture dispensed from the side discharging slot 52 and direct that moisture downwardly toward a spot on a fabric or the like. A single valve operator button 55, comparable to the button 26, is adapted to cause depression of a valve stem 56 for the air tube 49 and a valve stem 57 for the moisture tube 50. A depression 58 in the under side of the button 55 is for the purpose of providing a lost motion operation on the stem 57. Actuation of the moisture valve is thus delayed until such time as the air under pressure is initially discharged from the longitudinally extending bottom slot 51 in the tube 49 in the same manner as the delay of the operation of the moisture from the nozzle 18. A gun handle 59 is shown for the device of Figures 8 and 9. The handle 59 is gripped by the operator in a manner similar to the gripping of the handle 11 in the gun of Figure 1 and the operator may manually control operation of the valve button 55 in any manner he so desires to effect either the discharge of hot air under pressure alone or a combination of the hot air and moisture. The spot removing gun as shown in Figures 8 and 9 thus operates in the same manner as the gun of Figure 1 to effect removal of spots.

A further modified gun is shown at 60 in Figures 10 and 11. A handle 61 is provided for holding of the gun and a valve housing 62 is disposed midway between the handle 60 and the discharge nozzle tubes. A supply of hot air under pressure enters the valve housing 62 through a tube 63, a supply of steam under pressure enters the valve housing 62 through the tube 64, and a supply of water under pressure enters the valve housing 62 from the tube 65. On the other side of the valve housing a downwardly curved air nozzle 66 is provided on the top thereof and centrally of the valve housing is a downwardly curved steam nozzle 67 and the lowermost tube comprises a downwardly curved water nozzle 68. Individual valve buttons are provided for each of the hot air, steam, and water nozzles as shown at 69, 70, and 71 respectively. The valve buttons 69 and 71 are provided on one side of the valve housing 62 and the valve button 70 is on the opposite side of the valve housing 62, so that the valves are easily accessible to the fingers of the operator gripping

the gun handle 61. In this modified form of spot removing gun the operator may at his election discharge hot air, steam, and water all together or individually as desired. In some instances it is desired to impinge a stream of steam onto the spot area for the purpose of effecting the removal of a spot, whereas in other instances it might be desired to impinge a finely divided stream of cold water under pressure to the spot area and further it might be desired to propel a combination of hot air, steam and water to the spot area. In any event, the operator may discharge the desired elements to the spot area and after the spot is removed the air under pressure is preferably applied to the area to effect a quick and thorough drying of the steam or moisture which may have been deposited onto the fabric in effecting the removal of the spot.

It will be understood from the foregoing specification that the spot removing guns of Figures 1, 8 and 10 are operative to effect removal of spots from clothing or fabrics and are all easily manually operable by an operator holding the gun in his hand and controlling the valves for the several elements by his fingers. Removal of fabric spots requires an impinging of finely divided particles of moisture or steam under pressure to the spot area whether the spot be grease or dirt or other foreign substance. Thus the operator may first try a plain water and then attempt a removal of the spot by steam or a combination of hot air and steam or hot air and water, or all three, hot air, steam and water.

I am aware that various details of construction may be varied throughout a wide range without departing from the principles disclosed herein and I therefore do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claims.

What is claimed is:

1. A spot removing gun for fabrics comprising a source of hot air under pressure, a discharge nozzle for said hot air under pressure, valve means for controlling the discharge of said hot air under pressure through said hot air discharge nozzle, a source of moisture under pressure, a discharge nozzle for said moisture under pressure, valve means for controlling the discharge of said moisture under pressure through said moisture discharge nozzle, said hot air nozzle positioned above the moisture nozzle and arranged and constructed to spread the moisture as it is discharged, a single operating mechanism associated with both the air and moisture valves and said operating mechanism arranged and constructed to initially open the air valve and to initially close the moisture valve.

2. A device as set forth in claim 1 in which the valve operating mechanism includes a valve actuating stem for each of said air and moisture valves and disposed in side by side parallel relation, and a manually operable push button attached to the stem of said air valve, said button having a depression in the underside at the position of engagement by the moisture valve stem, whereby when the button is manually moved the button depression supplies a lost motion movement to delay operation of the moisture valve.

3. A device as set forth in claim 2 in which a second source of hot air under pressure is provided, a nozzle for said second source of hot air under pressure located adjacent said first two nozzles, and a valve means for said second source of hot air under pressure, whereby the hot air may be discharged separately from said combination air and moisture to effect drying of the fabric having a spot removed.

4. A spot removing gun for fabrics comprising a source of hot air under pressure, a discharge nozzle for said hot air under pressure, valve means for controlling the discharge of said hot air under pressure through said hot air discharge nozzle, a source of moisture under pressure, a discharge nozzle for said moisture under pressure, valve means for controlling the discharge of said moisture under pressure through said moisture discharge nozzle, said hot air nozzle positioned above the moisture nozzle and arranged and constructed to spread the moisture as it is discharged, said hot air nozzle comprising a closed ended tube having an arcuate slot spaced from the end thereof and the moisture nozzle comprising a tube having an open end.

5. A spot removing gun for fabrics comprising a source of hot air under pressure, a discharge nozzle for said hot air under pressure, valve means for controlling the discharge of said hot air under pressure through said hot air discharge nozzle, a source of moisture under pressure, a discharge nozzle for said moisture under pressure, valve means for controlling the discharge of said moisture under pressure through said moisture discharge nozzle, said hot air nozzle positioned above the moisture nozzle and arranged and constructed to spread the moisture as it is discharged, said air nozzle comprising a closed ended tube having an elongated slot in the bottom spaced from the end thereof, and the moisture nozzle comprising a tube offset from vertical alignment with the air nozzle tube and having an elongated slot in the side thereof toward a plane depending vertically from the air tube.

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