

Oct. 10, 1967

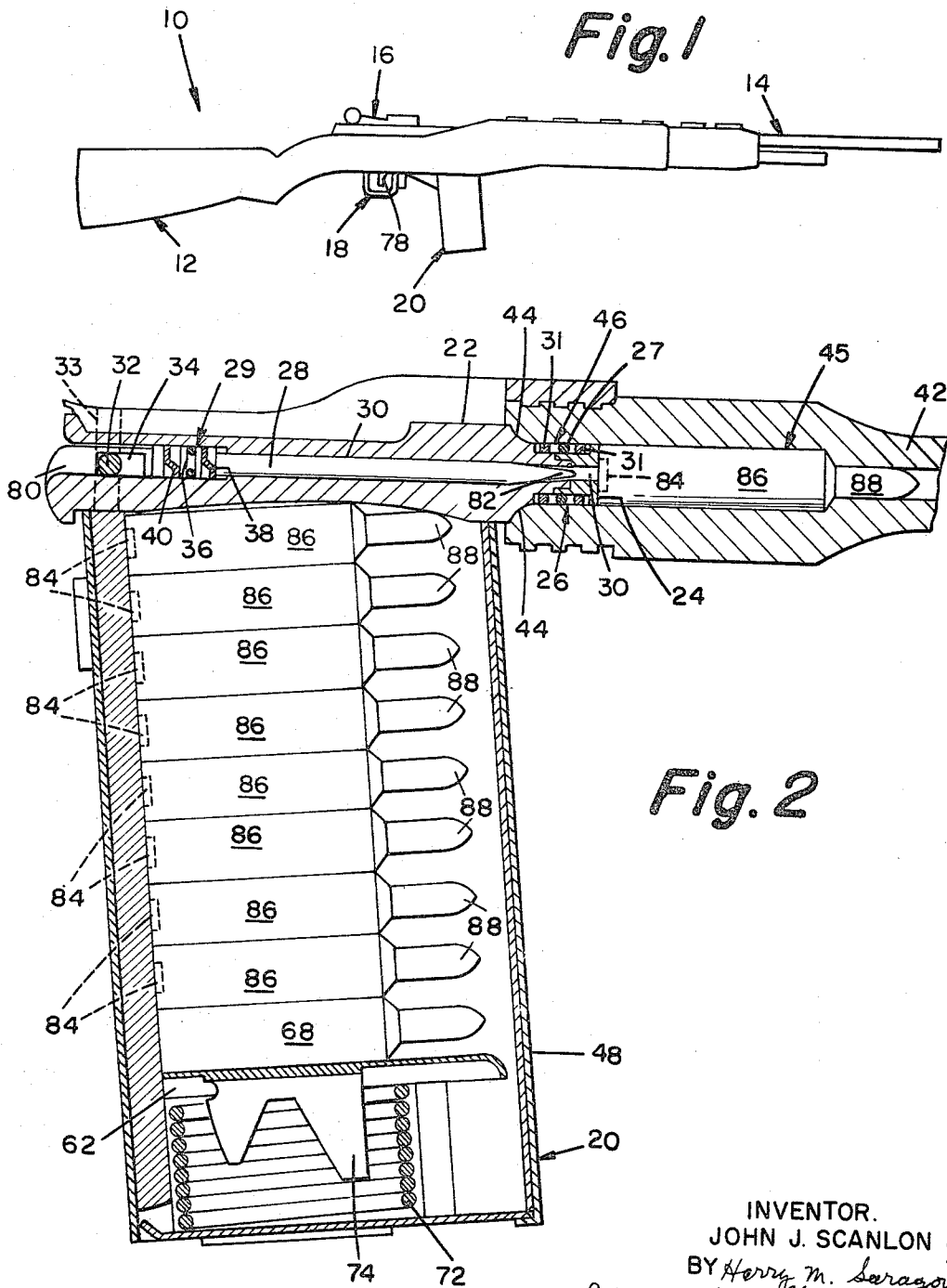
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3,345,770

AUTOMATIC RIFLE FOR FIRING CASELESS AMMUNITION

Filed Oct. 7, 1966

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

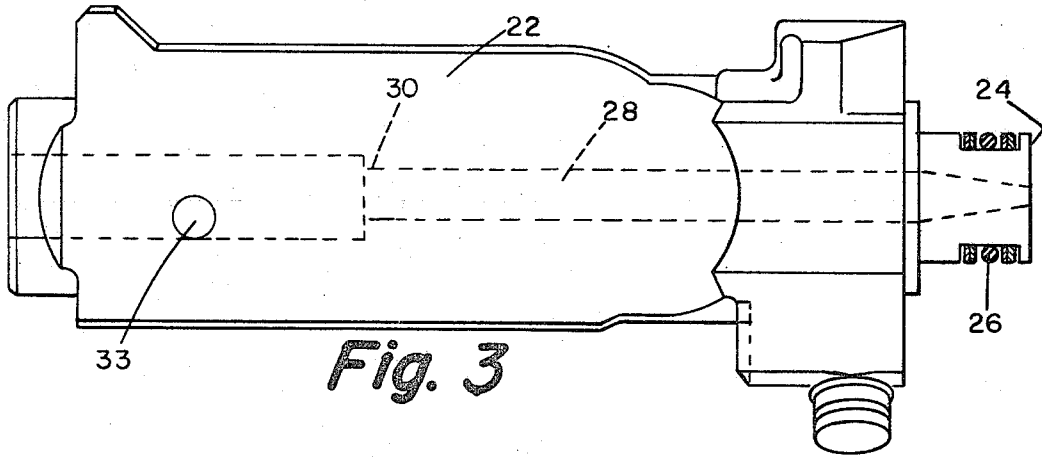


Fig. 3

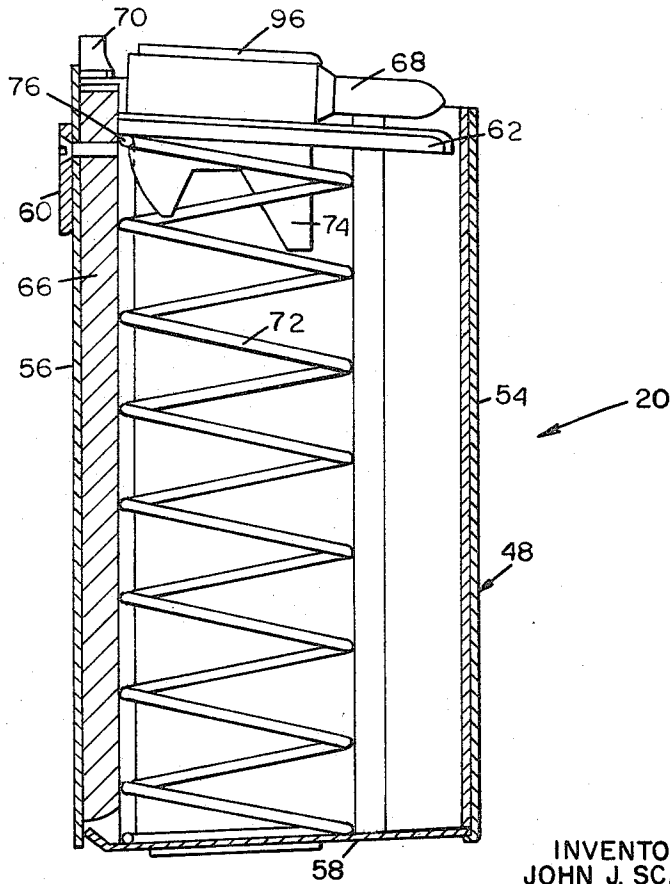


Fig. 4

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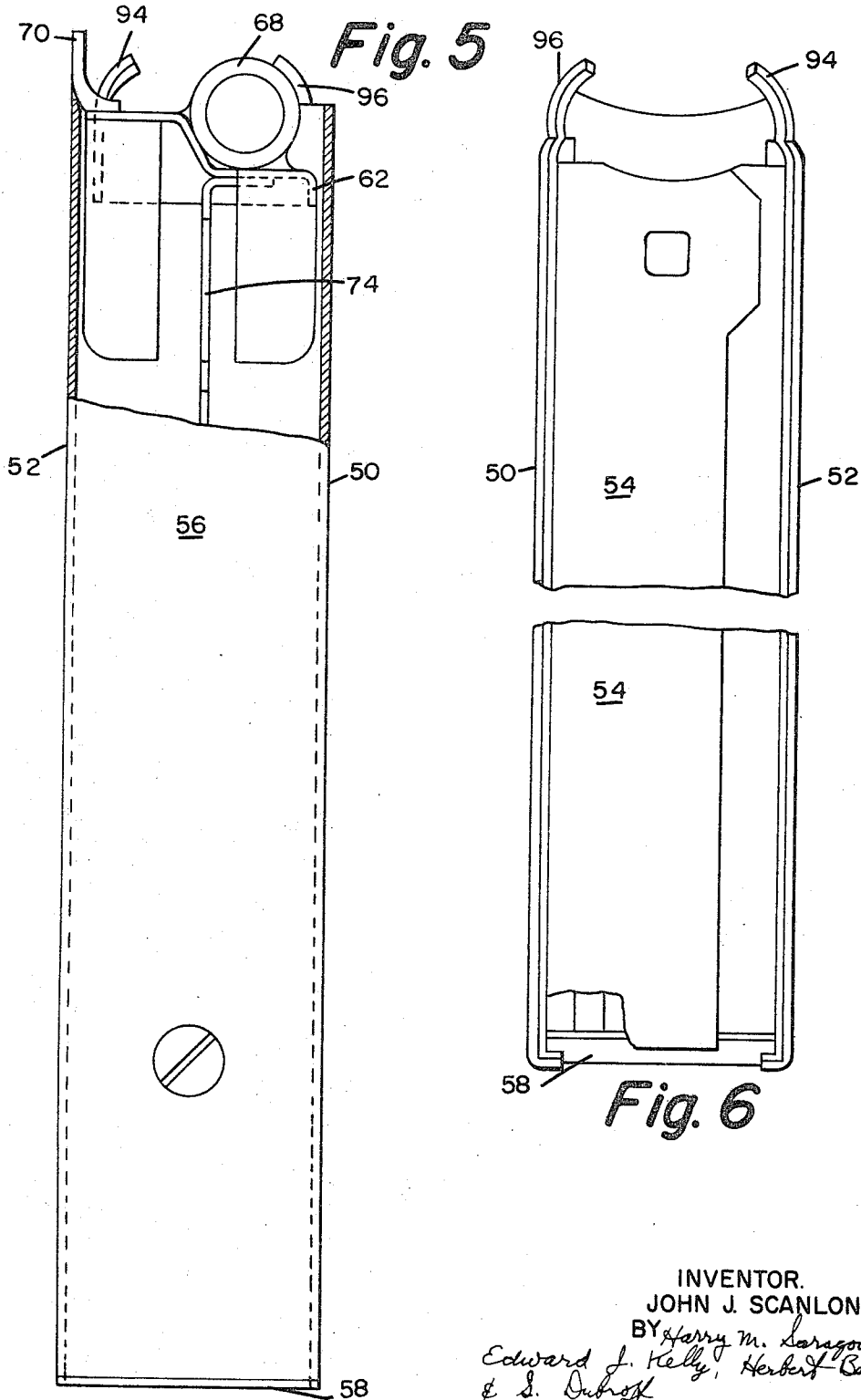
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

Fig. 7

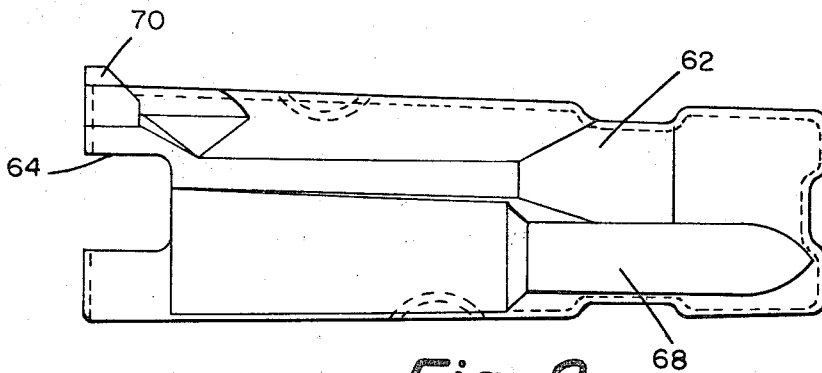
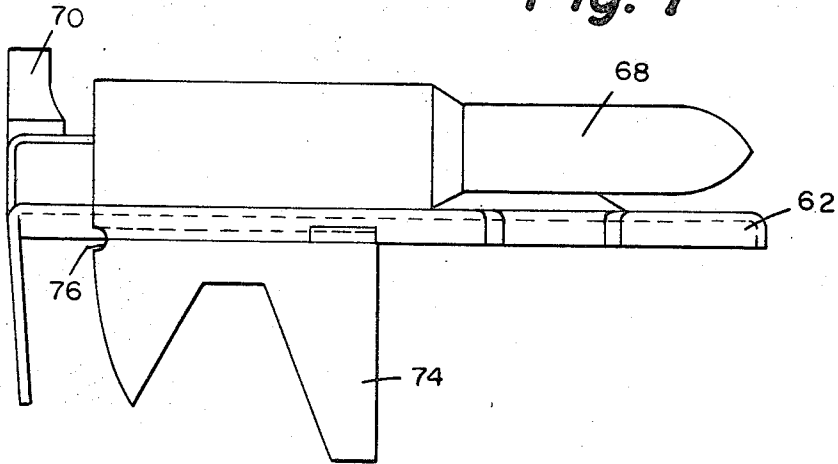


Fig. 8

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**AUTOMATIC RIFLE FOR FIRING
CASELESS AMMUNITION**

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of the Army

Filed Oct. 7, 1966, Ser. No. 586,004

7 Claims. (Cl. 42-18)

The invention relates to an automatic rifle and more particularly to an automatic rifle for firing caseless ammunition.

In ordnance, efforts are continually being made to increase the efficiency of the infantry rifleman. To this end the automatic rifle was introduced to provide the rifleman with rapid means of fire. The advent of caseless ammunition, and its numerous inherent advantages over cased ammunition, was attended by the seemingly insurmountable problem of providing a weapon adapted to the automatic firing of such ammunition. Where rapid fire is not a consideration the escape of propellant gas influences projectile velocity and range. However, where rapid fire is a consideration the escape of propellant gas also defeats automatic firing because the heat, from the flame in the chamber, now being so much more intense, causes damage to the O-ring used for obturation. This problem has been overcome, by the instant invention, by providing a firing pin obturator at the rear of the firing pin to reduce the temperature thereof. Specific parts of the receiver assembly and firing pin assemblies are desirably coated with chrome, tantalum alloy or the like to help reduce the friction in the obturation area.

Another inherent problem brought about by rapid fire resides in the feeding of ammunition. Since the caseless round of ammunition is much more fragile than the metallic cased round, the rounds have to be carefully placed in proper position in the receiver. A magazine has been devised that achieves this result by working in conjunction with the bolt.

It is therefore an object of the present invention to provide an automatic rifle that will fire caseless ammunition.

Another object is the provision of an automatic rifle for firing caseless ammunition that is efficient in operation and simple in construction.

The above objects as well as others together with the benefits and advantages of the invention will be apparent upon reference to the detailed description set forth below, particularly when taken in conjunction with the drawings annexed hereto in which:

FIG. 1 illustrates an elevational view of my inventive rifle.

FIG. 2 illustrates an enlarged, partial section of a portion of the rifle of FIG. 1.

FIG. 3 shows a plan view of the top of the rifle bolt.

FIG. 4 is a sectional view of the novel magazine of my invention.

FIG. 5 shows the magazine of FIG. 4 as viewed from the left side.

FIG. 6 shows the magazine of FIG. 4 as viewed from the right side.

FIG. 7 shows an enlarged view of the upper portion of FIG. 4, and

FIG. 8 shows the magazine of FIG. 4 as viewed from the top.

As shown in FIG. 1, rifle 10 has a stock assembly 12, a barrel and receiver assembly 14, a bolt assembly 16, means for firing 18, and a magazine assembly 20. Stock assembly 12 and firing means 18 are conventional and will not be discussed in detail.

Bolt assembly 16 (FIGS. 2 and 3) includes a bolt 22 having a detachable bolt face 24, an obturator 26, and

a firing pin 28. Obturator 26 is similar to the one described in Patent No. 3,166,864, issued on Jan. 26, 1965 to J. J. Scanlon, Jr., and has an O-ring 27 and two split rings 31 which prevent damage to the O-ring 27 from the heat of rapid fire. Firing pin 28 is constructed in one piece having a tip plated with chrome, or the like, the plating being about 0.003 inch thick. Firing pin passage-way 30 is also plated with chrome, or the like, the plating being about 0.001 inch thick and is used to reduce friction in the obturation area. A firing pin retaining pin 32 is positioned in slot 34 of the firing pin 28 and in the hole 33 of bolt 22. Firing pin 28 has an obturator 29 comprising an O-ring 36 and two split rings 38 and 40. The split rings 38 and 40 prevent damage to the O-ring 36 from the heat of rapid fire. The location of the obturator 29 at the rear of the firing pin 28 is to further insure long life of said obturator. The O-ring 27 and 36 are constructed of neoprene, Teflon, or synthetic rubber or the like, to insure longer life thereof.

The barrel and receiver assembly 14 include a barrel 42 having a feed ramp 44 leading into a chamber 45. The feed ramp 44 has a radius of such magnitude so as to facilitate the insertion of the obturator 26 which aids in the chambering of the caseless round during magazine feeding. Adjacent the feed ramp 44, is a sealing area 46 provided in the chamber 45 for preventing any gases from escaping therepast. The length of barrel 42 is plated interiorly with a coating of chrome or the like, having a thickness from about 0.0003 to 0.0007 inch.

The magazine assembly 20 (FIG. 5) includes a magazine 48 capable of feeding nineteen 7.62 mm. caseless rounds. Magazine 48 includes side walls 50 and 52, a front wall 54, a back wall 56 and base plate 58. A lock button plate 60 is provided on wall 56. A follower plate 62, which holds the ammunition in position in the magazine for insertion into the chamber of the rifle, has a slot 64 in the rear thereof in order to permit positioning of a bar 66 which prevents the rounds from moving laterally, in the magazine, during the feeding cycle. On the top of the follower 62, a block 68 (similar in shape to a 7.62 mm. caseless round to facilitate proper stacking of the ammunition in the magazine) is provided along with a bolt stop 70 to keep the bolt opened (in a known manner) after the last round has been fed and fired. A compression spring 72 bears on base plate 58 and is attached to spring guide 74 at notch 76 thereby providing pressure on follower plate 62.

The firing mechanism 18 is energized (in a known manner) by the pulling trigger 78 which causes a hammer (not shown) to travel approximately in a 45° arc and strike tang 80 on the rear of firing pin 28. The firing pin 28 thus energized travels forward approximately 0.060 to 0.065 inch until its point 82 strikes the combustible primer 84 in the rear of the caseless round 86. The primer 84 thus ignited, ignites caseless round 86 which burns rapidly to evolve gas at such a rate that it forces the projectile 88 out of barrel 42 at a muzzle velocity of about 2800 feet per second. The gases in the chamber 45 push against the projectile 88 to urge it down the barrel and also against bolt face 24 and obturator 26. These gases also expand through the firing pin passage-way 30 in the bolt 22 and act against the firing pin obturator 29. The firing pin 28, during the burning process, is moved rearward and is retained by the retaining pin 32.

As the projectile 88 travels through the barrel 42, the gases cause the bolt 22 to be pulled rearward until it abuts against the rear of the receiver (not shown). As the bolt 22 moves rearward it clears the top of the magazine 48. The magazine spring 72, once the bolt 22 is rearward, pushes the follower plate 62 and the next round upward until the round is stopped by one of the two lips 94 and 96 on the magazine 48. At this point the operating spring

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forces the bolt 22 and operating rod forward toward the muzzle. While the bolt 22 and operating rod are moved forward, a caseless round 86 moves into position to be fed from the magazine 48. As the bolt 22 moves forward the bolt face 24 engages the base of a round and forces it, guided by the feed ramp 44, into the chamber 45. The round is then ready to be fired.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:

1. In an automatic rifle for firing caseless ammunition including the combination of a magazine having a plurality of rounds therein; a chamber for receiving said rounds; and a bolt for transferring said rounds from said magazine to said chamber, the improvement wherein said bolt comprises

means for sealing said chamber, said bolt having a passageway through the center thereof,

a firing pin slidable within said passageway, and means on a rear portion of said firing pin for sealing said passageway;

wherein said chamber comprises

a feed ramp for guiding said caseless ammunition therein; and

a sealing area adjacent said feed ramp for preventing gases from escaping therepast;

and wherein said magazine comprises a front wall, a back wall, side walls and a base plate,

a lock means provided on said back wall,

a resilient means secured to said base plate at one end,

a follower plate slidably mounted in said magazine,

a spring guide integral with said follower plate securing said resilient means at its other end,

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said follower plate having a slot in the rear thereof, a bar passing through said slot the full distance of said magazine adjacent said back wall,

a block secured to the top of said follower plate,

a bolt stop secured rearward to said follower plate, said bolt stop being so constructed and arranged so as to keep the bolt opened after the last round of ammunition has been fed and fired.

2. A rifle of the type described in claim 1 including a barrel plated with material selected from the group consisting of chrome, and the like, said plating being between 0.0003 to 0.0007 inch thick.

3. A rifle of the type described in claim 1 including means for retaining said firing pin in said passageway, said firing pin having a slot in the rear portion thereof, and said bolt having a hole in alignment with said slot for containing said retaining means.

4. A rifle of the type described in claim 3 wherein said bolt sealing means and said firing pin sealing means each include an obturator each having two split rings and an O-ring.

5. A rifle of the type described in claim 4 wherein said firing pin is constructed in one piece having a tip plated with material selected from the group consisting of chrome and the like, and wherein said firing pin passageway is plated with material selected from the group consisting of chrome, and the like.

6. A rifle of the type described in claim 5 wherein said firing pin tip consists of a plating about 0.003 inch thick.

7. A rifle of the type described in claim 5 wherein said firing pin passageway consists of a plating about 0.001 inch thick.

No references cited.

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