

Nov. 19, 1946.

M. M. SEDWICK

2,411,232

MACHINE FOR CLOSING CONTAINERS

Filed May 15, 1945

3 Sheets-Sheet 1

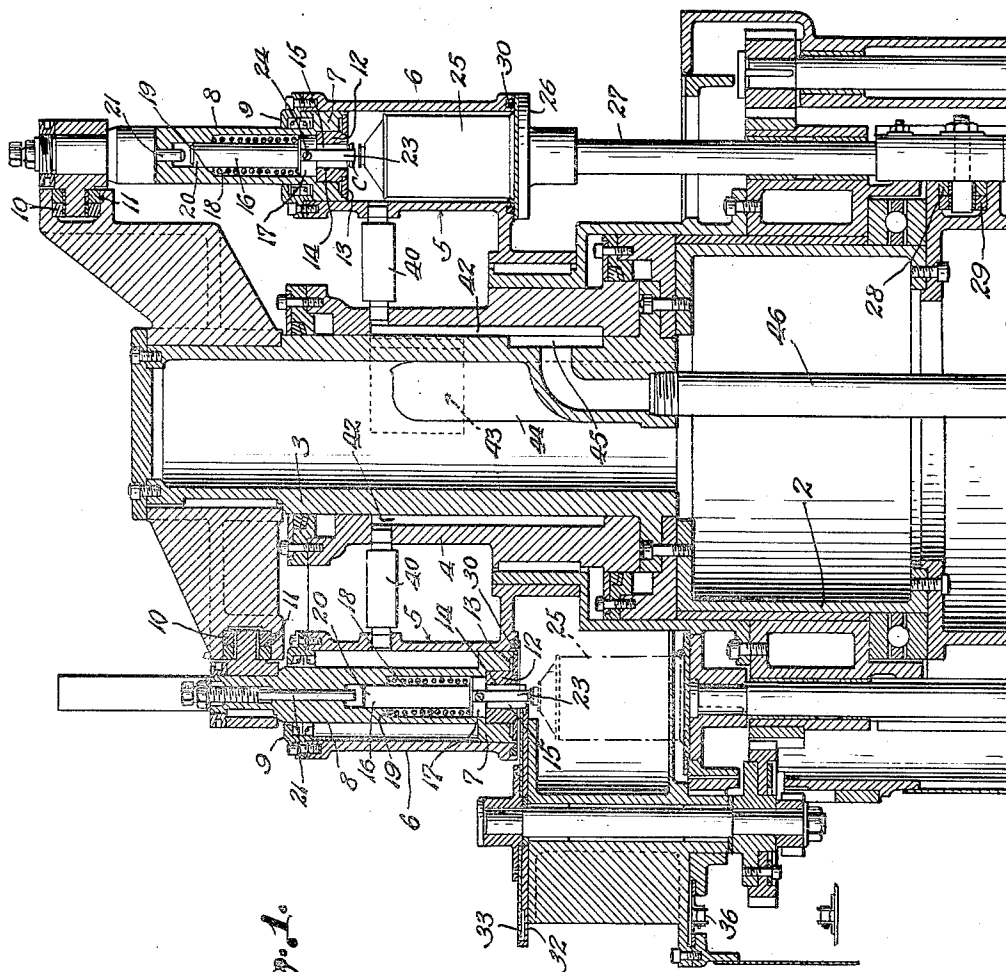


Fig. 1.

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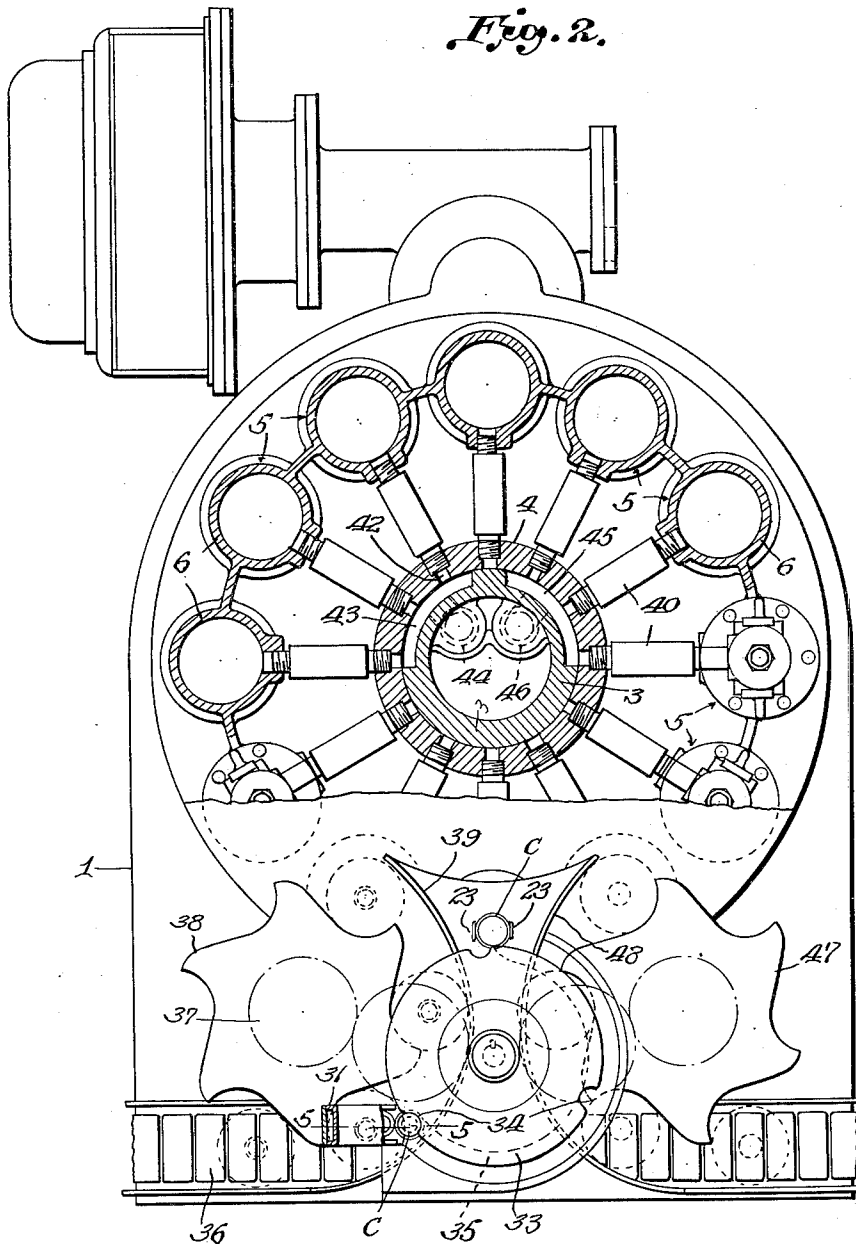
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 3.

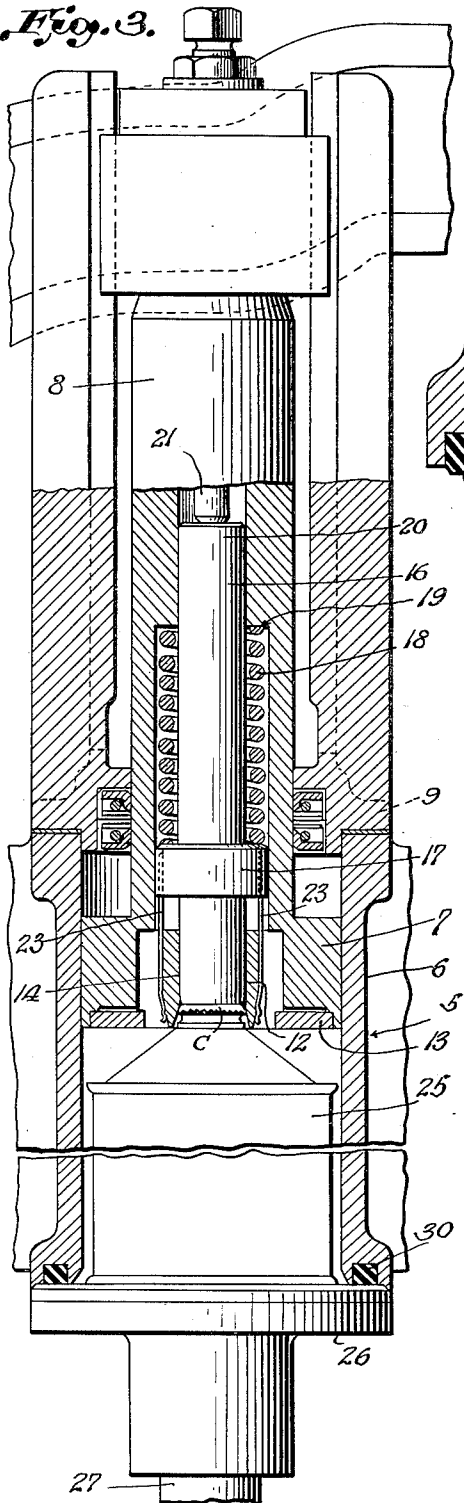


Fig. 4.

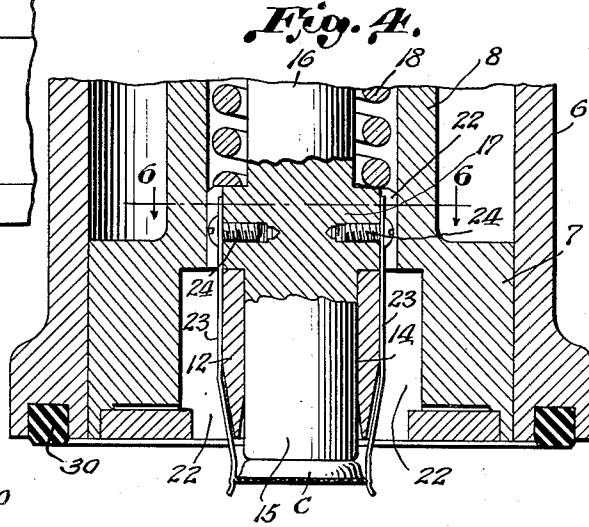


Fig. 5.

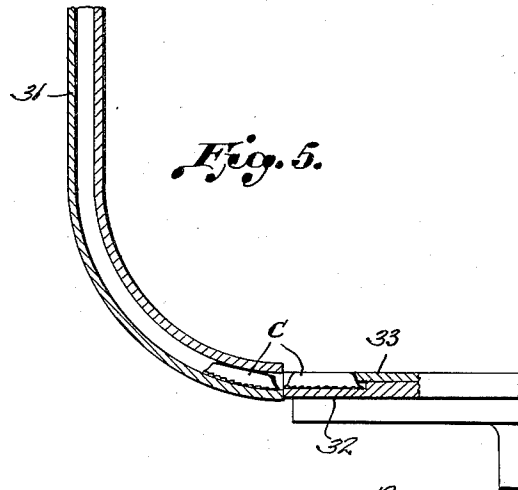
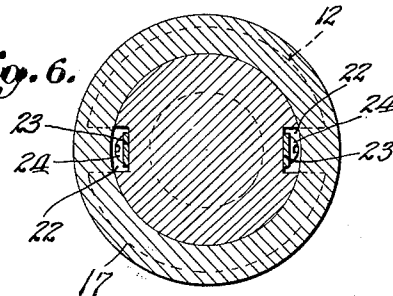


Fig. 6.



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UNITED STATES PATENT OFFICE

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MACHINE FOR CLOSING CONTAINERS

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Application May 15, 1945, Serial No. 593,831

8 Claims. (Cl. 226—82)

1

The invention relates to new and useful improvements in a machine for closing containers and more particularly to a machine for attaching a crown cap to a container for sealing the same. Capping machines have been provided with a bell for enclosing the upper portion of a container so that the container before sealing can be vacuumized and gassed. The cap for closing the container in machines as heretofore constructed is inserted through an opening in the side wall of the bell, which opening is afterward closed. It has been difficult to tightly seal the opening which must be opened and closed at each capping operation.

An object of the invention is to provide a machine of the above type with a means for placing a cap in a capping head through the open end of the bell so as to avoid this opening in the side wall and the closing and sealing of the same.

A further object of the invention is to provide a machine of the above type wherein the container is completely enclosed in a bell for vacuumizing and gassing.

A further object of the invention is to provide a machine of the above type wherein the capping head is moved to the open end of the bell so that a cap can be placed in the head before the container is moved into the bell.

A still further object of the invention is to provide a machine of the above type having a plurality of closing units mounted for rotation and wherein the caps and containers are placed in the bells, one after another, while the bells are moving.

A still further object of the invention is to provide a machine wherein the bell after being sealed with the container and cap therein, is subjected to vacuum treatment and then gassing treatment, after which the cap is attached to the container for sealing the same.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings—

Figure 1 is a vertical sectional view through a machine embodying the improvements;

Figure 2 is a view partly in section and partly in plan;

Figure 3 is a vertical sectional view on an enlarged scale showing one of the capping units with the bell closed and the cap sealed to the container;

Figure 4 is a detail showing the position of the capping head at the open end of the bell at the time a cap is placed in the head;

2

Figure 5 is a detail in section on the line 5—5 of Figure 2;

Figure 6 is sectional view on the line 6—6 of Figure 4, also showing in dotted lines the clinching die.

The machine for closing the containers includes a rotating turret having a series of bells for enclosing the containers. Disposed in each bell is a capping head associated with which is a means for supporting a cap directly beneath the capping head. The bells have no vertical movement. The capping head is movable in the bell and is moved down in the bell to the open end thereof, at which time a cap is placed in the capping head. After the cap has been placed in the capping head it is retracted to the upper end of the bell. At the same time a container is placed on a support and lifted into the bell. The support for the container seals the lower end of the bell. The cap is held for a time spaced above the mouth of the container after the bell is closed. As the turret rotates the bells will be connected one after another to a vacuum creating apparatus for drawing a vacuum on the bell and on the container therein.

As the turret continues to rotate, the connection to the vacuum creating apparatus is cut off and a connection is made to a gassing apparatus for supplying an inert gas to the bell and to the container. After the gassing period, the capping head moves down and applies the cap to the container and seals the same. This completes the closing operation for the container and then it is lowered from the bell and discharged from the machine.

The machine includes a supporting base 1 on which is mounted a frame structure 2 which includes a hollow column 3. Mounted for rotation about this column 3 is a turret 4, which turret is provided with a series of capping units, indicated generally at 5. Each unit includes a bell 6 which is fixed to the turret and rotates therewith. Disposed within each bell is a capping head 7 which includes a portion disposed within the bell and fitting loosely the inner surface thereof and a sleeve plunger 8 which extends through a cap 9 attached to the upper end of the bell and closing the same. This sleeve plunger carries rollers 10 at the upper end thereof which cooperate with a stationary cam 11 which positively raises and lowers the sleeve plunger.

In the lower end of the capping head is a recess in which is placed a clinching die 12. Said die is held in the recess by a ring clamp-

ing plate 13. This clinching die has a central opening 14 therethrough in which is located a chuck 15. This chuck is carried by a spindle 16 which is mounted for reciprocation in a cylindrical recess located in the sleeve plunger 8. Between the spindle 16 and the chuck 15 is an enlarged head 17. These parts are preferably made integrally. A spring 18 bears at one end against the head 17 and at its other end against a shoulder 19 in the sleeve plunger 8. The spring normally forces the chuck 15 in a downward direction and the adjustable pin 21 limits the upper movement of the chuck during the securing of the cap to the container as will be hereinafter more fully disclosed.

The clinching die 12 and head 17 have radial grooves 22, 22 therein. There are two of these grooves in each of parts 12 and 17 and in each groove is a yielding cap retaining finger 23. This cap retaining finger 23 is secured by a screw 24 to the enlarged head 17. These fingers, as shown more in detail in Figure 4, normally extend beneath the clinching die so that a cap C may be inserted between the fingers. The inner faces of the fingers are recessed in order to provide a holding means for the flange of the cap. As shown in Figure 4, the chuck 15 extends below the clinching die 12 and will in a measure sustain the cap in a fixed position relative to the capping head.

The containers are indicated at 25 in the drawings. A container is placed on a support 26 carried by a supporting rod 27 movable in bearings in the turret 4. Each rod is provided with rollers 28 which run in a stationary cam 29. This cam is so shaped that the support may be lowered to receive the cam, when moved laterally onto the same, after which the support is raised to bring the container into the bell, and at the same time the support contacts with a sealing gasket 30 and seals the bell. After the container has been sealed in the bell, vacuumized and gassed the capping head supporting the cap moves downward, placing the cap on the mouth of the container. Inasmuch as there is a spring 18 between the chuck and the sleeve plunger 8 carrying the clinching die, the clinching die continues to move downward, compressing the spring after the chuck has seated the cap on the container. This ensures that the cap is firmly pressed against the lip of the container, after which the clinching die continues its downward movement, contacting with the flange of the cap and forcing the same under the shoulder on the neck of the container. Thus the container is tightly sealed. The head is positively limited in its down movement by the pin 21 and this limits the extent that the clinching die moves down onto the cap during the sealing of the container. The caps are supplied from a cap chute 31. They are moved downward in the cap chute by gravity and are fed onto a table 32 with which is associated a rotating dial 33 having semi-circular pockets 34 conforming to the vertical wall portion of the cap C. The flange of the cap extends underneath the rotating dial. There is a guide rail associated with this dial so that as the cap is placed in the pocket of the dial the dial will carry the cap along the guide rails to the position where the cap is placed in the supporting fingers 23.

The capping head is lowered as the bell approaches the cap applying station so that these fingers 23 extend beneath the lower end of the bell as clearly shown in Figure 4 and at the left

in Figure 1. In Figure 2 a cap C is shown as forced between the fingers 23 and out of the pocket in the cap feed dial. This is accomplished by a cam-shaped plate indicated at 35 (Figure 2). This cam-shaped plate is stationary and as the dial pocket moves along the cam, the cap will be gradually forced out of the pocket and between the fingers 23. Thus a cap is transferred from the cap feed dial to each capping head as it passes this cap applying station.

The containers are placed on a traveling conveyor preferably consisting of a series of supporting plates 36 which are of sufficient length and width to support the containers in upright position as the containers are filled with the product which is to be sealed in the container when they are fed into this closing machine. Associated with this traveling conveyor is a star wheel 37 which is provided with spaced fingers 38 which engage the containers one after another and move them off from the conveyor along guide rails, one of which is indicated at 39. This places the container on the support 26 associated with each bell. It is understood, of course, that the bells are so mounted on the turret that they are well above the container at the time when a container is placed on the support therefor. In other words, the support is at its lower position when the container is placed thereon and as the turret continues its movement, the support is raised, carrying the container up into the bell. At the same time the capping head is also raised to the upper end of the bell.

As noted above, the bells 5 are a part of the turret and rotated therewith. A pipe 40 is connected to the chamber within each bell and is also connected to vertical ports or channels 42 at the inner face of the turret sleeve which contacts with the column 3. The column 3 is recessed to provide a manifold 43 which is connected with a pipe 44 leading to a vacuum creating means. Also formed in the column 3 is a recess providing a manifold 45 which is connected by a pipe 46 to an inert gas supply. As the turret rotates channels or ports 42 successively are brought into connection with the vacuum manifold 43 and then with the gas manifold 45. (See Figure 2.)

As has already been noted, the turret rotates continuously. When the bell of a capping unit passes the cap supplying station, the capping head is lowered so that the cap receiving fingers project below the lower end of the bell. At this time the cap is placed in the fingers. As the turret moves a little further in its cycle of rotation, a container is placed on the support associated with the bell. At this time the support is at the lower end of its stroke and the cap is supported slightly above the mouth of the container.

After the vacuum period is over, the pipe associated with the bell moves into connection with the gassing manifold 45 and the vacuum is released by an inert gas. During this treatment the cap is maintained in a position above the mouth of the container so that the gas will enter the head space of the container. At the completion of the gassing operation the capping head moves downward, placing the cap on the mouth of the container. The chuck yieldingly presses the cap firmly into engagement with the lip of the container and the clinching die continues its downward movement and clinches the cap to the container, sealing the same.

When the sealing operation is complete, the

5

container support is lowered and the container withdrawn from the bell and then it is discharged from the machine. A star wheel 47 (see Figure 2) engages the container on the support and moves it along a guide rail 48 and carries it around onto a conveyor so that it is discharged from the machine.

It is obvious that many changes may be made in the details of construction and the arrangement of the parts without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A closing machine comprising a bell, a capping head in said bell having a cap support, means for moving the capping head relative to said bell for placing the cap support at the mouth of the bell to receive the cap, a container support beneath the bell, means for moving the container support relative to the bell for positioning the mouth of the container in said bell and forming a closed chamber about said mouth, means for vacuumizing said chamber, and means for operating said capping head for securing the cap to the container and sealing the same.

2. A closing machine comprising a bell, a capping head in said bell having a cap support, means for moving the capping head relative to said bell for placing the cap support at the mouth of the bell to receive the cap, a container support beneath the bell, means for moving said container support so as to place the container completely within the bell and for engagement with the mouth of the bell for sealing the same, means for vacuumizing said closed bell, and means for operating said capping head for securing the cap to the container and sealing the same.

3. A closing machine comprising a bell, a capping head in said bell having a cap support, means for moving the capping head relative to said bell for placing the cap support at the mouth of the bell to receive the cap, a container support beneath the bell, means for moving the container support relative to the bell for positioning the mouth of the container in said bell and forming a closed chamber about said mouth, means for vacuumizing said chamber, means for relieving the vacuum with an inert gas, and means for operating said capping head at the end of the gassing period for securing the cap to the container for sealing the same.

4. A closing machine comprising a bell, a capping head in said bell having a cap support, means for moving the capping head relative to said bell for placing the cap support at the mouth of the bell to receive the cap, a container support beneath the bell, means for moving said container support so as to place the container completely within the bell and for engagement with the mouth of the bell for sealing the same, means for vacuumizing said chamber, means for relieving the vacuum with an inert gas, and means for operating said capping head after the gassing period for securing the cap to the container and sealing the same.

6

5. A closing machine comprising a rotating turret, a series of bells mounted therein, a capping head in each bell having a cap support, means for moving the capping head relative to the bell for placing the cap support at the mouth of the bell, means for placing a cap in said support, a container support beneath each bell, means for moving the container supports in succession relative to the bells for positioning the containers in said bells and for closing the lower end of the bell, means for vacuumizing the bell after it is closed, means for relieving the vacuum with an inert gas, and means for operating said capping head for securing the cap to the container after the gassing period for sealing the same.

6. A closing machine comprising a rotating turret, a series of bells mounted therein, a capping head in each bell having a cap support, means for moving the capping head relative to the bell for placing the cap support at the mouth of the bell, means for placing a cap in said support, a container support beneath each bell, means for placing containers in succession on said container supports, means for moving the container supports in succession relative to the bells for positioning the containers in said bells and for closing the lower end of the bell, means for vacuumizing the bell after it is closed, means for relieving the vacuum with an inert gas, and means for operating said capping head for securing the cap to the container after the gassing period for sealing the same.

7. A closing machine comprising a bell, a capping head in said bell including a chuck, a clinching die, and cap supporting fingers carried by said chuck and projecting beneath the capping die when said die is in raised position, means for moving said capping head relative to said bell for placing the cap supporting fingers at the mouth of the bell to receive a cap, a container support beneath the bell, means for moving said container support relative to the bell for positioning the container in the bell and for closing the lower end of the bell.

8. A closing machine comprising a rotating turret, a series of bells mounted in said turret, a capping head disposed in each bell and including a chuck, a clinching die and cap supporting fingers carried by the chuck and projecting below said clinching die when said die is raised, means for moving said capping head for placing the supporting fingers below the mouth of the bell, means for placing a cap in said fingers, a container support beneath the bell, means for moving the container support for closing the mouth of the bell and for positioning a container within the bell, said means for moving the capping head operating to position the head at the upper end of the bell with the cap above the mouth of the container, means for vacuumizing the bell, means for releasing the vacuum with an inert gas, and means for operating said capping head for securing the cap to the container after the gassing period for sealing the same.

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