W. J. CULLEN.

MACHINE FOR APPLYING PAPER ENDS TO PAPER CAN BODIES.

APPLICATION FILED MAR. 17, 1913.

1,254,207.

Patented Jan. 22, 1918.

3 SHEETS—SHEET 1.

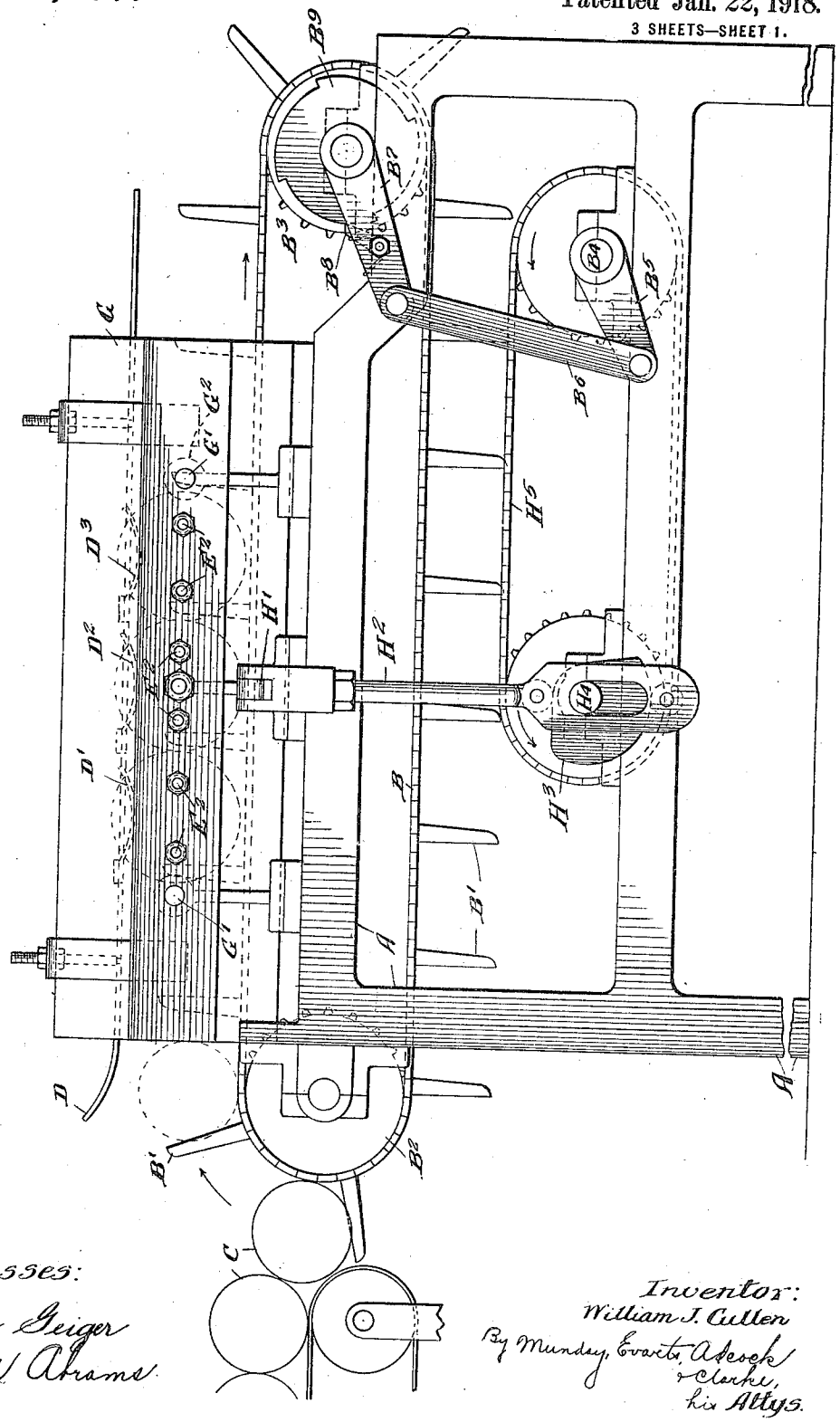


Fig. 1.

Witnesses:
Wm. Geiger
Pearl Abrams.

Inventor:
William J. Cullen
By Munday, Evarts, Adcock & Clarke,
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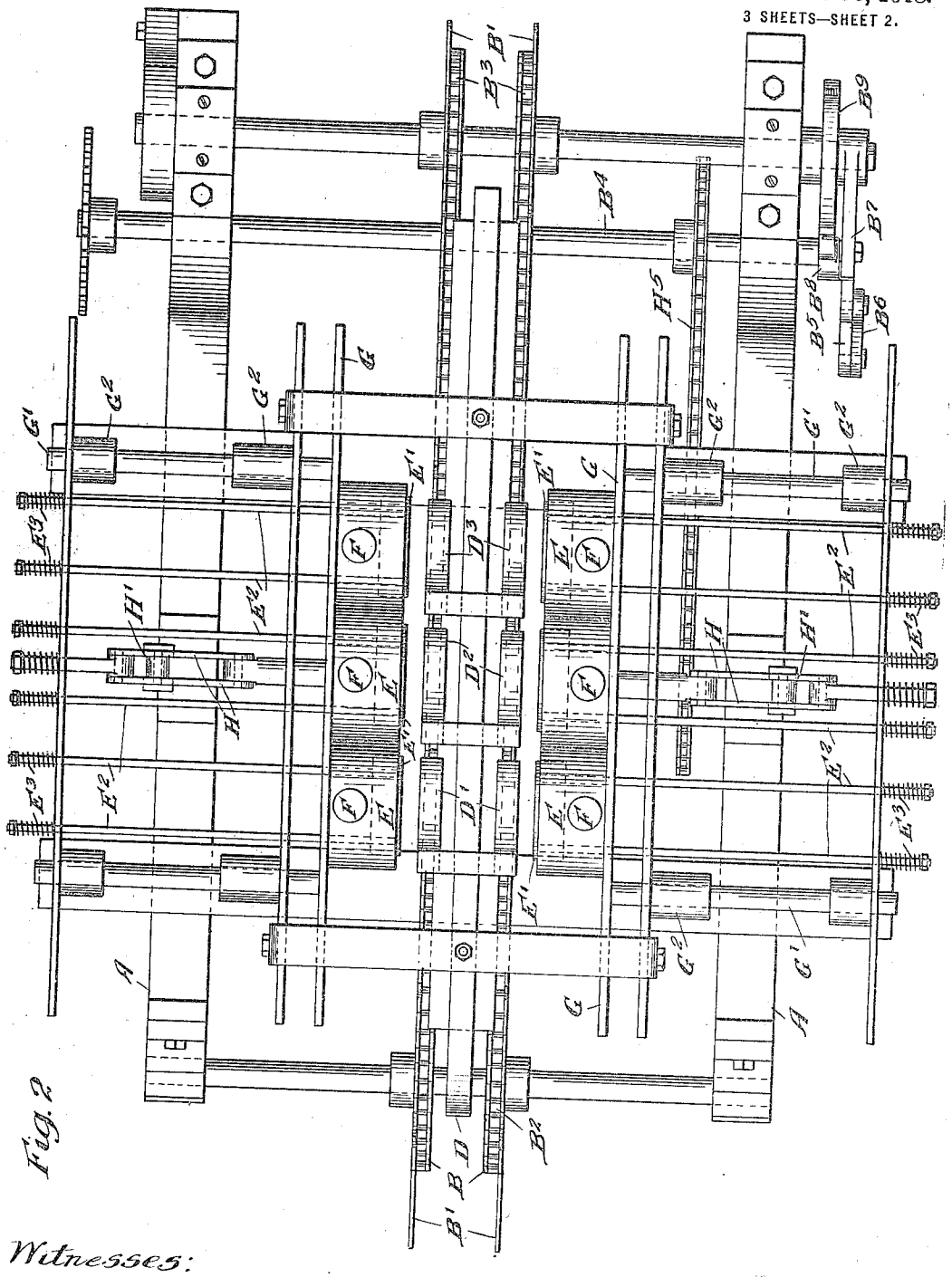


Fig. 2.

Witnesses:

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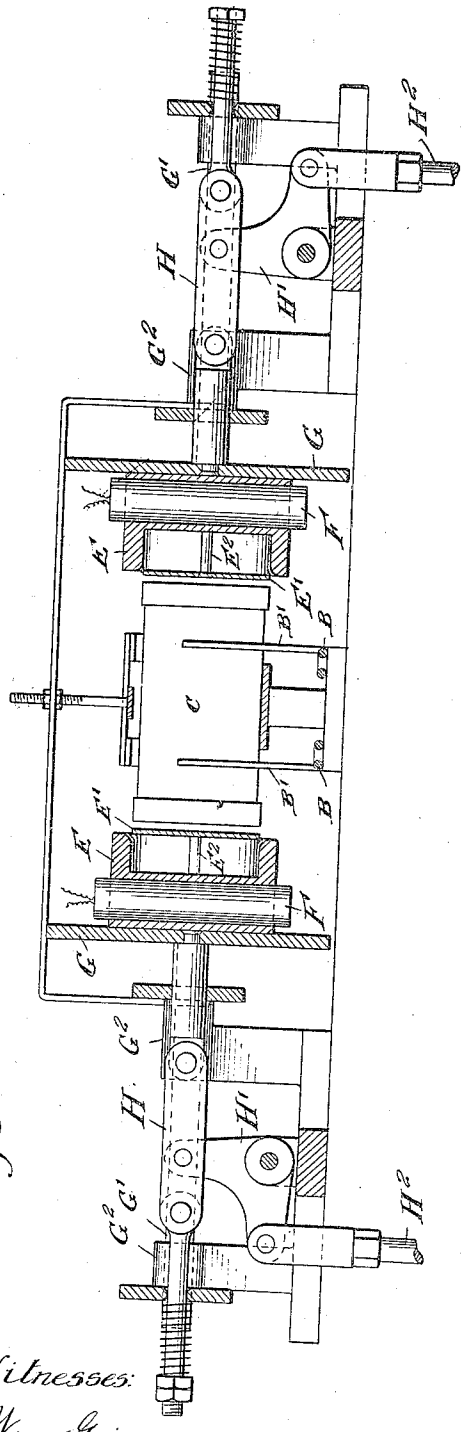


Fig. 3

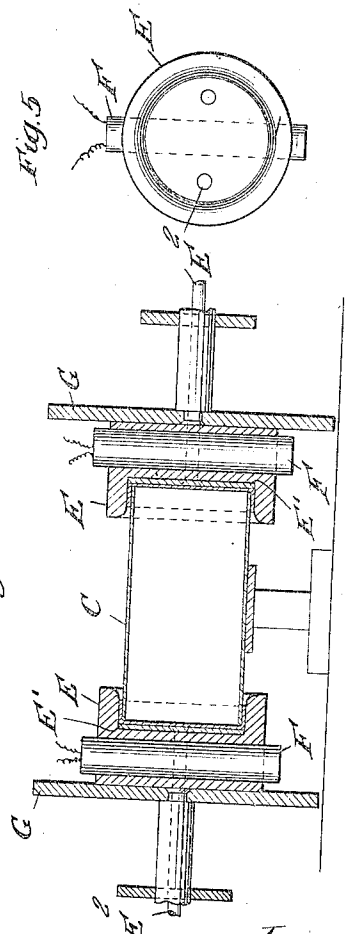


Fig. 4

Fig. 5

Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM J. CULLEN, OF DETROIT, MICHIGAN, ASSIGNOR TO DETROIT CAN COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF NEW JERSEY.

MACHINE FOR APPLYING PAPER ENDS TO PAPER CAN-BODIES.

1,254,207. Specification of Letters Patent. Patented Jan. 22, 1918.

Application filed March 17, 1913. Serial No. 754,706.

To all whom it may concern:

Be it known that I, WILLIAM J. CULLEN, a citizen of the United States, residing in Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Machines for Applying Paper Ends to Paper Can-Bodies, of which the following is a specification.

This invention relates to a machine for drying and shrinking on ends or heads of paper or fiber upon paper or fiber cans or vessels, and the invention consists in the novel parts and devices and combinations thereof made the subject of claim hereinafter.

In the accompanying drawing which forms a part of this specification, Figure 1 is a side elevation of the machine; Fig. 2 a plan view of the same; Fig. 3 a central vertical cross section of Fig. 1; Fig. 4 a partial section similar to the section in Fig. 3 but showing the dies in a different position; Fig. 5 a face view of one of the dies.

In the manufacture of fiber or paper vessels, to facilitate the formation of the outside fitting cup-like heads or ends by dies, it is customary to moisten the stock out of which the heads or ends are made. This tends to expand the material and such heads will therefore not fit properly upon the paper or fiber bodies when the latter are dry. Moreover, in drying, these heads are liable to warp, dry unevenly, and to get out of shape. And in addition to this the material in the flat portion of the head being much in excess of the material in the depending flange, the result of the method of manufacture and natural shrinking is to cause the depending flanges of the heads or ends to flare out so that they do not fit upon the cylindric bodies. The purpose of the present invention is a machine which will receive the fiber can bodies with the moistened heads loosely applied thereto, hold said loosely fitting moist heads firmly in place and in shape and while thus held heat and dry the same, and perform this operation by a series of similar operations.

In the accompanying drawing, A is a suitable framework upon which the moving parts of the machine are mounted. B, B are carrier chains provided with suitable flights B^1 and moving in the direction of the arrows with an intermittent motion. These chains are mounted on the sprocket B^2, B^3. The intermittent motion is imparted to the chains as follows: On the main power shaft B^4 is a crank B^5 connected by a pitman B^6 to a crank B^7, the latter crank being of greater length or swing than the crank B^5. Upon the crank B^7 is mounted a pawl B^8 which takes into a ratchet B^9. The shaft B^4 revolving continuously in the direction of the arrow causes the crank B^7 to swing up and down through a certain arc which, in the instance illustrated, is sufficient to move the sprocket wheel B^2 through a fourth of a complete revolution and thus move the feed chain a specified distance. The loosely headed can bodies C are fed up by suitable means continuously to the feed chains so that one of said loosely headed can bodies is seized by each of the flights B^1 as it passes. The guard D prevents the loosely headed can body from being thrown out by the forward movement of the feed chains. And downwardly holding spring detents D^1, D^2, D^3, by coming in contact with the can body, positions it accurately at each stoppage of the intermittent feed. Lying athwart the direction of the feed chain are the holding and heating dies arranged in pairs. These dies are shown more clearly at Figs. 3 and 4 and each pair consists of a metallic cup E of a proper size and shape to contain the ends of the loosely headed can and to compress the flanges of said ends into true cylindric form and to hold the same thus compressed. The pairs being designed to operate in succession one pair after another upon the same head may be made of slightly different shape approaching gradually the final shape to be imparted to the product. To each one of each pair of cups a motion is given toward the can body, the cups of each pair being moved toward each other to cover the can ends and hold them upon the can body for a space of time and thereafter moved away from each other, releasing the headed can. To facilitate this action, in each of the cup-dies is loosely mounted flat holding plates E^1 carried on the sliding rods E^2, held retracted by springs E^3. Each of the metallic cup like dies is provided with means for heating the same which preferably may con-

sist of an electric resistance coil F. The oppositely moving pair of dies are connected to a suitable moving framework G mounted on rods G^1 sliding through ways G^2 carried on the stationary frame of the machine at each side thereof. The intermittent movement of the pairs of dies toward each other is accomplished in the instance illustrated by the links H, the bell cranks H^1, the pitman rod H^2 and the cam H^3 mounted on the shaft H^4 and actuated from the main power shaft B^7 by a guide chain H^5. The adjustment and time is such, as indicated in the drawing, that the loosely headed can bodies are fed by the feed chains intermittently step by step until the first one reaches the position of the first pair of holding and heating dies. Here the can body stops momentarily and the pair of heating dies close upon it in opposite directions, forcing the heads or ends firmly upon the body and holding them momentarily there in the heated dies, after which said dies separate away from the can bodies and from the holding plates E^1, leaving the headed can with its heated heads free in the feed chains. The feed chains now move another space bringing the can into position opposite the second pair of dies which may preferably be a closer approximation to the final shape and the next succeeding can into position opposite the first pair of dies when the operation of compressing, heating and releasing is repeated. This operation is thus continuously repeated until all of the cans are fed through the machine and discharged completely headed at the other end of the machine with the heads fitted and shrunk smoothly in place. By thus operating several times successively by different pairs of dies upon the same can, the total time of the heating and drying action is multiplied, without correspondingly multiplying the length of time required for feeding the cans through the machine. And when the pairs of dies are made successively more nearly conformed to the final form required, they operate gradually to shape the heads to such final form. The intervals of time during which the body and heads are released from the dies serves to permit the free escape of vapor from the moist heads and thus to facilitate the ultimate and complete drying and setting of the material.

I claim:—

1. In a machine for conforming paper ends to the bodies of vessels, the combination of a series of successively arranged cup-shaped dies, means for heating said dies, means for feeding said bodies with paper ends loosely applied thereto successively from one die to the next die, and means for causing said dies to conform the paper ends around the exteriors of said bodies, whereby said ends receive successive conformations and are caused to fit said bodies and maintain the shape to which they have been conformed.

2. In a machine for conforming paper ends to the bodies of vessels, the combination of a series of successively arranged cup-shaped dies, means for heating said dies, means for feeding said bodies with paper ends loosely applied thereto successively from one die to the next die, means for causing said dies to conform the paper ends around the exteriors of said bodies, and a corresponding series of ejectors, whereby said ends receive successive conformations and are caused to fit said bodies and maintain the shape to which they have been conformed.

3. In a machine for conforming paper ends to the bodies of vessels, the combination of a series of successively arranged cup-shaped dies, means for heating said dies, an endless conveyer passing along said dies and from one die to the next die for feeding said bodies with paper ends loosely applied thereto successively from one die to the next die, and means for causing said dies to conform the paper ends around the exteriors of said bodies, whereby said ends receive successive conformations and are caused to fit said bodies and maintain the shape to which they have been conformed.

4. In a machine for conforming paper ends to the bodies of vessels, the combination of a series of pairs of successively arranged and oppositely acting cup-shaped dies, means for heating said dies, means for feeding said bodies with paper ends loosely applied thereto between said dies, successively from one pair of dies to the next pair of dies, and means for actuating said dies, whereby said ends receive successive conformations and are caused to fit said bodies and maintain the shape to which they have been conformed.

5. In a machine for conforming paper ends to the bodies of vessels, the combination of a series of successively arranged and successively smaller cup-shaped dies, means for heating said dies, means for feeding said bodies with paper ends loosely applied thereto successively from one to the next die, and means for causing said dies to conform the paper ends around the exteriors of said bodies, whereby said ends receive successive conformations and are caused to fit said bodies and maintain the shape to which they have been conformed.

6. A machine of the character described comprising, in combination: a set of pairs of oppositely arranged successively smaller cup-shaped dies axially alined; means for feeding assembled can bodies and ends to successive positions in alinement with said pairs of dies; and mechanism for reciprocating said dies toward and from each other

while the can bodies and ends are in alinement therewith, substantially as specified.

7. A machine of the character described comprising, in combination: a plurality of sets of successively smaller opposed dies; means for feeding assembled can bodies and ends successively to each set of dies; and mechanism for reciprocating said dies, substantially as specified.

8. A machine of the character described comprising, in combination: a series of successive sets of alined oppositely disposed cup-shaped dies; said dies being successively of smaller dimensions; an intermittently operated conveyer for conveying assembled can bodies and ends successively to each set of dies; and mechanism for reciprocating said dies relatively toward and from each other, substantially as specified.

9. A machine of the character described comprising, in combination: a plurality of successive sets of alined and oppositely disposed and successively smaller heated dies; means for feeding can bodies and ends to a position in alinement with said dies and between the latter; and mechanism for moving the dies relatively toward and from each other when the can bodies and ends are therebetween, substantially as specified.

10. A machine of the character described comprising, in combination: a series of successive sets of heated successively smaller cup-shaped dies, each set comprising a pair of dies axially alined and oppositely arranged; means for feeding successively the can bodies and ends to a position between said sets of dies; and mechanism for operating the dies, substantially as specified.

11. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends exteriorly on said bodies; means for feeding said bodies and ends successively to said stations and means for actuating said dies.

12. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends; means for heating said dies; means for feeding said bodies and ends successively to said stations and means for actuating said dies.

13. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies for compressing and conforming said ends, arranged at successive stations; heaters of less than flame-temperature for said dies; means for feeding said bodies and ends successively to said stations; and means for actuating said dies.

14. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends; electric resistance coils carried by said dies; means for feeding said bodies and ends successively to said stations; and means for actuating said dies.

15. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends; means for heating said dies; means for feeding said bodies and ends successively to said stations; means for actuating said dies; and means for causing the bodies with applied ends to remain central between and disengaged from opposing dies when the dies are withdrawn.

16. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends; electric resistance coils carried by said dies; means for feeding said bodies and ends successively to said stations; means for actuating said dies; and means for causing the bodies with applied ends to remain central between and disengaged from opposing dies when the dies are withdrawn.

17. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends; means for heating said dies; means for feeding said bodies and ends, while disengaged from both of the opposing dies successively to said stations; and means for actuating said dies.

18. In a machine for conforming separate paper ends to vessel bodies, in combination: a series of opposing cup-shaped dies arranged at successive stations for compressing and conforming said ends exteriorly on said bodies; means for feeding said bodies and ends successively to said stations and means for actuating said dies; and means for causing the bodies with applied ends to remain central between and disengaged from opposing dies when the dies are withdrawn.

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