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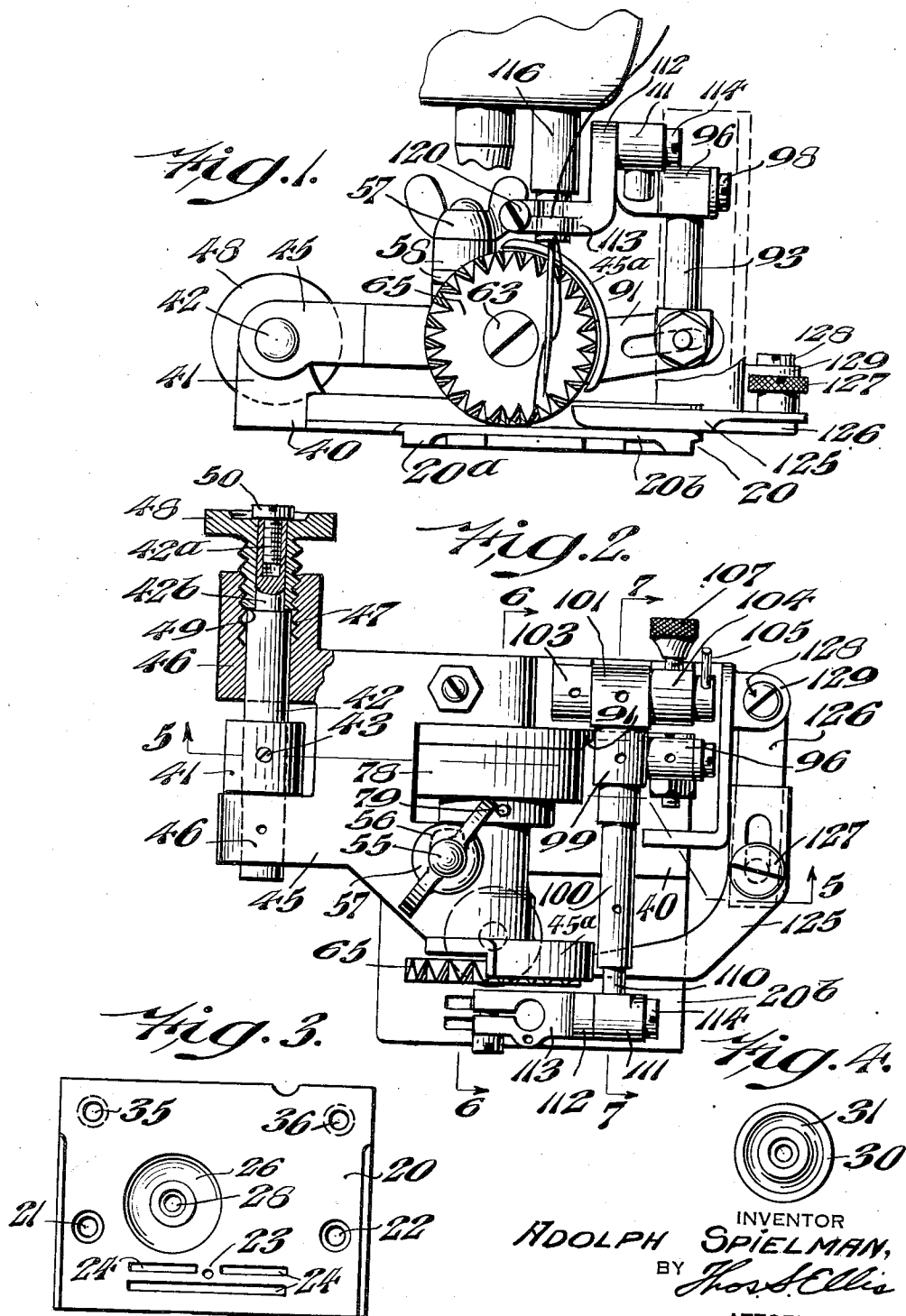
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# ATTACHMENT FOR SEWING MACHINES

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## ATTACHMENT FOR SEWING MACHINES

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My invention relates to sewing machines and, more particularly, to a novel attachment for pinking, trimming, and scalloping the edges of material adjacent a seam.

Heretofore, when it was desired to cut material, either in a straight line or with an ornamental, pinked or scalloped edge at the time the material was being sewed a machine was necessary which was either costly or unsatisfactory in operation.

The present invention comprises an attachment adapted to fit all sewing machines that use a vertically reciprocating needle bar, the only difference between the attachments for various machines being that different throat plates are used for the different makes of machines. The attachment comprises an intermittently rotatable cutter knife which is regulable to control not only the distance travelled by the periphery of the cutter knife relative to the stroke of the feed dog of the sewing machine but also the distance of the cutting edge of the knife from the seam.

A primary object of my invention is to provide a novel attachment for sewing machines which will trim the material being sewed at the time of sewing.

Another object of my invention is to provide a novel device in which a rotating knife co-operates with a rotating lower cutter plate, whereby is avoided the dulling, wedging, and mutilation of knives which was a fault of the reciprocating knives heretofore used.

Another object of my invention is to provide a rotating knife which is positioned out of parallelism with the needle, whereby the knife optionally may be positioned in close relationship to the needle and a narrow edge trimmed.

A further object of my invention is to provide an attachment for sewing machines adapted to trim an edge on the material being sewed, on which are provided means for adjusting the position of the cutter knife relative to the seam and means for adjusting the distance traveled by the cutter knife relative to the amount of material fed thereto by the feed dogs of the sewing machine.

Another object of my invention is to provide in an attachment for sewing machines a novel means for translating the reciprocating motion of an element of the sewing machine into intermittently rotated motion of a cutter knife.

These and other objects and advantages of my invention will be apparent from the specification, claims, and from the drawings in which:

Fig. 1 is a side elevation of my invention as viewed from the needle side of a sewing machine and showing the driving connection between the attachment and the needle bar of the sewing machine;

Fig. 2 is a plan view of my invention with certain parts broken away;

Fig. 3 is a detailed plan view of a throat plate;

Fig. 4 is a detailed plan view of the underside of a lower cutter plate;

Figs. 5, 6, and 7 are vertical sections taken on the lines 5—5, 6—6, and 7—7 respectively, Fig. 2;

Fig. 8 is a front elevation of a knife for making a straight cut;

Fig. 9 is a plan view of a piece of material illustrating the type of cut made by the knife shown in Fig. 8;

Fig. 10 is a vertical front elevation of a pinking knife;

Figs. 11 and 12 are plan views of pieces of cloth showing an incomplete and a complete pinking cut;

Fig. 13 is a vertical front elevation of a scalloping cutter; and

Fig. 14 is a plan view of a piece of material showing a scallop as made by the cutter illustrated in Fig. 13.

Broadly considered, my invention comprises a base, forming a part of the sewing machine, carrying a cutter plate, driving means attachable to the needle bar of the sewing machine, a cutter, an adjustable clutch interposed between the driving means and the cutter, and means for moving the cutter toward or away from the seam.

#### *The throat plate and lower cutter plate*

My entire attachment may be mounted upon and removably attached to a sewing machine by a throat plate 20 (Fig. 3) which is attachable to the sewing machine by screws (not shown) passing through the countersunk holes 21, 22, the holes being of such number and properly positioned to fit the particular type of machine to which the attachment is to be fitted. Preferably, as indicated in Fig. 1, the throat plate 20 is constructed so that the lower portion 20a thereof conforms to the shape of the opening closed by the original throat plate while the upper part 20b overlies the portions of the machine adjoining such opening.

The throat plate 20 carries the usual openings therein such as the needle hole 23 and feed dog openings 24, the positions and shape of which may be varied to suit the type of machine upon which the attachment is to be used.

Spaced approximately one quarter inch forwardly of the needle hole 23 and to the right thereof is a circular recess 25 having formed therein a circular race-way 26 for ball bearings 27 (Fig. 6). The raceway 26 is spaced from an axial threaded opening 28 receiving a flat headed screw 29 which holds the lower cutter plate 30, acting as an anvil, in place. The lower cutter plate 30 is disc shaped and has formed in its under face a ball bearing raceway 31 cooperating with the raceway 26 in the throat plate 20 so that the lower cutter plate 30 is free to revolve on the ball bearings 27 about the screw 29 as an axis.

The opening 28, raceway 26, and recess 25 are so formed that the plane of the upper surface of the lower cutter plate 30 lies at an angle greater than 90° with the vertical plane passing through the needle, the angle preferably being about 93°, it being understood that the greater angle is on the cutter side of the needle.

The throat plate 20 has formed therein other openings such as are indicated at 35, 36 by means of which the remainder of the attachment, mounted on a casting 40, may be connected to the plate as by the screw 37 passing therethrough and engaging the casting.

#### *The cutter and its support*

The parts of the attachment mechanism hereinafter described are common to all machines to which the attachment is adapted to be fitted and need no variation other than those which are automatic or which must be made in the operation of every machine.

Screws such as indicated at 37 connect the casting 40 having an upwardly directed stud 41 to the throat plate 20. The stud 41 is formed with a cylindrical bore, having its axis in a plane parallel to that of the upper surface of the lower cutter plate 30, and carries a fixed shaft 42 held in position against both rotative and longitudinal motion by a set screw 43.

The fixed shaft 42 is, at its end away from the cutter, hollow and interiorly threaded as at 42a and is of reduced diameter as at 42b. A cutter blade carriage 45 is mounted on the shaft 42, for oscillation thereabout and longitudinal movement thereon, on a plurality of bearings 46. Adjacent one of the bearings 46 in the carriage 45 the carriage is internally threaded, coaxially with the bearing, as at 47, to receive a hollow screw 48 fitting over the reduced end 42b of the shaft 42. The inner end of the screw 48 bears against a shoulder 49 on the shaft 42 at the point where the diameter of the shaft changes. A screw 50 is carried by the shaft 42. Movement of the screw 50 permits longitudinal movement of the bearings 46 on the shaft 42 and movement of the screw 48 on the shaft 42 causes movement of these bearings to move the cutter carriage 45 toward or away from the needle as desired. The two screws form in effect a vernier device and fine adjustments may be made.

Adjustment of the carriage 45 to vary the distance of the cutter blade from the lower cutter plate may be made by reason of the oscillating mounting of the carriage 45 on the shaft 42. Inasmuch as it is not necessary that the lower limit of movement be controlled, provision is made only for maintaining the cutter blade at its lowermost position. This is accomplished by means of the stud bolt 55 mounted in the casting 40 and passing through a slot 56 in the carriage 45, the stud carrying a wing nut 57 and

lock washers 58. By turning the wing nut 57 the position of the cutter carriage 45 may be varied and the cutter blade held in position against the lower cutter plate and when so positioned the attachment will receive any and all materials regardless of their thickness.

Axially aligned bearings 60 and 61, formed on the carriage 45, with their axes aligned and parallel to the axis of the shaft 42 carry a cutter shaft 62 on the end of which, adjacent the needle, is fixed as by the screw 63 a cutter knife 65. The cutters 65 have, formed on their inner faces, a slot 66 which engages a complementary tongue on the end of the shaft 62 to prevent rotation of the cutter relative to the shaft. The operation of the machine is protected from the cutter knife by a guard 45a cast integrally with the cutter carriage 45.

As illustrated in Figs. 8 to 14, the cutters may be of any suitably shaped edge to obtain the desired result, the cutter 70 (Fig. 8) being formed with a knife edge 70a to give a straight cut as at 71 (Fig. 9) adjacent the row of stitches 72; the cutter 65 (Fig. 10) being formed with a zig-zag edge to form what is known as pinking 73 (Figs. 11 and 12) adjacent the stitches 72; and the cutter 74 (Fig. 13) being formed with a semi-circular edge to cut a scallop 75 (Fig. 14).

#### *Driving mechanism and clutch*

The cutter shaft 62 is rotated through a friction clutch comprising a drum 78 fixed on the shaft 62 as by a set screw 79. Within the drum 78 and rotatably mounted on the cutter shaft 62 is a spider 80 having cut out portions 81 forming cam surfaces 82 within which are cylindrical bearings 84. Expansion springs 85 push the bearings 84 in a direction such that the cam surfaces 82 will force the bearings into contact with the inner face of the drum 78 and move the drum, by friction, in a counter clockwise direction (as viewed in Fig. 5). It will be obvious that when the spider 80 is moved in the opposite direction the cylindrical bearings 84 will exert no great force upon the drum 78, and to insure against retrograde movement thereof a plunger 90 is held under pressure against the outer face of the drum by an expansion spring 86 positioned in a bore 87 in the carriage 45 by a screw 89.

The spider 80 is oscillated on the shaft 62 to alternately move and allow to remain stationary the drum 78 and shaft 62 by a segment 91 fixed to the spider 80. The segment 91 has formed therein a slot 92 which has connected thereto a connecting rod 93 by means of a bolt 94 passing through the lower end of the rod and held in place by a nut 95. The upper end of the connecting rod 93 is formed with a bearing 96 in which is mounted a hollow pin which carries a screw 98 to keep the connecting rod from slipping from the pin. The pin is mounted on a sliding bearing 99 on a hollow drive shaft 100 one end of which is formed with a bearing 101 mounted on an eccentric shaft 102. The eccentric shaft 102 is mounted in bearings 103, 104 formed in the casting 40 and carries a radially extending lever 105 whereby it may be turned to vary the length of the driving shaft 100. The eccentric shaft bearing 104 carries a thumb screw 107 the inner end of which abuts the eccentric shaft whereby the shaft may be locked in position when adjusted.

The hollow end of the driving shaft 100 carries a pin 110 slidably mounted therein on the end of which is formed a bearing 111 for a screw

114 connected to an end 112 of a bent split connecting yoke 113, a portion of the screw forming a shaft within the bearing 111.

A vertically reciprocating needle bar 116 of a sewing machine 117 is engaged by the yoke 113 and held in engagement therewith by a tension screw 120.

In order to gauge, when desired, the distance between the edge of the material and the line upon which the new edge is to be cut, I provide a sliding gauge arm 125 adjustable in position along a swinging arm 126 by a thumb screw 127 (Fig. 2). The arm 126 is pivoted on a screw 128 mounted on a lug 129 on the casting 40 so that it may be swung out of the way when its use is not desired.

#### Operation

In operation my attachment, being provided with a throat plate 20 suitable for the machine to which it is to be attached, is fastened to the sewing machine in place of the original throat plate by suitably located screws and the driving yoke 113 is fastened to the needle bar 116 by the screw 120. With the cutter knife having an edge of the desired configuration mounted on the cutter shaft 62 the machine may be started and other adjustments made.

Due to the tilting of the cutter knife the edge of the knife may be brought close to the seam to form a narrow edge, if desired, or moved away therefrom to make a wider edge. This adjustment is accomplished by manipulation of the screws 48 and 50 coupled with a loosening of the thumb screw 57 to permit movement of the slot 56 in the carriage 45 with respect to the stud 55. Movement of the driving mechanism on the carriage 45 with respect to the driving mechanism on the casting 40 is permitted by the sliding engagement of the bearing 99 on the driving shaft 100. Following the proper positioning of the cutter knife 65 with respect to the needle the thumb screw 57 is tightened to maintain the cutter knife in adjusted position relative to the seam and to bring the cutter knife into contact with lower cutter plate 39 and maintain it in such position.

Since a majority, if not all, of the sewing machines can be adjusted to vary the number of stitches to the inch, usually by varying the distance the material being sewed is moved by the feed dogs between successive stitches, it is necessary to provide means for varying the distance which the cutter knife travels during each of its periods of movement since the co-operation between the cutter knife and the lower cutter plate causes the material to advance. Thus, if the edge of the cutter knife moves a greater lineal distance than the length of the material advanced by the feed dogs the material will be under tension and cause uneven spaces between the stitches and if it moves a lesser lineal distance than the material fed, the material will pile up between the cutter knife and the needle and finally crease and cut unevenly. To obviate this disadvantage both coarse and fine adjustments are provided, for adjusting the distance which the cutter knife shaft 62 is revolved at each stroke of the needle bar. Since the connecting rod 93 travels a constant distance relative to the distance traveled by the needle bar the extent of movement of the cutter shaft may be varied by varying the distance between the axis of the shaft and the point at which the connecting rod is attached thereto. This may be accomplished by loosening the nut 95 and moving bolt 94 within

the slot 92 of the segment 91 to a position at which the lineal distance traveled by the cutter wheel is roughly equivalent to the amount of material advanced by the feed dogs of the sewing machine at which position the nut may be tightened and the adjustment maintained.

To correct this relationship more accurately during the time the machine is running or to take care of small variations in the rate at which the material is fed, since the relationship of the needle bar to the end of the driving shaft 100 is fixed but the length of the driving shaft may be varied because of the sliding connection between the shaft 110 and the shaft 100, the eccentric shaft 102 upon which the driving shaft is pivoted may be turned by the lever 105 to shorten or lengthen the drive shaft and thus vary the distance it travels and hence the distance which it moves the segment 91.

From the foregoing description it will be obvious that I have provided a trimming attachment for sewing machines which is adjustable to vary the width of the edge of the material and which may be varied so as to remain operative as the amount of material moved by the feed dogs may be varied.

Various modifications may be made in the above described embodiment of my invention without departing from the spirit and scope thereof as set forth in the following claims.

What I claim is:

1. An attachment for sewing machines adapted to trim an edge on the material being sewed, adjacent the seam, comprising a cutter knife; a cutter plate; means for adjusting the pressure of said knife on said plate; means imparting an intermittent rotative motion to said cutter knife; means for varying the distance travelled by said knife during each period of motion; and operating means for moving said knife toward or away from said seam.

2. An attachment for sewing machines adapted to trim an edge on the material being sewed, adjacent the seam, comprising a rotatable cutter knife; a cutter plate rotatable by friction by said cutter knife; means for driving said cutter knife intermittently, said means including linkage comprising means for varying the extent of movement of said knife, and operating means for moving said knife radially of said plate.

3. A trimming device, adapted for association with a sewing machine, comprising a casting, bearings in said casting; a shaft in said bearings, the axis of said shaft being at an angle of more than 90° and less than 180° with respect to the plane in which lies the needle of the sewing machine; a carriage on said shaft; a cutter shaft mounted for rotation in said carriage, the axis of said cutter shaft being parallel to the axis of said first named shaft; a substantially disc shaped cutter on said cutter shaft, the periphery of said cutter lying in a plane normal to the axis of said shaft; and means for driving said cutter shaft, said means comprising a reciprocable, telescoping, driving shaft, means for attaching said driving shaft to a reciprocating part of said sewing machine; and linkage between said driving shaft and said cutter shaft, said linkage including means for telescoping said driving shaft thereby varying the length of movement thereof, a crank, a connecting rod between said driving shaft and said crank, and means for adjusting the position of said connecting rod longitudinally upon said crank.

4. A trimming device, adapted for association with

with a sewing machine, comprising a casting, bearings in said casting; a shaft in said bearings, the axis of said shaft being at an angle of more than 90° and less than 180° with respect to the plane in which lies the needle of the sewing machine; a carriage on said shaft; a cutter shaft mounted for rotation in said carriage, the axis of said cutter shaft being parallel to the axis of said first named shaft; a substantially disc shaped cutter on said cutter shaft, the periphery of said cutter lying in a plane normal to the axis of said shaft; and means for driving said cutter shaft, said means comprising a reciprocable, telescoping driving shaft, means for attaching said driving shaft to a reciprocating part of said sewing machine, and linkage between said driving shaft and said cutter shaft, said linkage including an eccentric shaft for telescoping said driving shaft thereby varying the length of movement of a part of said driving shaft.

5. A trimming device, adapted for association with a sewing machine, comprising a cutter shaft, means for supporting said cutter shaft; a cutter on said cutter shaft, said cutter being normal to the axis of said shaft; and means for driving said cutter shaft, said means comprising a reciprocating, telescoping driving shaft, means for attaching said driving shaft to a reciprocating part of said sewing machine; and linkage between said driving shaft and said cutter shaft, said linkage including means for varying the length of movement of a part of said driving shaft.

6. An attachment for sewing machines adapted to trim an edge on the material being sewed adjacent the seam comprising a cutter knife, means for driving said knife, a cutter plate adapted for movement about an axis, and operating means for adjusting the position of said knife radially of said plate.

7. An attachment for sewing machines adapted to trim an edge on the material being sewed adjacent the seam comprising a base, a cutter knife and means for driving said knife operably mounted on said base, a cutter plate rotatable about a fixed axis on said common base, means for connecting said base in a fixed relationship with a sewing machine, and operating means carried by said base for moving said cutter knife across a cooperating face of said cutter plate and relative to said base toward or away from said seam.

8. A pinking attachment for sewing machines comprising a base adapted for attachment to a sewing machine, a cutter knife, means for rotating said knife from a moving element of said sewing machine, a rotatable cutter plate supported on said base, and ball bearings between said plate and said base, some of said ball bearings being positioned beneath a point at which a portion of said knife normally contacts with said plate.

9. A pinking attachment for sewing machines comprising a base adapted for attachment to a sewing machine, a cutter knife, means for rotating said knife from a moving element of said sewing machine, a rotatable cutter plate journaled on a screw fixed in said base, and ball bearings between said plate and said base.

10. A trimming device adapted for attachment to a sewing machine having feed dogs adapted to

feed material being sewed past a needle, comprising a cutter knife, means for rotating said cutter knife, said means comprising a shaft connected to the needle bar of said sewing machine and lying in a vertical plane at a right angle to a plane passing vertically through the line of movement of the feed dogs and parallel to said line of movement.

11. A pinking attachment for sewing machines having a vertically reciprocating needle bar comprising a shaft; a cutter wheel mounted on said shaft, a drive shaft connected to said needle bar and mounted for oscillation in a plane parallel to the axis of said cutter wheel shaft, and means operatively connecting said drive shaft and said cutter wheel shaft.

12. A pinking attachment for a sewing machine having a vertically axially reciprocable needle bar and needle, said attachment comprising a rotary peripheral face cutter adapted to be positioned laterally adjacent said needle bar and needle in a plane upwardly divergent to the axis thereof, a lower cutter plate having a surface cooperating with the peripheral cutting face of said cutter and disposed in a plane at right angles to the plane of said cutter, and means for rotating said cutter including an element attachable to said needle bar and operable therewith and thereby in the angle of divergency between the cutter and the needle bar and needle.

13. An attachment for sewing machines, comprising a normally horizontal base, a carriage overlying and pivotally mounted on said base about a substantially horizontal axis, a cutter plate rotatably mounted on said base about a substantially vertical axis spaced laterally from the pivotal axis of said carriage, a cutter wheel rotatably mounted on said carriage about an axis parallel to said pivotal axis of the carriage and overlying said cutter plate with the peripheral face of the cutter wheel in contact with the upper flat face of the cutter plate, and operating means functioning between said base and said carriage for shifting said carriage bodily relative to said base in the direction of the axes of said pivot and said cutter wheel to vary the point of contact of said wheel with said flat face of said cutter plate.

14. An attachment for sewing machines comprising a normally horizontal base provided with a normally vertical needle opening, a carriage overlying and pivotally mounted on said base about a substantially horizontal axis remote to said opening, a cutter plate rotatably mounted on said base about a substantially vertical axis adjacent said opening and spaced laterally from the pivotal axis of said carriage, a cutter wheel rotatably mounted on said carriage about an axis parallel to said pivotal axis of the carriage and overlying said cutter plate with the peripheral face of the cutter wheel in contact with the upper flat face of the cutter plate, and operating means functioning between said base and said carriage for shifting said carriage bodily relative to said base in the direction of the axes of said pivot and said cutter wheel to vary the point of contact of said wheel with said flat face of said cutter plate and with respect to said needle opening.

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