Feb. 18, 1947. W. E. SOMERVILLE 2,416,126

ROPE MACHINE

Filed Aug. 1, 1945 4 Sheets-Sheet 1

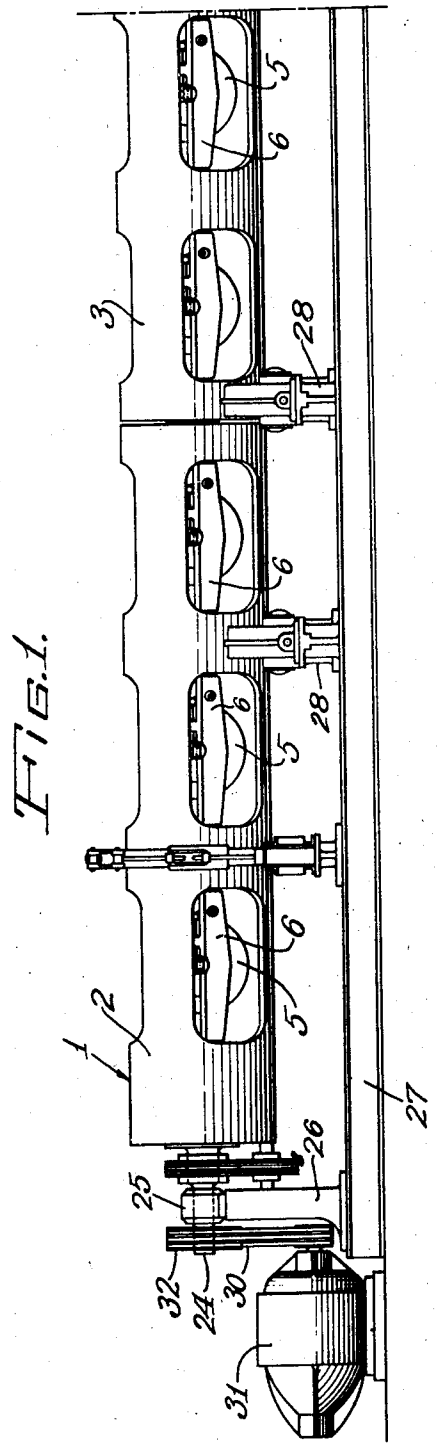


FIG. 1.

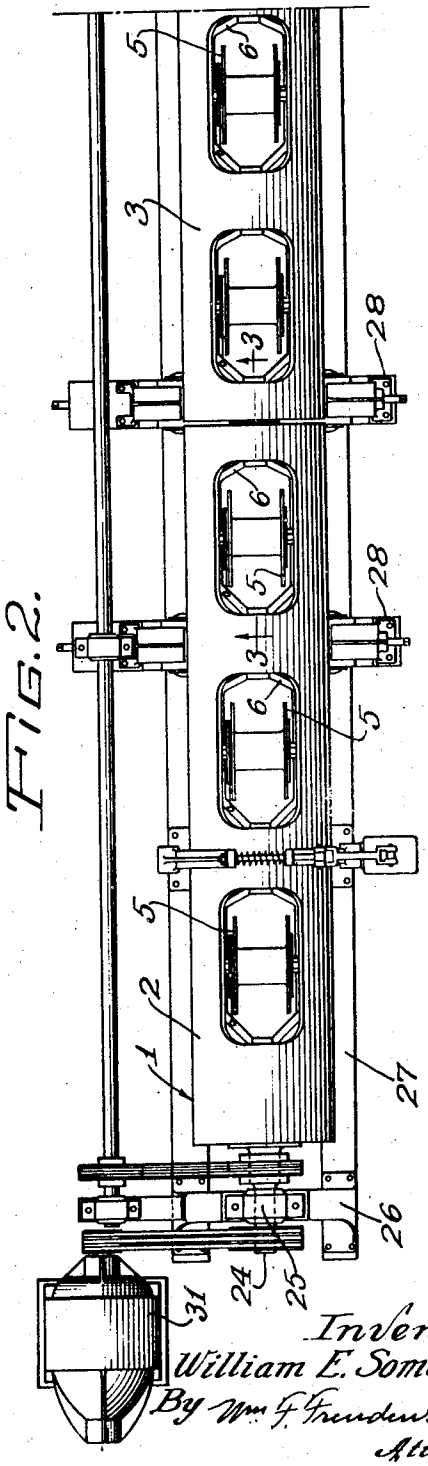


FIG. 2.

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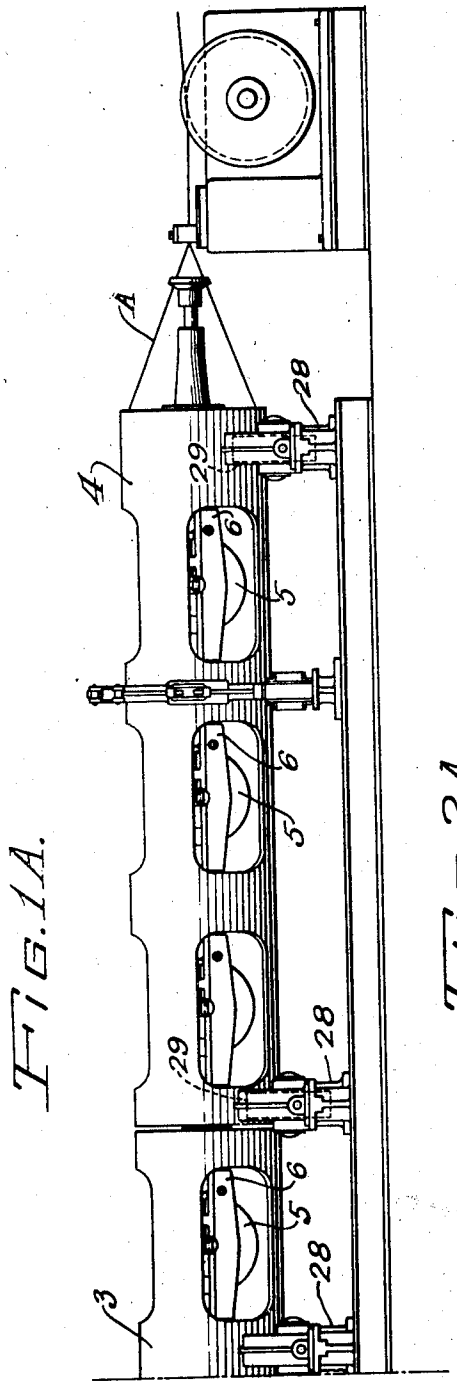


FIG. 1A.

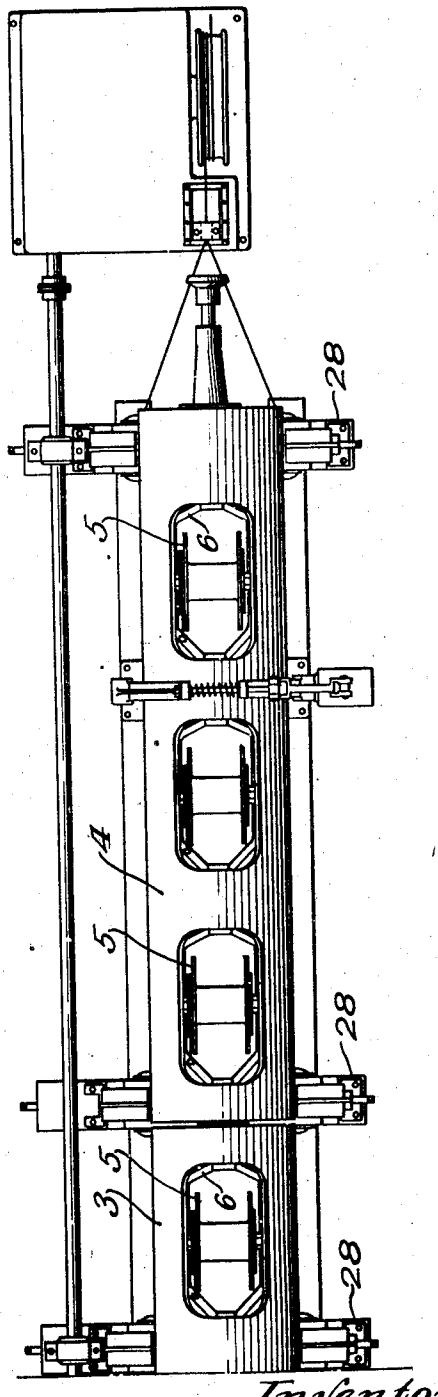


FIG. 2A.

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Fig. 3.

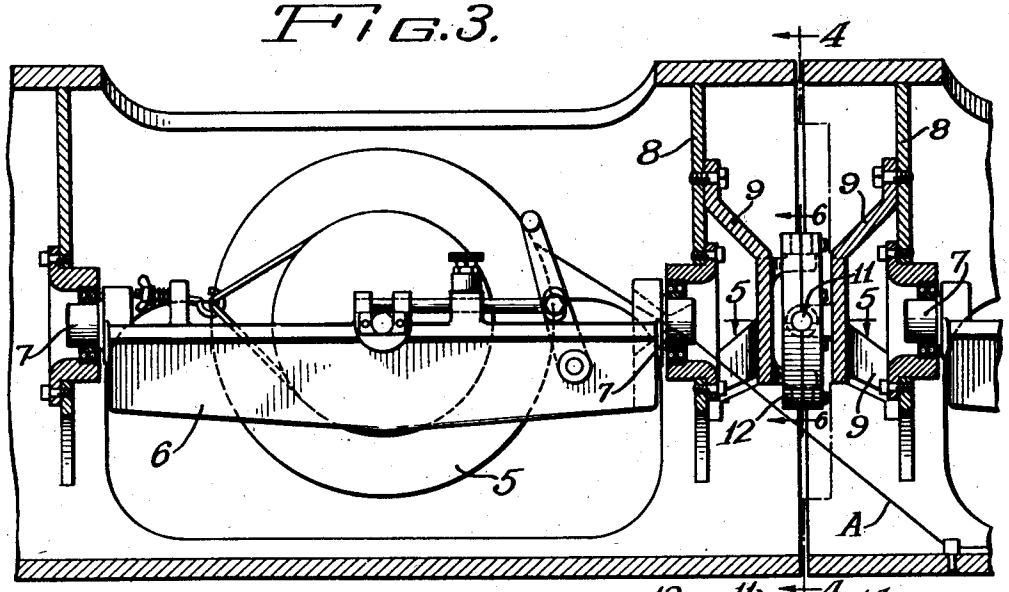


Fig. 5.

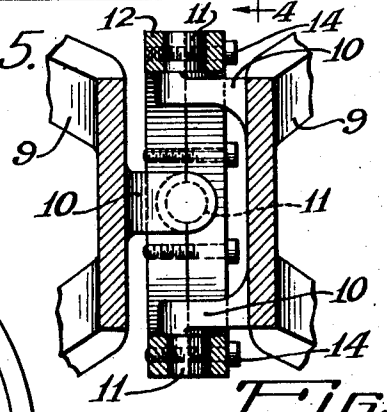


Fig. 4.

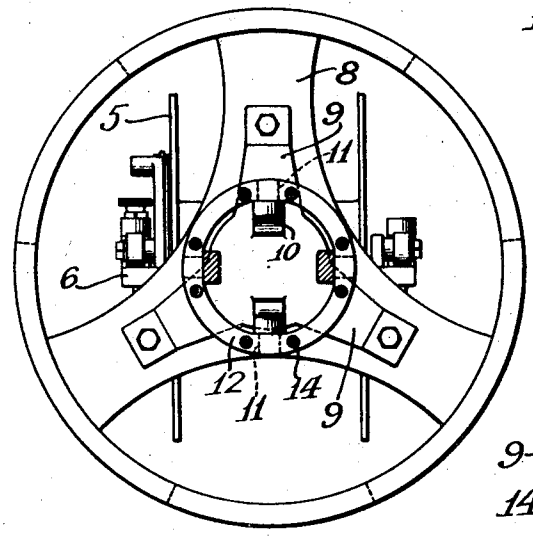


Fig. 6.

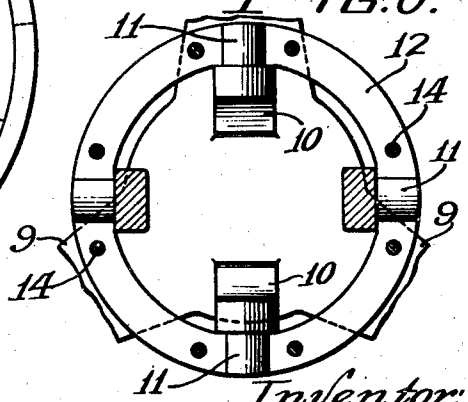


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Fig. 7.

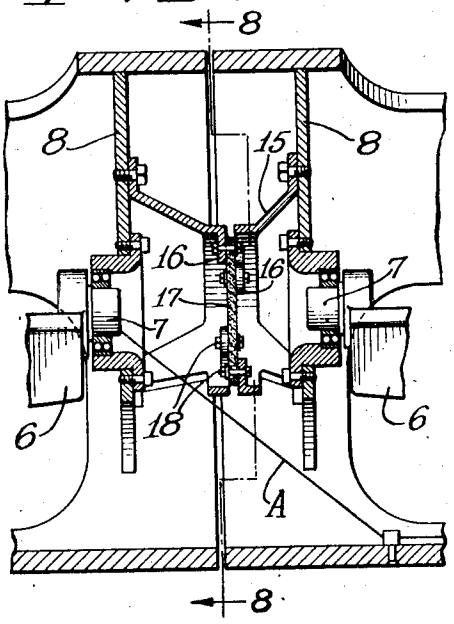
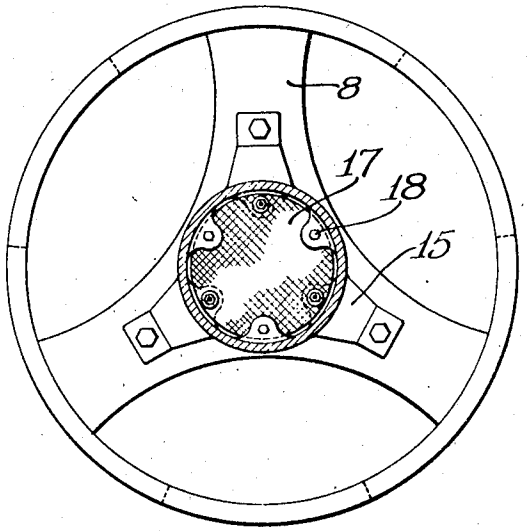



Fig. 8.

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# UNITED STATES PATENT OFFICE

2,416,126

## ROPE MACHINE

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Application August 1, 1945, Serial No. 608,128

6 Claims. (Cl. 57—59)

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In the so-called tubular or pipe type of wire rope machine, whether it be a stranding machine or a closer, the long tubular body in which the bobbins are suspended must be made in sections that have been, heretofore, rigidly united, end to end. It is almost impossible to achieve such accuracy in manufacture as is necessary to obtain perfectly balanced completed rigid tubes or pipes; the result being that, even though time and expense be not spared in the making of such a long rigid tubular member, it is apt to whip or wobble more or less in use. This causes a waste of power, undue wear and requires slower operation of the machine than would be the case with a perfectly balanced body member.

The primary object of the present invention is so to construct a sectional tubular body for machines of the type under discussion as to overcome the faults which almost inevitably exist in such members made in the old way.

In carrying out my invention, the tubular body is formed in sections, as heretofore, but, instead of connecting the sections rigidly to each other, I make the connections yieldable to such an extent that each complete body becomes self aligning.

Therefore, viewed in one of its aspects, the present invention may be said to have for its object to produce a rope making machine of the tubular body type wherein the body is self aligning.

The various features of novelty whereby the present invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of the invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figures 1 and 1A are side views of the halves of a machine, embodying the present invention, divided along a central transverse plane; Figs. 2 and 2A are top plan views of the two parts of the machine appearing in Figs. 1 and 1A, respectively; Fig. 3 is a section, on an enlarged scale, on line 3—3 of Fig. 2; Fig. 4 is a section on line 4—4 of Fig. 3; Fig. 5 is a section, on a still larger scale, on line 5—5 of Fig. 3; Fig. 6 is a section on line 6—6 of Fig. 3, the scale being the same as that of Fig. 5; Fig. 7 is a central longitudinal section at a joint between two tube or pipe sections, showing a modified form of joint; and Fig. 8 is a section on line 8—8 of Fig. 7.

Referring to Figs. 1 to 6, 1 represents the tubular body of a stranding or closer machine

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divided transversely into any desired number of sections. A good length for a section is one adapted to house three or four bobbins. In the particular machine illustrated there are three sections, 2, 3 and 4, each of which contains three bobbins 5 supported in cradles 6 in the usual manner. The cradles are pivotally supported in any usual way, conveniently by providing them at opposite ends with trunnions 7 having bearings in transverse spiders 8 fixed in the tube or pipe; these bearings being at the longitudinal axis of the body and above the centers of gravity of the cradles and their bobbins. There is one such spider a short distance inward from each end of each tube or pipe section.

I utilize the spiders at the meeting ends of the tube or pipe sections to couple the latter together; the couplings being, however, yieldable instead of rigid. In the arrangement shown, there are on the two spiders at each joint brackets 9, which preferably take the form of small spiders shaped to extend toward each other. On each bracket or small spider are two short arms 10, paralleling and on opposite sides of the axis of the tubular body and extending across the dividing plane between the corresponding tube or pipe sections. On each arm is a trunnion 11 that is radial to the axis of the body and has its own axis in the dividing plane between the corresponding tube or pipe sections. Each group of four trunnions has bearings in a ring 12 that is preferably divided on the plane containing the axes of the trunnions; the two halves of each ring being fastened together by screw bolts 14. In other words, the coupling is a swivel universal joint that allows members connected thereby freely, with no bias toward or from any relative angular position, freely to rock while being held against other relative movements. The parts are so proportioned that meeting ends of the tube or pipe sections are spaced a little apart from each other. The bearings in the rings are spaced ninety degrees apart so that any two meeting sections may rock relatively to each other about two transverse axes at right angles to each other; the rocking movements being, of course, limited to a very small angle by reason of the fact that the gaps between meeting ends of the sections are very small.

Instead of using the trunnion or any other swivel type of flexible coupling, the cooperating brackets may be secured together by an elastic member fixed to both of them and permitting slight adjusting movements between two con-

nected tube or pipe sections by reason of the elasticity of such members. Thus in Figs. 7 and 8 the brackets 15, similar to the brackets 9 heretofore described, have ears 16 instead of trunnions, these ears on each bracket being in a plane at right angles to the axis of the machine, and the plane of the ears on one bracket being spaced a little apart from the plane of the ears on the cooperating bracket. A stiff fiber plate in the form of a disc 17 is disposed in the space between the two sets of ears and is fastened to the latter by bolts 18. The ears on one bracket are staggered relatively to those on the other bracket, so that there is no metal to metal connection between the two tube or pipe sections and they may rock slightly relatively to each other through the flexing of the fiber disc.

It will be noted that both couplings described are so constructed that they do not interfere with the wire or strand A that emerges in the usual way from the hollow trunnion 7 on the cradle in one tube or pipe section and extends diagonally into the adjacent section. Thus in Figs. 3 and 7 the wire or strand passes between the arms of the spiderlike bracket on the large spider that supports the trunnion through which the wire or strand is led; the wire clearing the connecting means between the two brackets.

The tubular body may be supported and driven in any suitable way. In the arrangement shown, the tube or pipe is supported at its driven end by a heavy journal 24 that is fixed thereto and extends through a bearing 25 on top of a pedestal 26 which rises from one end of a sturdy base 27 that extends throughout the length of the machine. At intervals along the base are the usual roller frames 28 provided with rollers 29 on which the body rests and by which the remainder of the support for the latter is given. It will be seen that there is only one roller frame under section 2, this being located between the second and third bobbins. Under section 3 are two roller frames, one close to the adjacent end of section 2 and the other between the second and third bobbins. There are two roller frames under section 4, one at each end. The tube or pipe is driven by a belt 30 extending from a motor 31 around a pulley 32 on journal 24.

Because the tubular body is not constrained by an embracing bearing anywhere except at the driven end, the flexible couplings are enabled to permit it to flex a little and permit its sections to become accurately aligned through proper adjustment of the roller frames; and even though the roller frames should not be accurately adjusted, the body member does not offer the resistance to turning that a rigid member would under the same conditions. On the other hand, when the roller frames are adjusted to accommodate a tubular body of which the sections are accurately aligned, the latter will automatically align themselves. Consequently, using my invention, a machine can be driven at higher speed, with the same expediture of power, than is possible with prior machines of this type; the machine is easier to manufacture; and it will last longer.

While I have illustrated and described with particularity a single preferred form of my invention, together with some simple modifications, I do not desire to be limited to the specific structural details thus illustrated and described; but intend to cover all forms and arrangements that come within the definitions of my invention constituting the appended claims.



I claim:

1. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, external bearings for the body each engaging only one section thereof, spiders fixed within said body, one on each side of each gap, and a universal joint unit of the swivel type, of small diameter compared with the diameter of said body, disposed within and coaxial with the body between and secured to the central portions of each pair of opposed spiders, and the space around each universal joint unit being clear and unobstructed.

2. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, external bearings for the body each engaging only one section thereof, transverse members fixed within the body so as to extend from the cylindrical wall inwardly toward the axis, one on each side of each gap, brackets, whose dimensions transverse to the axis of the body are much smaller than the diameter of the body, secured to said members near the said axis, the brackets on opposite sides of each gap extending toward each other, and means connecting each pair of opposed brackets to permit relative movements of the corresponding tubular sections in any direction.

3. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, transverse members fixed in the body so as to extend from the cylindrical wall inwardly toward the axis, one on each side of each gap, brackets, whose dimensions transverse to the axis of the body are much smaller than the diameter of the body, secured to said members near said axis, the brackets on opposite sides of each gap extending toward each other, and means constituting a universal joint disposed at the axis of the body between each pair of opposed brackets to provide the sole connection between the tubular sections.

4. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, transverse members fixed in the body so as to extend from the cylindrical wall inwardly toward the axis, one on each side of each gap, brackets, whose dimensions transverse to the axis of the body are much smaller than the diameter of the body, secured to said members near said axis, the brackets on each side of each gap extending toward each other, each bracket having thereon a pair of aligned trunnions disposed at right angles to said axis, the axes of all trunnions being in the same plane and the common axis of one pair being at right angles to the axis of the other pair, and a ring-like element containing radial bearings for said trunnions.

5. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, spiders spanning the interior of and fixed to said body, one on each side of each gap, a small spider whose transverse dimensions are much smaller than the body diameter fixed to the center of each of the aforesaid spiders on the side facing the spider

across the adjacent gap therefrom, means connecting the central portions of opposed small spiders in a manner to form universal joints which allow adjacent tubular sections to move freely relatively to each other to bring their axes into positions at an angle to each other, and the space within the body around each pair of small spiders and the connecting means between them being clear and unobstructed.

6. A rope making machine embodying an elongated body formed of a plurality of tubular sections arranged end to end with a gap between proximate ends of adjacent sections, means to support the body in a manner to leave it unconstrained at the gaps, transverse members fixed within the body so as to extend from the cylindrical wall inwardly toward the axis, one on each side of each gap; and a coupling much



smaller in transverse dimensions than the diameter of the body, including a universal joint, between said transverse members at each gap and coaxial with the said body.

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