July 24, 1956 J. A. CASTRICONE 2,755,651

DRIVE MECHANISM FOR CLOTHES WASHING MACHINES

Original Filed May 15, 1947 3 Sheets-Sheet 1

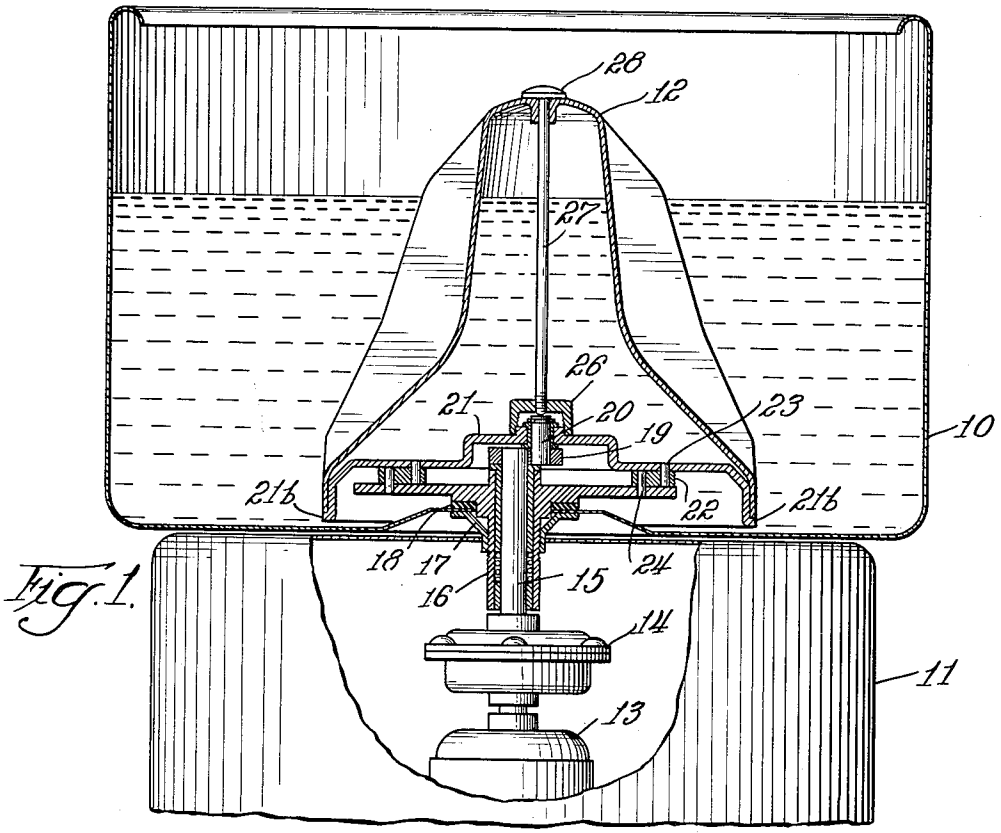

Fig. 1.

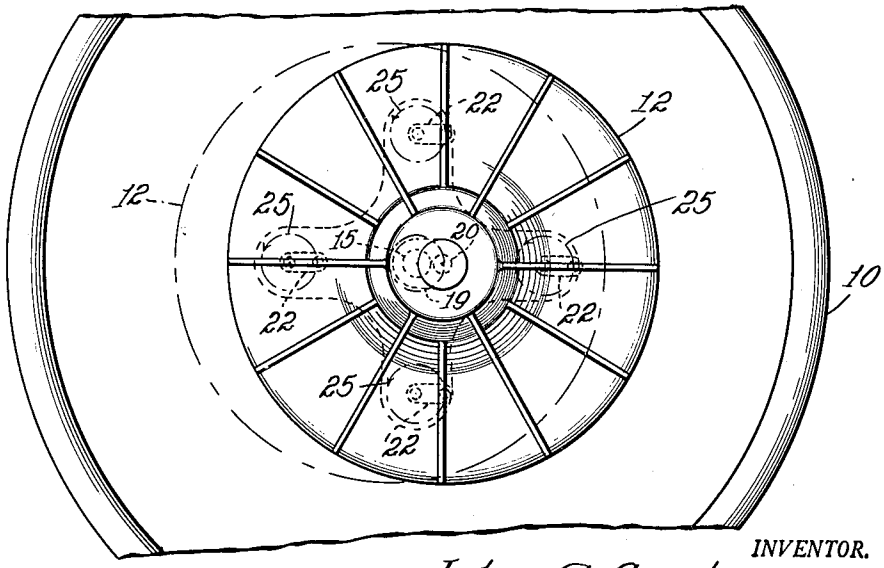

Fig. 2.

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Fig. 4.

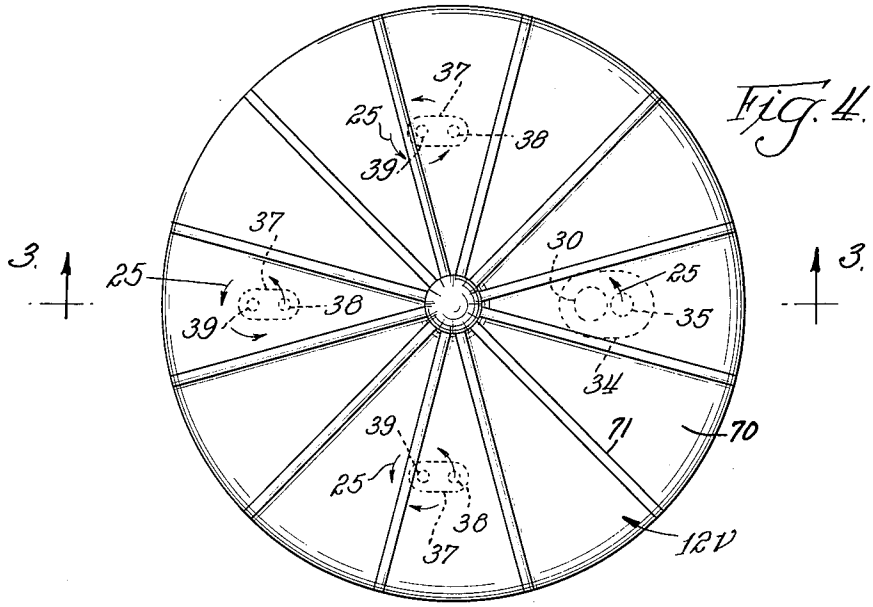
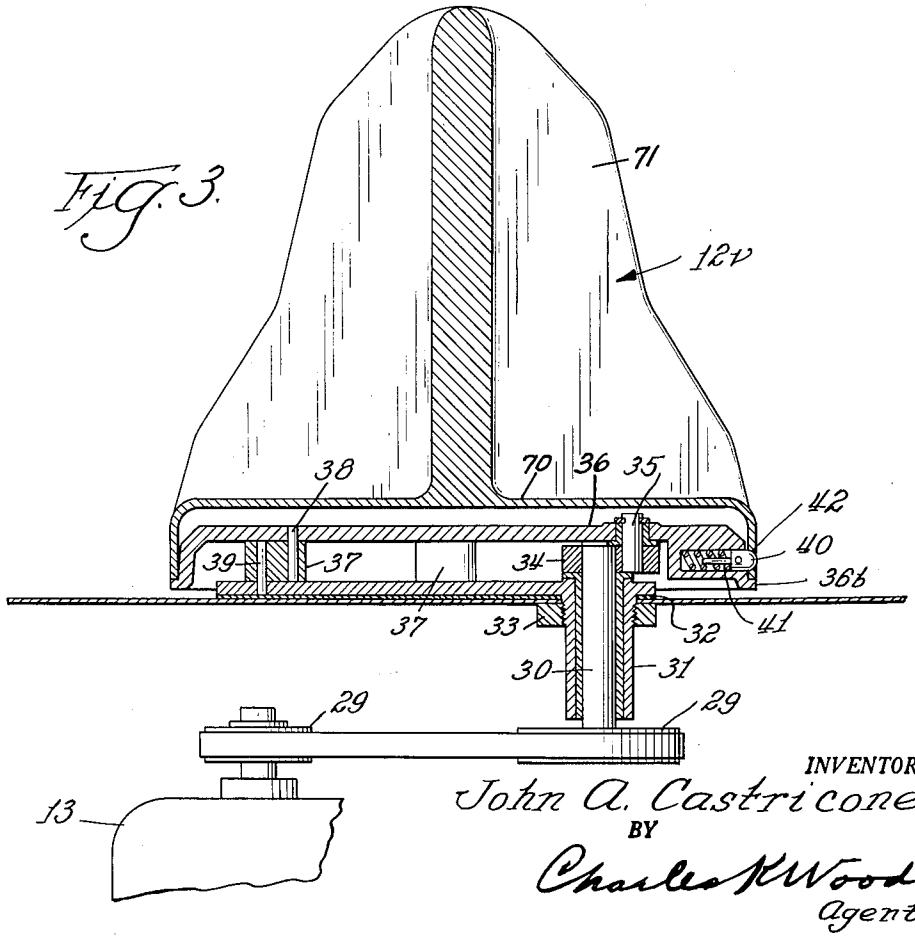


Fig. 3.



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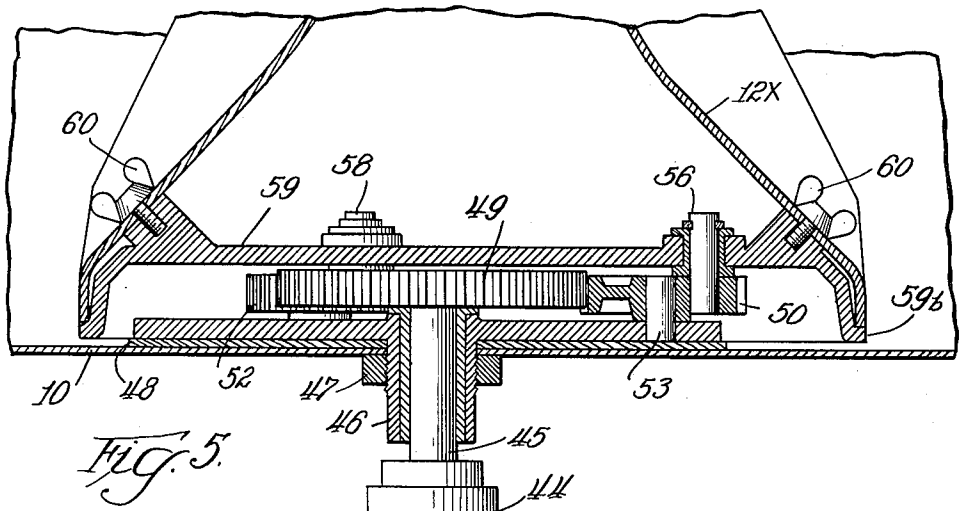

Fig. 5.

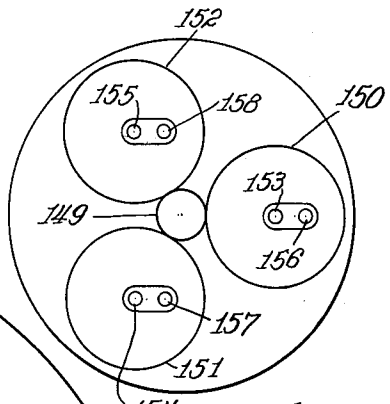

Fig. 6a

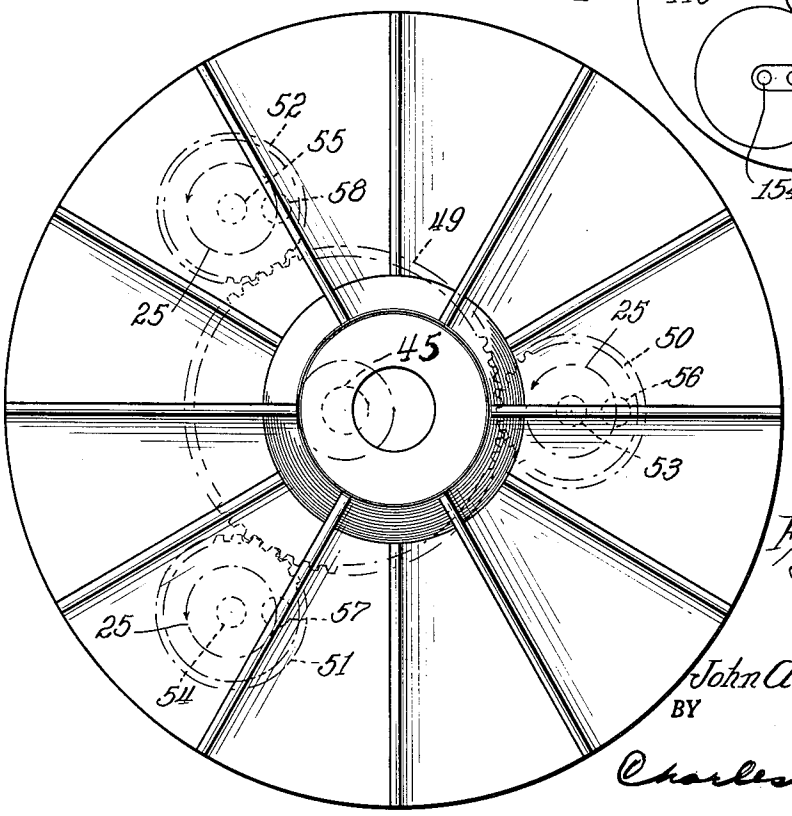

Fig. 6

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DRIVE MECHANISM FOR CLOTHES WASHING MACHINES

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Substituted for abandoned application Serial No. 748,327, May 15, 1947. This application March 14, 1952, Serial No. 276,659

7 Claims. (Cl. 68—131)

This application is a substitute for my application, Serial No. 748,327, filed May 15, 1947 (now abondoned).

This invention relates to clothes washing machines, and particularly to a drive mechanism for washing machines employing dashers rotated in an orbital path.

In my prior patent, No. 2,416,611, granted Feb. 25, 1947, I fully described and illustrated a washing machine employing a dasher power driven in an orbital path within the washing machine tub without substantial axial rotation. The mechanism for so driving the dasher included a center post extending from the bottom of the tub to approximately the top of the dasher. Through this center post the dasher was both power driven and supported.

Analysis of the structure readily discloses that the entire dasher drive is through a single crank pin located on the top of the center post and that the comparatively tall and slender center post must withstand all the reaction stresses resulting from the dasher contact with the clothes. It will be appreciated also that the interior of the dasher is so filled with mechanism that the space within the dasher is not available for any other purpose should such a need develop.

It is a particular object of the present invention to provide a drive mechanism for an orbital movement dasher that will eliminate the conventional center post and concentrate the mechanism in the bottom of the dasher closely adjacent the bottom of the tub.

Another object is to provide a simple sturdy mechanism for driving an orbital movement dasher without axial rotation.

A further object is to provide a dasher drive mechanism wherein the dasher is completely supported from its base.

A further object is to provide a dasher driven mechanism wherein the need for a hollow center section of the dasher is eliminated.

A still further object is to provide a mechanism for driving an orbital movement dasher wherein the drive shaft of the mechanism may be offset from the dasher and the tub center to provide more compact and better balanced drive.

Other objects and benefits will be disclosed in the following description and in the drawings in which:

Fig. 1 is a broken front elevational view of a washing machine, partly in section, to disclose my new compact orbital dasher drive;

Fig. 2 is a broken top plan view of the washing machine shown in Fig. 1;

Fig. 3 is an enlarged central sectional view on the line 3—3 in Fig. 4, of an optional form of my drive mechanism wherein the drive shaft is offset from the center of a dasher having radiating blades without any hollow center stem section;

Fig. 4 is a top plan view of the mechanism in Fig. 3;

Fig. 5 is a similar enlarged broken elevation view, partly in section, showing an optional form of driven mechanism wherein gears are employed;

Fig. 6 is a top plan view of the mechanism shown in Fig. 5; and

Fig. 6*a* is a smaller somewhat diagrammatic view of an optional form of mechanism, as shown in Figs. 5 and 6, wherein the drive gears are arranged to provide speed reduction from the drive motor.

Now, referring to Fig. 1, I show a conventional washing machine tub **10** mounted on a base **11** with an orbital movement dasher **12** within the tub. A drive motor **13** mounted in the base **11**, is connected to a conventional reduction gear case **14** and drives a drive shaft **15** at reduced speed for the driving of the dasher **12**. The drive shaft **15** is mounted in a conventional type of gland bearing base **16** through conventional support and sealing structure **17—18** as shown. The gland base bearing **16** is provided with suitable bearings and water seals to provided proper lubrication and sealing for the shaft **15**.

On the upper end of the shaft **15** is mounted a crank member **19** having a crank pin **20** connected to a base support drive-member **21** as shown. The drive-member **21** is secured at its periphery **21***b* to the periphery of the base of the dasher **12** and extends across the base of the dasher, as shown in Fig. 1.

At four spaced points, as clearly shown in Fig. 2, the dasher drive-member **21** is supported on four parallel crank members **22** having the same throw as the driven crank **19** to support effectively and to rotate the dasher base member **21** in the orbital circular movement determined by the throw of the supporting crank members **22**. It will be appreciated fully of course that the crank members are of the same throw and are arranged in parallel relationship. Thus, all points on the base member **21** are rotated in a uniform circular path as indicated by the circles **25** in Fig. 2.

The dasher **12** is mounted on the base member **21** by the support flange **21***b* and the clamping action of nut **26** through the rod **27** and thumb nut **28**. Thus the dasher **12** is effectively clamped on the base member **21** and the supported points of the dasher move uniformly with the base member **21** in the circular paths **25** as previously described. It will be understood and appreciated that the washer **12** is rotated in an orbital path within the tub **10** without axial rotation.

Now referring to Figs. 3 and 4, I show a variation of my orbital motion mechanism wherein the motor **13** through a belt and pulley drive mechanism **29** drives the drive shaft **30** through the bearing gland base **31** attached to the tub **10** in a conventional manner through nut **33** and gasket **32**. On the top of the drive shaft **30** is mounted a drive crank **34** having a crank pin **35** rotatably connected in a conventional manner to the dasher base casting **36**. This dasher base casting **36** is supported on the crank members **34—35** as well as three similar supporting crank members **37—38—39** as clearly shown in Fig. 4. By this structure the cranks **37** of the dasher base member **36** are rotated in circular orbital paths **25** exactly similar to the paths indicated in Fig. 2, as described above.

It will be appreciated further that the offset drive shaft **30** enables the motor **13** to be mounted in a compact manner directly under the washer tub while providing ample belt length **29** as shown.

In this optional structure, the dasher **12***v* has no hollow central stem section and consists of a flat base **70** with radiating blades **71**. It is mounted on the base member **36** by resting on the flange portion **36***b* where it is securely held in place by three ball and spring retainer members **40—41** with the balls **40** entering into openings **42** in the base of the dasher **12***v*. These spring retainers securely hold the dasher **12**v against all normal stresses encountered in the washing but permit the dasher to be removed by a sharp transverse hand stroke. It will be

appreciated that in this structure the blade section of the dasher **12***v* must be entirely free of mechanism.

Now referring to Figs. 5 and 6 I show another optional form of my orbital motion mechanism wherein the motor **13** through the coupling **44** drives the drive shaft **45** conventionally mounted in a gland base casting **46** attached to the tub **10** in a conventional manner by the nut **47** and gasket **48**. The drive shaft **45** is directly attached to a drive gear **49** meshing with three driven gears **50**, **51** and **52** as clearly shown in Fig. 6. These gears are rotatably mounted on the base casting **46** by stub shafts **53**, **54** and **55** as shown. The gears **50**, **51** and **52** also carry crank pins **56**, **57** and **58** eccentrically thereof, respectively, and journaled in the dasher base member **59** as shown and exactly similar to the structures previously explained for the other dasher base members shown in Figs. 1 and 3. It will be fully understood and appreciated that by this structure the cranks that support the dasher base member **59** are rotated in similar orbital paths **25** as previously described and that the dasher **12** is moved in the same orbital path without axial rotation. It will also be understood that I may choose any of the gears as the drive gear and effect similar orbital motion.

Also in this mechanism I have mounted the dasher **12***x* on the flange **59***b* of the base member **59** by thumb screws **60** as clearly shown in Fig. 5. The structure permits the dasher to be securely mounted on the base member **59**, leaving the interior of the dasher entirely free of mechanism and available for any other purpose that may seem proper and convenient.

Now referring to Fig. 6*a*, I show somewhat diagrammatically on a reduced scale an optional form of gear driving mechanism wherein the drive gear **149** is much smaller than the driven gears **150**, **151** and **152**, thus to accomplish speed reduction when such reduction is desirable. The driven gears **150**, **151** and **152** have similar pivot bearings and crank pins **153** and **156**, **154** and **157**, **155** and **158**. Although these gears are driven at a slower speed, the dasher will be driven in exactly a similar manner as previously described. Although in the embodiment of Fig. 6*a* the drive gear **149** is centrally located with respect to the gears **150**, **151** and **152**, it will be understood that the drive gear **149** need not be centrally located and, if desired, may only engage one of the follower gears **150**, **151** and **152** without affecting the path of travel of the dasher **124**.

From the foregoing, it will be appreciated that I have shown and described orbital driving mechanism wherein the mechanism is confined to a narrow area within the base of the dasher closely adjacent the washer tub. This mechanism can be driven by drive shaft means either centrally or offset from the center of the dasher and the tub. The mechanism may be constructed in various ways with all the drive mechanism concentrated in the base of the dasher leaving the interior of the dasher free of mechanism and available for any purpose that may seem desirable.

Having thus described my invention, I now claim as new:

1. A washing machine comprising a tub, a drive shaft extending upwardly through the bottom of said tub, a drive crank mounted on the drive shaft, a dasher disposed within said tub, a drive connection between said drive crank and said dasher, a plurality of dasher supporting cranks pivotally supported with respect to said tub, said support cranks having equal throws and said dasher being mounted on said cranks whereby said dasher traverses an orbital path within said tub.

2. A washing machine comprising a tub, a drive shaft extending into said tub, multiple crank means spaced around the drive shaft, means connecting the drive shaft to said crank means to rotate the crank means in uniform parallel circular paths, a dasher disposed within said tub, and means to mount said dasher on the crank means.

3. A washing machine comprising a tub, a dasher disposed within said tub, a drive shaft extending upwardly through the bottom of said tub, a drive gear mounted on said drive shaft, and driven gear means having crank pins coacting with the drive gear for moving the crank pins in parallel equal movement, said dasher being pivotally mounted on the crank pins for orbital movement within said tub without axial rotation thereof upon rotation of the drive gear.

4. A washing machine comprising a tub, a dasher disposed within said tub, a drive shaft extending through the bottom of said tub, a sealing gland bearing base mounted in the bottom of the tub for rotatably supporting the drive shaft, a drive gear mounted on top of the drive shaft, driven gears having crank pins respectively mounted at corresponding positions thereon, said driven gears coacting with the drive gear to move the crank pins in parallel equal cranking movement, and means for rotatably mounting the dasher on the crank pins whereby upon rotation of the drive gear said dasher traverses a circular path with respect to the tub without axial rotation of the dasher.

5. A washing machine comprising a washtub, a drive shaft extending through the bottom of said tub, a sealing gland bearing base mounted in the bottom of the tub and rotatably supporting the drive shaft, a drive gear mounted on the drive shaft within said tub, a plurality of driven gear means having crank pins mounted thereon, said driven gear means being disposed for coaction with the drive gear to drive the crank pins in parallel equal cranking movement, and a dasher disposed within said tub and rotatably mounted on said crank pins for orbital movement within the tub without axial rotation thereof upon rotation of the drive gear.

6. A washing machine comprising a tub, a dasher mounted adjacent the bottom of said tub, a stationary base member mounted in the bottom of said tub, a drive shaft extending through the center of said tub and the base member, a drive gear mounted on said drive shaft, a plurality of gears meshing with said drive gear, coacting eccentric driving means mounted on said plurality of gears, means for supporting said dasher, said last mentioned means including bearings engaging the eccentric driving means, said gears, said eccentric driving means and said means for supporting said dasher cooperating with one another to impart a bodily orbital movement to the dasher in response to rotation of said drive shaft.

7. A clothes washing machine comprising a receptacle, a drive shaft extending into said receptacle, a drive gear mounted on said drive shaft for rotation therewith, follower gears pivotally supported on said receptacle in engagement with said drive gear, a dasher disposed within said receptacle, and connector means pivotally connecting said follower gears to said dasher at points on said follower gears equally displaced from the axes of rotation thereof.

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