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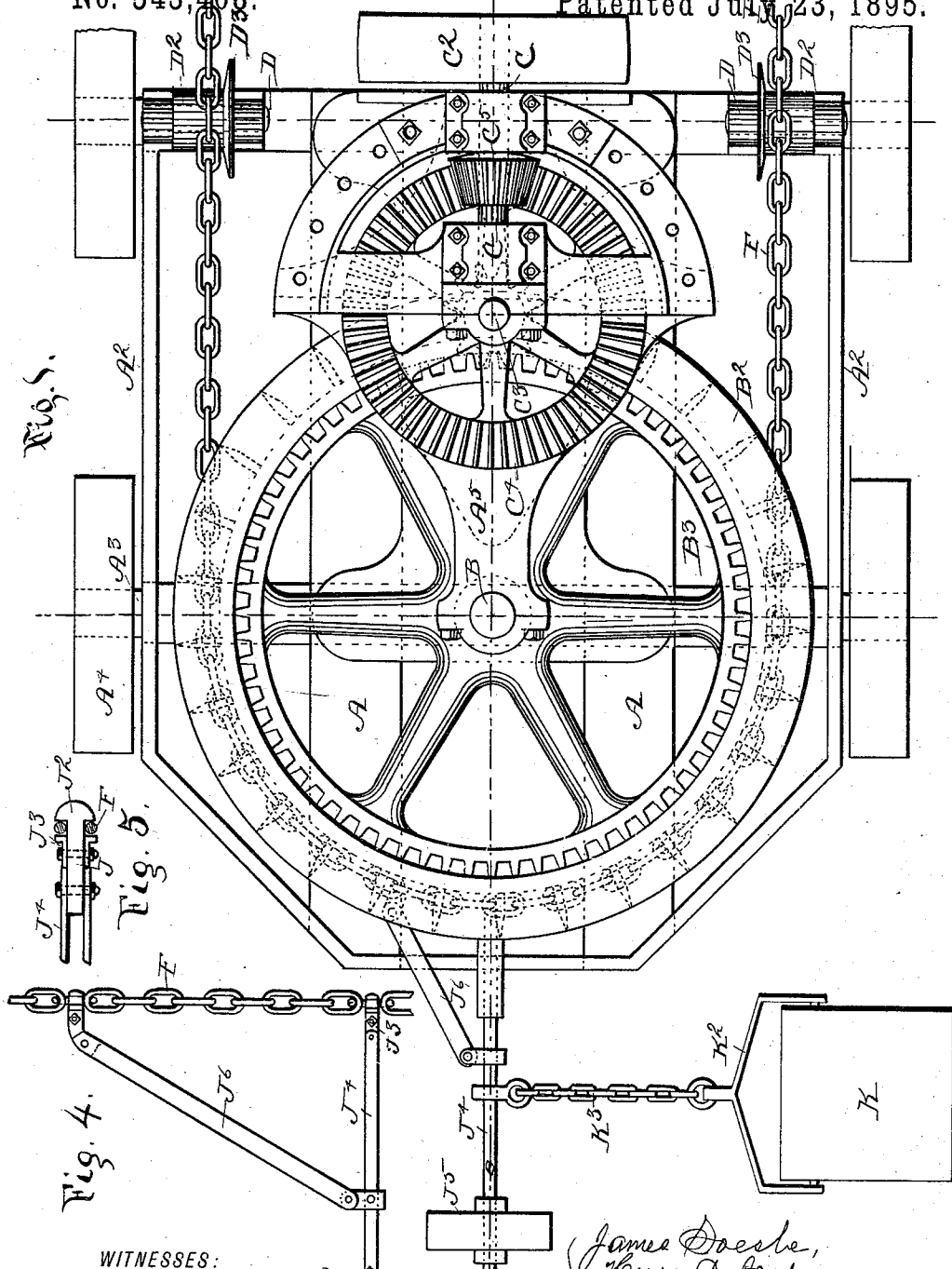
3 Sheets—Sheet 1.

J. T. MONTGOMERY, H. C. JORDAN, J. SOESBE,
W. H. GILMAN & M. HARTMAN.

APPARATUS FOR HANDLING EARTH AND GRADING.

No. 543,408.

Patented July 23, 1895.



WITNESSES:
W. J. Sankey
Reuben G. Orrig.

Inventors:

James Doese,
Henry C. Jordan,
John T. Montgomery,
Moses Hartman and William
H. Gilman,
By Thomas G. and J. Ralph Ormoy, ATTORNEYS.

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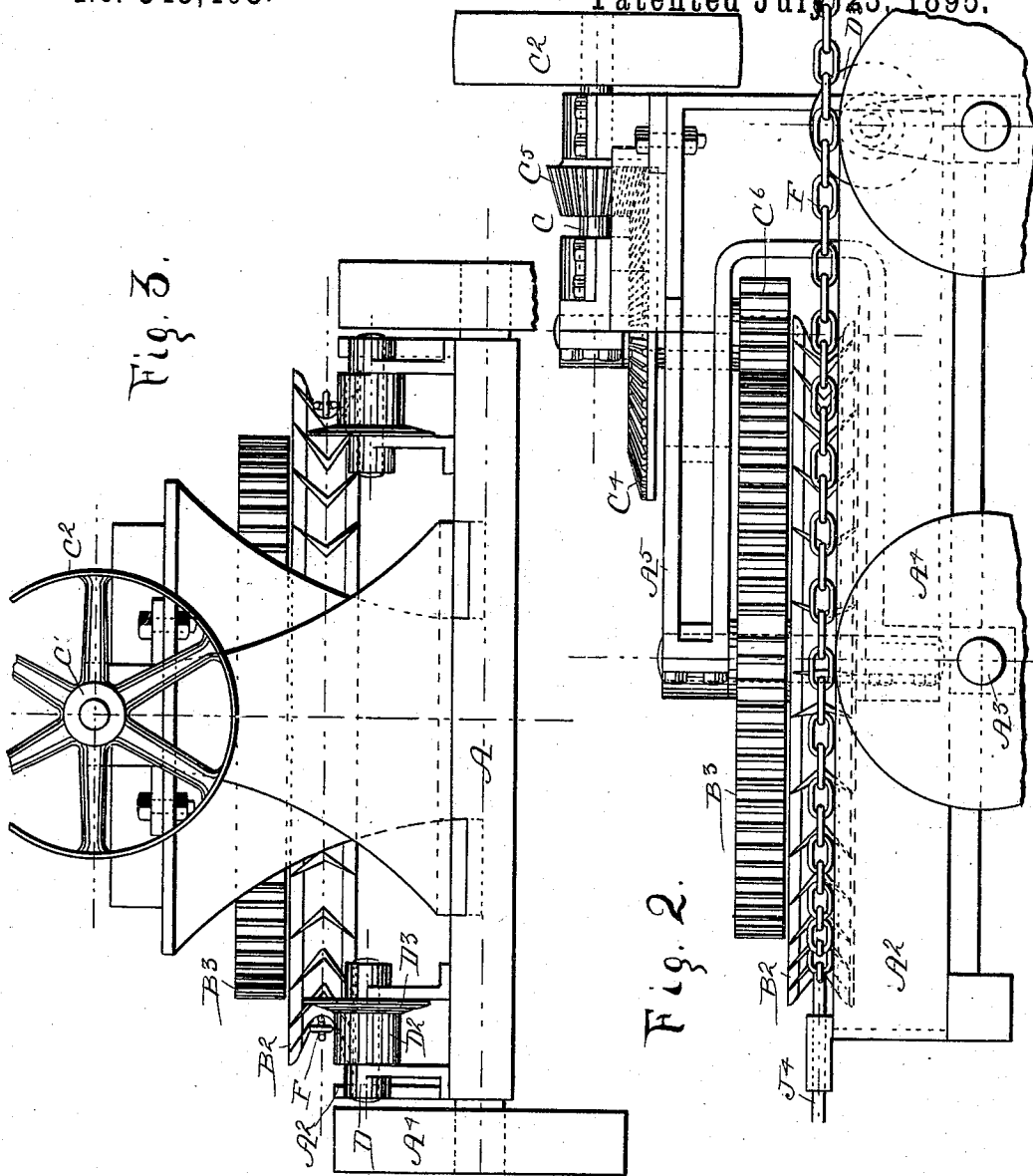
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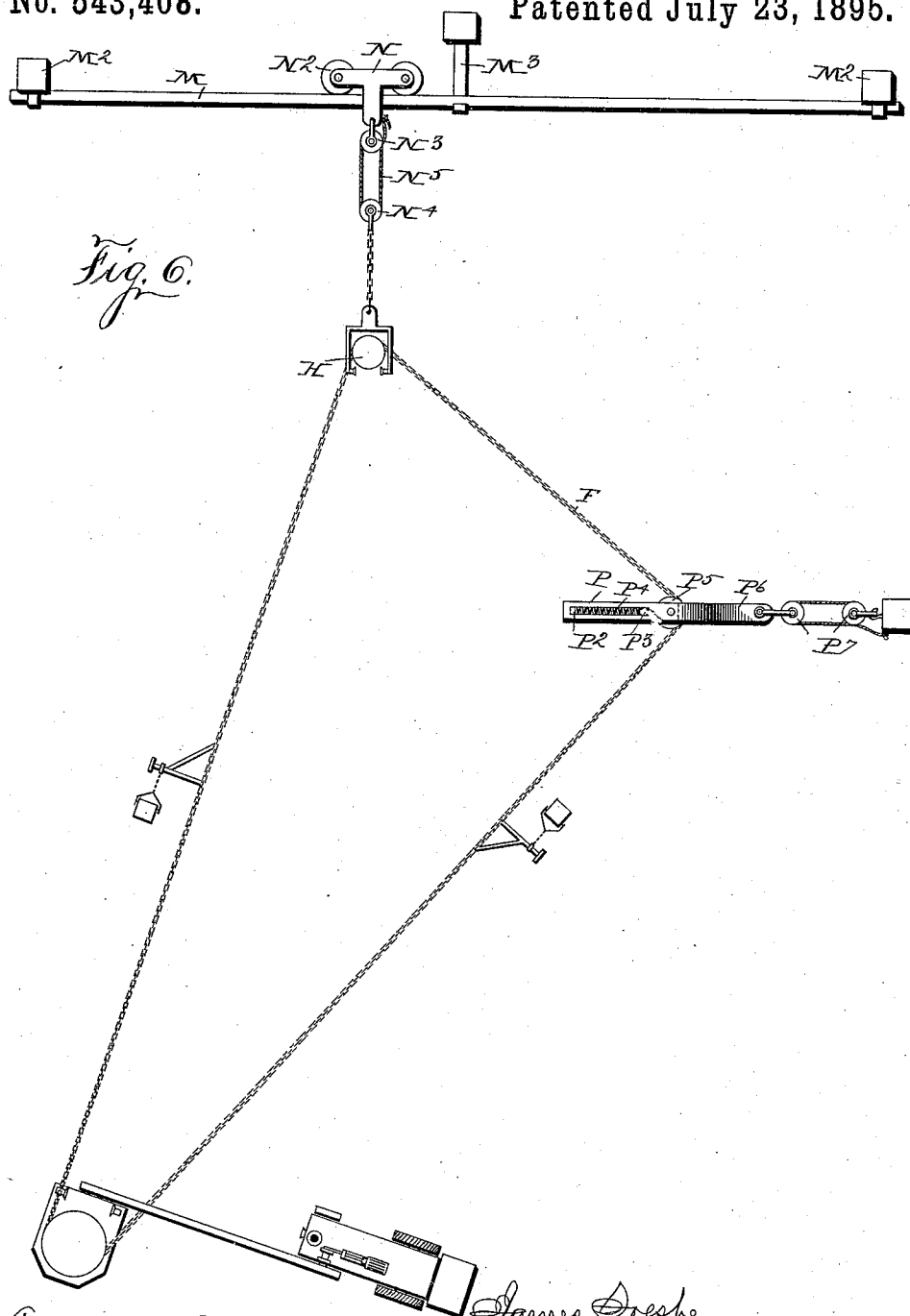
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UNITED STATES PATENT OFFICE.

JOHN T. MONTGOMERY, HENRY C. JORDAN, JAMES SOESBE, WILLIAM H. GILMAN, AND MOSES HARTMAN, OF BATTLE CREEK, IOWA.

APPARATUS FOR HANDLING EARTH AND GRADING.

SPECIFICATION forming part of Letters Patent No. 543,408, dated July 23, 1895.

Application filed March 8, 1895. Serial No. 541,070. (No model.)

To all whom it may concern:

Be it known that we, JOHN T. MONTGOMERY, HENRY C. JORDAN, JAMES SOESBE, WILLIAM H. GILMAN, and MOSES HARTMAN, citizens of the United States, residing at Battle Creek, in the county of Ida and State of Iowa, have invented an Improved Grading and Ditching Machine, of which the following is a specification.

10 The object of this invention is to provide a machine adapted to excavate ditches or cellars, level the ground surface or convey earth from one point to the other, and to provide means whereby the scrapers may be moved
15 in other than a straight line to clear obstructions, said machine to be of simple, cheap, and durable construction and capable of being operated by a minimum of power to accomplish a given quantity of work.

20 Our invention consists, primarily, in the construction of the device for applying power to the endless chain and the means for connecting the scoops to the chain, and, further, in the construction and arrangement of the
25 complete apparatus, as hereinafter set forth, pointed out in our claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a top or plan view of the device for applying power to the endless chain. Figs.
30 2 and 3 are respectively side and end views of the same. Fig. 4 is an enlarged detail view of the connection between the endless chain and the scrapers. Fig. 5 is a detail sectional view of the connection of the arms with
35 the links of the chain. Fig. 6 is a diagrammatical view of the complete apparatus.

Referring to the accompanying drawings, the frame of the device by which power is applied to the endless chain is seen to be composed of a base A, having vertical side pieces
40 A² passed completely around the frame, except at one end, having a horizontal top surface mounted on the axles A³, which have the wheels A⁴ on their ends, and a part A⁵, projecting upwardly and then inwardly over the
45 center of the base.

B indicates a vertical shaft having bearings in said part A⁵ and the base A, and on said shaft are firmly fixed a flanged winding-drum

B², with its central portion on a level with the top of the sides A² of the base, and a large gear-wheel B³.

C indicates a horizontal shaft having its bearings on top of the part A⁵ of the frame and provided with a belt-wheel C² on its outer
55 end, to which power is applied by means of a stationary engine or the like. This power is transmitted to the drum B² as follows:

C³ indicates a vertical shaft mounted in the part A⁵, beyond the inner end of the shaft C, and provided with a bevel gear-wheel C⁴ to mesh with a gear-wheel C⁵ on the shaft C, and also having a pinion C⁶ on its lower end to mesh with the cog-wheel B³.

D indicates a suitable axle mounted on the inner end of the base A, at one side thereof, and having a collar D² loosely mounted thereon, and provided with a flange D³ at its inner end. The periphery of this collar is on the same horizontal plane as the top of the side
65 pieces A². A like device is located at the opposite side of the base A. The endless chain indicated by the reference-letter F is adapted to pass over the collar D², thence horizontally around the drum B² and over the remaining
75 collar D².

H indicates a drum adapted to have the chain passed thereover and located at a point distant from the power-drum B², having the section of earth to be excavated between the
80 drums. This drum is of the same construction as the drum B², with the exception that the mechanism for applying power thereto is omitted, and it is believed that a further description of its construction would be super-
85 fluous.

The means for connecting the scrapers with the chain at suitable points thereon comprises a flat bolt J, having an enlarged rounded head J² at one end and adapted to be extended horizontally through the links in the
90 chain.

J³ indicates metal plates having upturned ends adapted to be bolted to the central portion of the part J, with said upturned ends in
95 engagement with the outer face of the link.

J⁴ indicates parallel metal bars pivoted to the top and under surfaces of the part J,

adapted to be extended outwardly from the chain, and on the outer end of said bar J is mounted a wheel J⁵.

J⁶ indicates a brace connected at one end with the chain in advance of the bars J in the same manner and extended rearwardly and outwardly and pivotally connected with the bars J⁴ at a point near their outer ends.

K indicates a scraper of common form, having a bail K² attached thereto connected with the outer end of the bar J⁴ by means of a chain K³.

M indicates a metal bar or track supported in a horizontal position by posts M² at its ends and a hook M³ at its central portion connected with a post. This bar is supported in a horizontal plane a slight distance above the ground surface and extended at right angles to the line of advance of the scrapers at a point beyond the end of the drum H.

N indicates a carriage-frame having two flanged wheels N² therein and mounted on the said bar M. A pulley N³ is attached to one end thereof, a pulley N⁴ is connected with the outer end of the frame of the drum H, and a rope N⁵ is passed around said pulleys N³ and N⁴. By this arrangement the endless chain is kept taut at all times, and the drum H² may be adjusted laterally in either direction by moving the carriage on the bar M. This, it is obvious, will provide a large area, from which the earth may be taken without stopping the machine or moving the power-drum.

If it is desired to deposit the earth at a point distant laterally from a line drawn between the two drums, we have provided a device comprising a frame composed of upper and lower bars P, having a vertical slot P², through which a stake P³ may be driven into the ground, and an extensible coil-spring P⁴ placed in said slot in engagement with the end of the frame and the said stake P³.

P⁵ indicates a pulley at the upper end of the frame and P⁶ an upwardly and outwardly inclined extension on top of the bar P. This frame is adapted to be connected with a stationary post by means of a tackle P⁷. It is obvious that the scrapers and chain may readily pass around said pulley P⁵ and under the extension P⁶, and, further, that the pulley may move laterally a slight distance when a strong tension is brought to bear on any part of the chain to allow a slight flexion and prevent the chain from breaking.

In practical use power is applied to the drum B² and the chain caused to travel around the drums B² and H and the pulley P⁵ with a continuous movement. The scrapers are held outwardly from the chain, and when traveling around the drums the bars which support the scrapers will engage the top surfaces of the side pieces A², and thereby be held in a horizontal position and the scrapers be permitted to clear the said side pieces. When the scrapers are traveling over the ground surface at a point between the

two drums, the wheel J⁵ will engage the ground surface and prevent the bars J⁴ from coming in contact therewith. Thus the said bars are held in a horizontal position at all times and the scrapers carried in a plane parallel with the chain at one side thereof. A chain K³ is connected with the bail J⁴ of the scrapers K to permit a lateral movement of the scrapers relative to the endless chain F. Thus earth may be conveyed from any point on a straight line between the two drums to any point on said line within a comparatively wide range limited by the length of the chain K³, or the drum H may be moved laterally by moving the carriage N and the earth taken from a range limited only by the length of the rod M. If it is desired to move the earth laterally from a line between the two drums, the frame P is placed at a suitable point laterally removed from the line between the two drums and the earth taken from any point throughout the movement of the chain and deposited at any other point. Any desirable number of scrapers may be attached to the chain in the same manner as herein described.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent of the United States therefor, is—

1. An apparatus for excavating or removing ground, comprising two drums in a horizontal plane, means for applying power to one of them, an endless chain or the like passed around said drums, one or more arms attached to said chain and extended horizontally outwardly therefrom and a scraper attached to said arm, a bar supported in a horizontal plane at right angles to a line drawn through the two drums at a point beyond the end of one drum, a suitable frame slidably mounted thereon and pulleys connected with said frame and the frame of the drum and a rope passed through said pulleys, for the purposes stated.

2. An apparatus for excavating or removing ground, comprising two drums in a horizontal plane, means for applying power to one of them, an endless chain or the like passed around said drums, one or more arms attached to said chain and extended horizontally outwardly therefrom, a scraper attached to each arm, a suitable frame having a vertical slot, a flanged pulley at one end of the frame, a stake driven through said slot into the ground, an extensible coil spring in engagement with the said stake and the outer end of the frame, and means for securing the opposite end of the frame to a suitable support fixed in the ground, for the purposes stated.

3. In a grading and ditching apparatus, the combination of a frame having a suitable base and side pieces extended around said base with a horizontal top, a flanged drum mounted on said frame in a horizontal plane with its central portion in approximately the

same plane as the top of the side pieces, flanged collars rotatably mounted at the opposite sides of one end of the frame and an endless chain or the like having horizontal arms fixed thereto and extended outwardly therefrom and scrapers attached to the said arms, for the purposes stated.

4. In a grading and ditching apparatus the combination of a frame having a suitable base and side pieces extended around said base with a horizontal top, a flanged drum mounted on said frame in a horizontal plane with its central portion in approximately the same plane as the top of the side pieces, flanged collars rotatably mounted at the opposite sides of one end of the frame and an endless chain or the like having horizontal arms fixed thereto and extended outwardly therefrom and scrapers attached to the said arms, and a bar supported in a horizontal position beyond the outer end of the frame, a carriage mounted on the said bar and pulleys connected with the carriage and said frame, and a rope passed around said pulleys.

5. In a grading and ditching apparatus, a power drum, comprising a frame having a suitable base, a side piece having a horizontal top extending around said frame, wheels for supporting said frame, flanged collars at the opposite side of the inner end of the frame, a flanged drum mounted on said frame in a horizontal plane with the central portion of the drum on the same plane as the top of said side pieces, a gear wheel fixed to the shaft of the drum and means for applying power to the said gear wheel, substantially as and for the purposes stated.

6. In a grading and ditching apparatus the combination with an endless chain, of a bar fixed to a link of the chain and extended horizontally outwardly therefrom, a wheel on its outer end and a brace pivotally connected with the chain at a point in advance of said bar, extended outwardly therefrom and pivotally attached to said bar, for the purposes stated.

7. In a grading and ditching apparatus the combination with an endless chain, of a bar fixed to a link of the chain and extended horizontally outwardly therefrom, a wheel on its outer end and a brace pivotally connected with a chain at a point in advance of said bar extended outwardly therefrom and pivotally attached to said bar, a chain attached to the

upper end of said bar and a suitable scraper, having a bail connected with said chain, for the purposes stated.

8. The combination in a grading and ditching apparatus of an endless chain, a headed bolt adapted to be passed through a link in said chain, flanged plates on the upper and lower surfaces of said bolt, flat bars pivotally connected with the upper and lower surfaces of the outer end of said bolt, a wheel mounted on the outer ends of said bars, a bolt having flanged plates at its upper and lower surfaces connected with the chain in advance of the aforesaid bolt and a brace pivotally attached to the outer end of said bolt and pivotally connected with the aforesaid bars, substantially as and for the purposes stated.

9. An improved grading and ditching apparatus comprising a suitable frame mounted on wheels and having side pieces with a horizontal top, flanged rollers at the opposite sides of one end of said frame, a flanged drum mounted on said frame in a horizontal plane, means for applying power to said drum, a second frame having horizontal tops at its sides, flanged rollers at the opposite sides of one end thereof, a flanged drum mounted thereon in a horizontal plane, an iron bar extended in a horizontal plane at right angles to a line drawn through said drums, a carriage on said bar and ropes connected therewith and with said latter drum frame, an endless chain passed around said drums and having one or more arms fixed at right angles thereto, a wheel on the outer end of each arm and a brace pivoted to said arm and to the chain in advance of the arm, a scraper connected by means of a chain with the outer end of the arm, a frame having a flanged pulley thereon and provided with a vertical slot, an extensible coil spring in said slot, and means for connecting the upper end of said frame to a post, all arranged and combined substantially as and for the purposes stated.

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