March 9, 1971 E. G. MARSHALL 3,568,369

GEM GRINDING MACHINE

Filed May 1, 1969 3 Sheets-Sheet 1

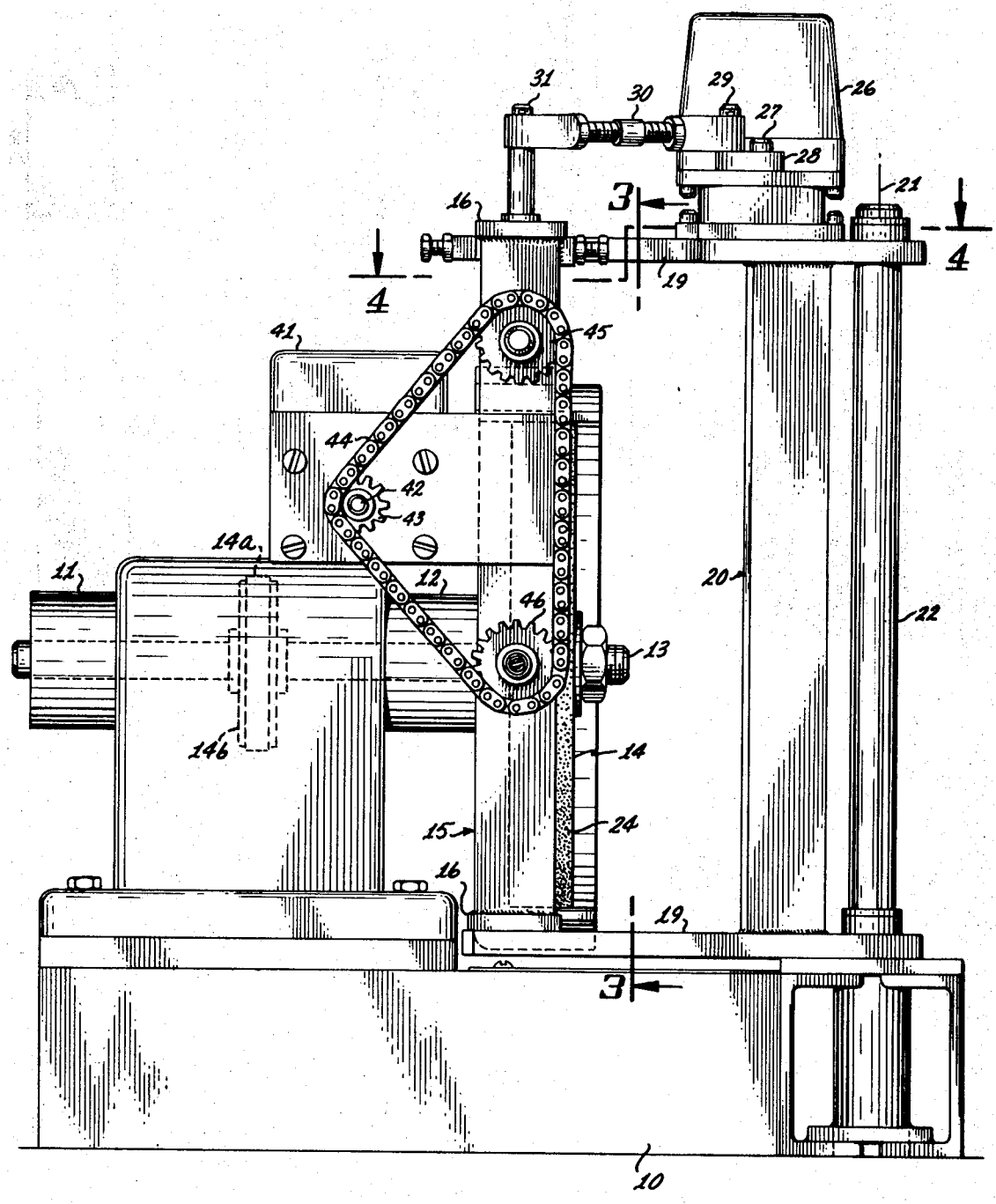


Fig-1

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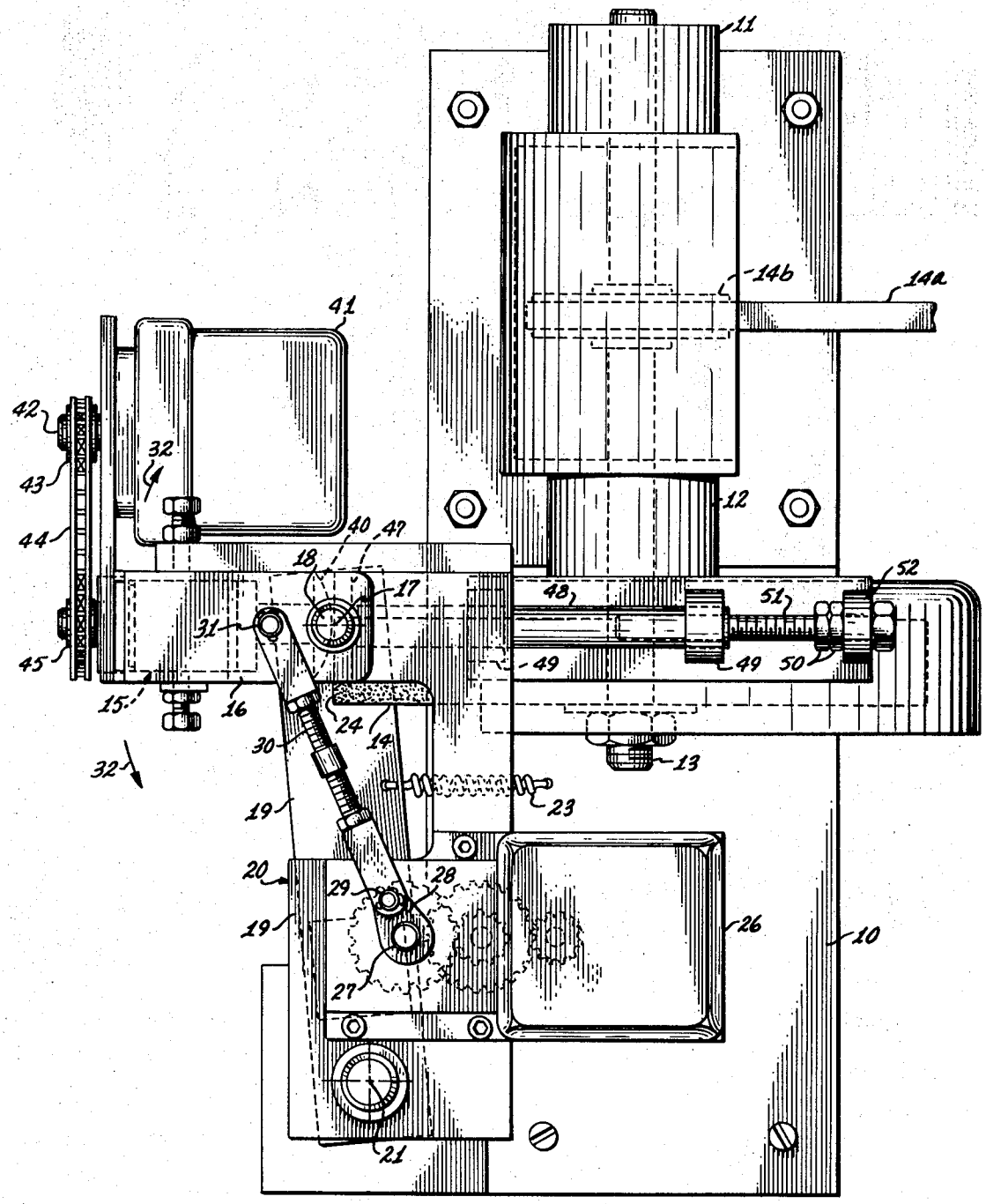


FIG-2

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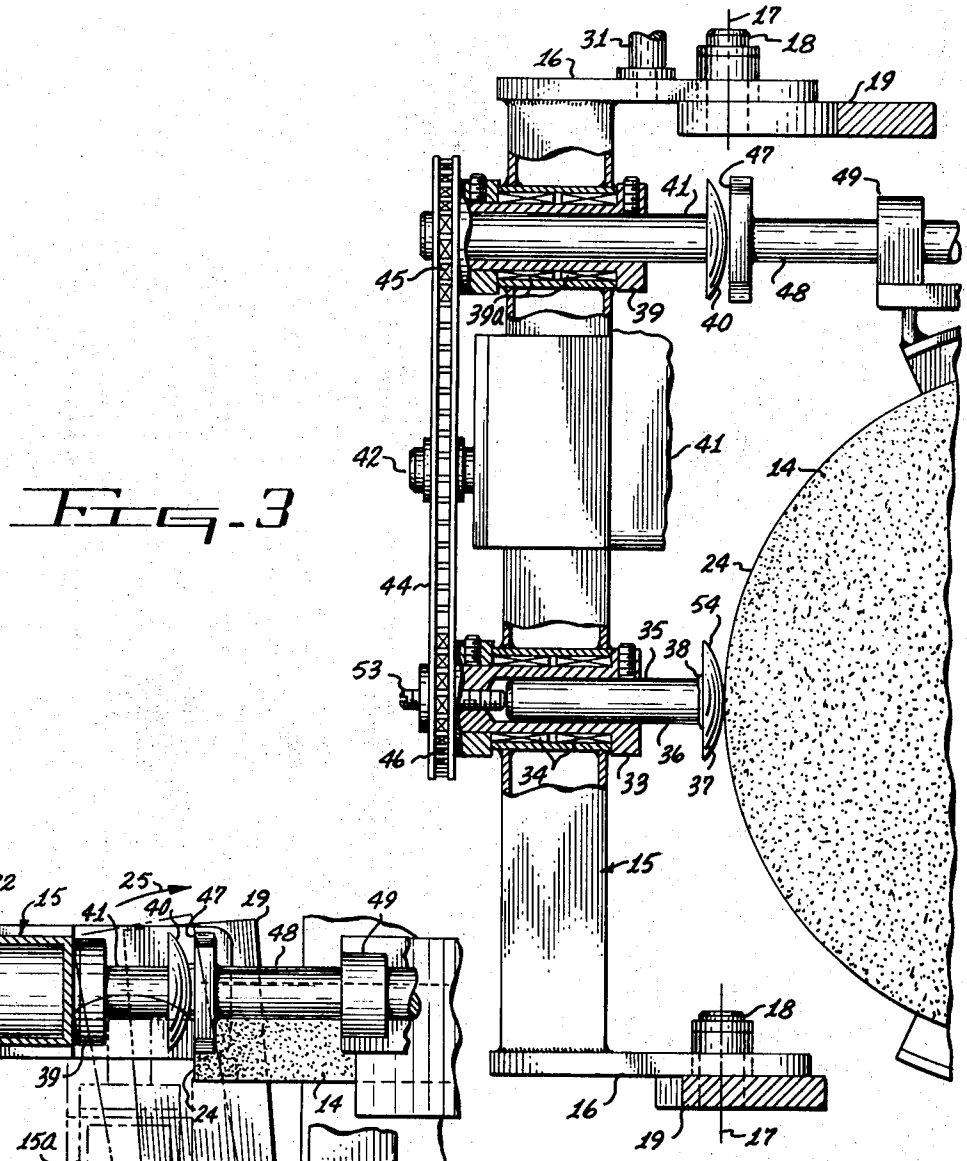


Fig. 3

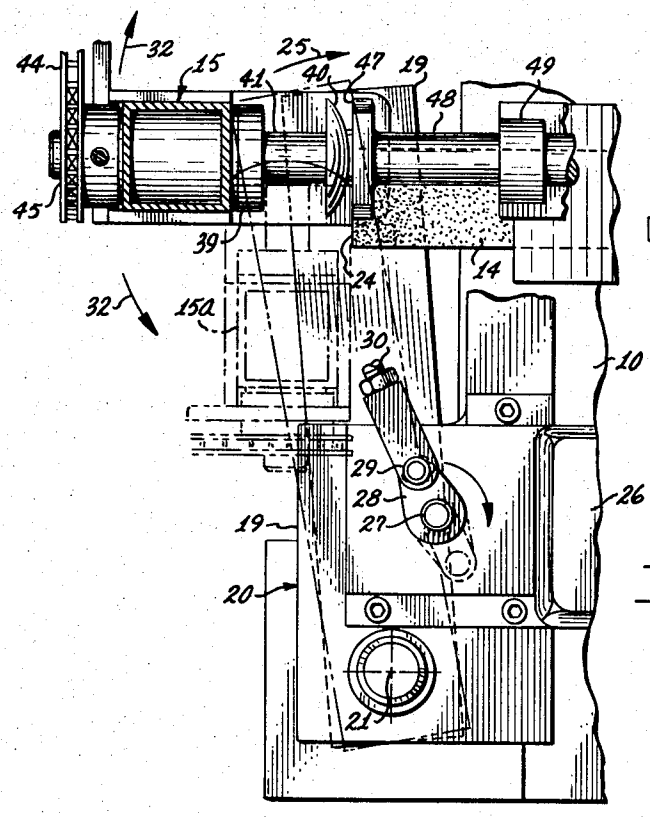


Fig. 4

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GEM GRINDING MACHINE

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Int. Cl. B24b 5/16, 17/02
U.S. Cl. 51—97 4 Claims

ABSTRACT OF THE DISCLOSURE

A machine arranged to eliminate the hand work in grinding cabochons of semiprecious gems in which the size and shape are mechanically controlled.

BACKGROUND OF THE INVENTION

(1) This invention pertains to template controlled grinding machines, and is more particularly directed to a grinding machine for cabochons of semiprecious gems that automatically reproduces the work in a rapid high production manner.

(2) Heretofore, it required a professional with many years experience and skill to make an accurate cabochon. A great amount of time was required by former methods in laborously making a properly shaped and finished cabochon of acceptable quality.

SUMMARY OF THE INVENTION

One of the objects of this invention is to provide an automatic grinding machine to grind agate and other materials up to hardness nine to form cabochons.

Still another object is to provide such a machine which enables the most amateur of rockhounds and collectors to make as accurate a cabochon as a professional with many years experience.

Further, the above machine is the answer to the time problem formerly inherent in the production by hand of cabochons.

And another object is to provide a machine that does away with present hand methods while automatically sizing and shaping the cabochon without skill and care upon the part of the operator.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of the grinding machine incorporating the features of this invention.

FIG. 2 is a plan view of the grinding machine shown in FIG. 1.

FIG. 3 is a sectional view on the line 3—3 of FIG. 1.

FIG. 4 is a fragmentary sectional view on the line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As an example of one embodiment of this invention, there is shown a gem grinding machine comprising a base **10** upon which are mounted suitable bearing supports **11** and **12** for the grinding wheel spindle **13** on which is conventionally mounted an appropriate grinding wheel **14** being driven by a motor, not shown, through the belt **14a** and pulley **14b**. A template and work support arm **15** has integral link pieces **16** which have their outer ends pivotally mounted to swing about the axis **17** about the pins **18** carried in the outer ends of the brackets **19** of the feed frame **20** which in turn is pivotally mounted

to swing about the axis **21** on the support column **22** fixed on the base **10**. A tension spring **23** interconnected between the base **10** and a bracket **19** of the feed frame **20** normally yieldingly swings the pivot axis **17** toward the periphery **24** of the grinding wheel **14** about the axis **21** as indicated by the arrow **25**.

The swinging arm **15** is arranged to swing back and forth about the axis **17** by a drive motor **26** having an output shaft **27** to which is fixed a crank arm **28** having a crank pin **29** to which is pivotally mounted one end of an adjustable connecting rod **30**, the other end of which is pivotally mounted on a pin **31** fixed in the upper link piece **16** of the swinging arm **15** so that when the motor **26** is energized the swinging arm will rock back and forth about axis **17** as indicated by the arrows **32** between the full line position **15** and the broken line position **15a**, best shown in FIG. 4.

A work spindle **33** is journaled in suitable bearings **34** in the swinging arm **15** and is adapted to chuck a shank **35** of the dop **36** upon which the stone **37** to be ground is mounted by suitable adhesive **38**. Above the work spindle, and in parallel relationship with it, is journaled the master spindle **39** on suitable bearings **39a** in the swinging arm **15**. A master cabochon **40**, preferably made of metal, has its shank **41** chucked in the spindle **39**. Both of the spindles **33** and **39** are synchronously rotated by an appropriate drive motor **41** suitably mounted on the swinging arm **15** and having an output shaft **42** with a sprocket **43** driving a chain **44** operating over the sprockets **45** and **46** respectively fixed on the master spindle **39** and the work spindle **33**.

The master cabochon **40** is arranged to engage a wear plate **47** on the outer end of the longitudinally adjustable support shaft **48** carried in an appropriate support bracket **49** fixed to the base **10**, the longitudinal adjustment and positioning being accomplished by the jamb nuts **50** on the threaded portion **51** of the support shaft **48** and the lug **52** fixed to the base **10**. An adjusting screw **53** threaded in the rear of the work spindle **33** adjusts the workpiece stone **37** in against the grinding wheel **14** to thereby regulate the amount ground off of the contoured surface **54** of the stone **37**. The stone **37** at the start of the operation is larger than the master **40** and the stone **37** is held against the grinding wheel periphery **24** by the spring **23** which is just strong enough to hold the stone in contact but not strong enough to overheat and fracture the stone. The master **40** does not contact the wear plate **47** during the grinding of the stone until the stone is ground down to the desired size, whereupon the master contacts the wear plate and prevents further grinding.

What is claimed is:

1. A gem grinding machine comprising in combination:

(A) a base,

(B) a rotatable grinding wheel mounted on the base,

(C) a feed frame mounted on the base to move relative to a grinding surface of the grinding wheel,

(D) yielding means between the base and the feed frame to normally move the feed frame toward the grinding wheel,

(E) a swinging arm pivotally mounted on the feed frame,

(F) power means interconnected between the swinging arm and the feed frame energizable to rock the swinging arm back and forth on the feed frame,

(G) a work spindle journaled on the swinging arm,

(H) a master spindle journaled on the swinging arm,
(I) power means on the swinging frame including a power transmission for rotating the work and master spindles in synchronism,
(J) a work support on the spindle to hold the workpiece in engagement with the grinding surface of the grinding wheel,
(K) a master on the master spindle,
(L) and a wear plate on the base arranged to be engaged by the master on the master spindle when the required grinding of the work has been completed.

2. A gem grinding machine as in claim **1** wherein the work spindle and master spindle are journaled on parallel axes of rotation.

3. A gem grinding machine as in claim **1** wherein adjusting means is provided in the work spindle to move the work support relative to the spindle and the grinding wheel.

4. A gem grinding machine as in claim **1** wherein the wear plate is adjustable relative to the base and the master in the master spindle.

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