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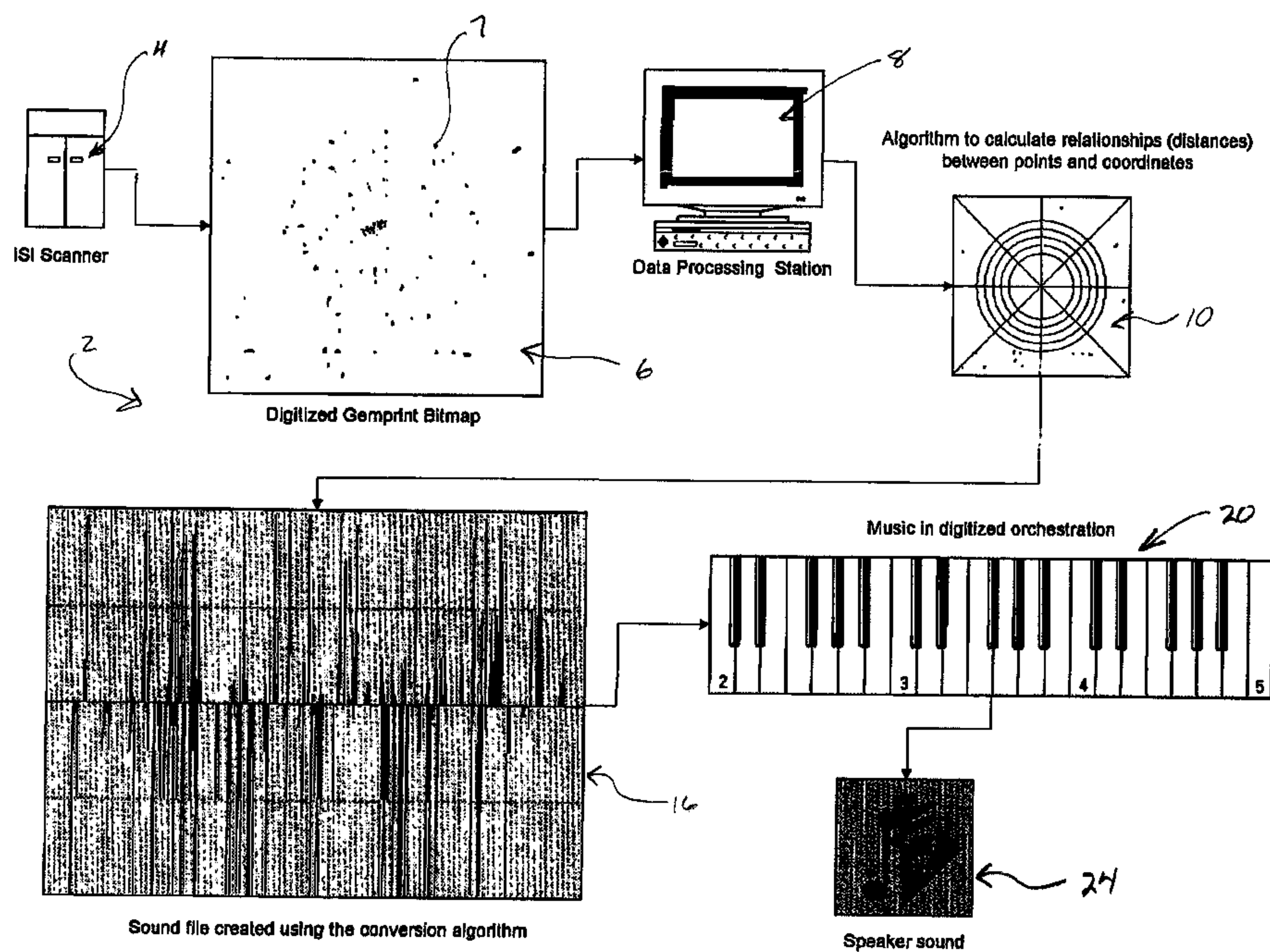
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(54) REPRESENTATION MUSICALE DE LA SIGNATURE D'UN  
DIAMANT

(54) MUSICAL REPRESENTATION OF DIAMOND SIGNATURE



(57) The present invention uses the unique optical response of a gemstone to produce a song of the gemstone. The optical response is processed in a certain way, allowing conversion and the addition of harmonics. The conversion uses the hot spot of the gemprint and based on the position and size, forms a sound transfer file. Additional tone or notes can be added to enhance the song. As the optical response of each gemstone is unique, the results sound should be unique.

ABSTRACT OF THE DISCLOSURE

The present invention uses the unique optical response of a gemstone to produce a song of the gemstone. The optical response is processed in a certain way, allowing conversion and the addition of harmonics. The conversion uses the hot spot of the gemprint and based on the position and size, forms a sound transfer file. Additional tone or notes can be added to enhance the song. As the optical response of each gemstone is unique, the results sound should be unique.

TITLE: MUSICAL REPRESENTATION OF DIAMOND SIGNATUREFIELD OF THE INVENTION

5           The present invention relates to a gemstone recording arrangement and a method of assigning a musical song according to the optical signature of a gemstone.

10 BACKGROUND OF THE INVENTION

          There are a number of arrangements for using optical techniques to obtain an optical signature of a gemstone. It has been found that the reflection and refraction characteristics of a gemstone, and in  
15 particular, a diamond, defines a unique pattern for the particular gemstone, which can be used to identify the gemstone.

          Gemprint Corporation markets a system and manages a  
20 database where the optical response of gemstones are determined and the optical responses are recorded in a database for future reference. The optical response of gemstones has been determined by courts to be sufficiently unique to distinguish one gemstone fro another.

25           The optical response of a gemstone is influenced by the position that the gemstone is secured in the device and any misalignment of the axis of the gemstone does distort the optical response. It may also be necessary to rotate  
30 and correct the image for distribution to compare one optical response for a gemstone with a previously recorded optical response of a gemstone.

          The system sold by Gemprint Corporation allows the  
35 comparison of a first optical response with a second optical response and allows both of these responses to be displayed on a computer monitor and appropriately rotated and overlaid. The computer system does provide a

comparison of the two optical records but in most cases, the final determination of a match is carried out by a person comparing the two optical responses.

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SUMMARY OF THE INVENTION

The purchase of a diamond and the determination of the value of a diamond is a function of its size and weight, the cut of the stone, the clarity of the stone, and other features. There are a number of systems where the stones are graded and accurately described, and these systems have been combined with the optical response recording arrangement offered by Gemprint Corporation.

Many of these technical features are difficult to appreciate by the purchaser. It is known to provide the purchaser with a certificate which includes a print of the optical response of the stone, however, these features do not take into account the beauty of the stone and the artistic skill of the cutter of the stone. To many cutters and to many purchasers, the diamond or gemstone is unique and has its own artistic characteristics. The present invention allows the recording of these artistic characteristics in a more meaningful way for the purchaser.

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The present invention uses the unique optical response of a gemstone to produce a unique song of the gemstone. The optical signature of the gemstone is captured and then subsequently processed to produce a unique musical equivalent of the captured pattern. This musical equivalent provides the song of the gemstone which can be provided to the purchaser.

According to a preferred aspect of the invention, the gemstone is sold in combination with the unique musical equivalent of the optical signature of the gemstone.

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According to a further aspect of the invention, the gemstone is sold in a container which when opened, plays the unique musical equivalent of the particular gemstone.

5           According to yet a further aspect of the invention, a jewellery box for a gemstone, includes a battery and a sound generating arrangement with the sound generating arrangement, including a unique musical sequence derived based on the optical signature of the gemstone. The  
10 jewellery box includes an actuator for playing of the musical sequence by the sound generating arrangement when the jewellery box is opened.

15           The song of the gemstone is produced based on the optical signature of the gemstone and as such, it is unique to the particular stone.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20           Preferred embodiments of the invention are shown in the drawings, wherein:

Figure 1 shows a schematic layout of the various equipment for producing of the song of a gemstone;

25           Figure 2 is a perspective view of a jewellery box for holding of a gemstone and playing of the song of the stone; and

Figure 3 is a schematic layout of the circuitry of the jewellery of Figure 2.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The system 2 shown in Figure 1 produces a musical output based on the optical signature of a gemstone. The gemstone is scanned using the scanner 4, which produces an  
35 optical response of the reflection and refraction characteristics of the gemstone. This optical response is captured and is digitized by the scanner. The digitized gemprint is schematically shown as Figure 6.

The gemprint has a number of hot spots 7 which correspond to reflected or refracted light beams. If the gemstone is correctly supported in the scanner 4, these hot points will be produced and the only issue may be a slight degree of rotation, depending upon the placement of each gemstone. If there is misalignment of the axis of the gemstone, there will be a distortion to the position of the hot spots. If the gemstone is correctly positioned by a skilled technician, there is only a small degree of variation in the gemprint.

The digitized bitmap 6 is processed by the data processing station 8. In contrast to the printing of a certificate, where the actual bitmap is reproduced, it has been found to be preferable to summarize some of the information in the bitmap.

In Figure 1, the bitmap has been divided into a number of concentric circles and a number of segments. The concentric circles, each define a region which can be summarized for hot spots. In this way, the rotational position of the diamond is not critical as the bitmap will be summarized using the concentric circles. It is also possible to look at the information within limited portions of the concentric circles, using small segments, and comparing the values of different segments to determine whether a gemstone is the same. There can be logic associated with this for determining where the initial data representing the start of the song occurs, such that each song can be consistent. In many cases, the summary using concentric circles itself, is sufficient to distinguish one gemstone from another and to create the unique of the diamond.

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Based on the summarized information of the bitmap of Figure 10, a sound file 16 is produced. There are various known algorithms for translating a bitmap sequence

to a sound file. This sound file is then used to produce the song of the diamond. The song filed preferably will be enhanced using the arrangement 20 to create a song which is pleasing to the ear. For example, certain notes or  
5 scales can be enhanced using harmonics to improve the actual song.

The point is, that the sound file 16 which is based on the optical response of the gemstone to produce a song  
10 of the diamond. Depending upon the length of a song and the amount of information that is summarized, the song of the gemstone can uniquely identify a particular gem. In many applications, it may be sufficient that the song is based on the inherent characteristics of the stone and it  
15 is not necessary to distinguish one gemstone from another, based on the song.

The summary of the information as described in Figure 1, does allow the song for a particular gemstone to  
20 be reproduced. For example, it is only based on the alignment of the gemstone that variations should occur thereto and that skill is taken in aligning the stone, the summary information resulting at 10 should be sufficient to reproduce the song. The song is reproduced by the speaker  
25 24.

As can be appreciated, the song can be relatively simple based on such instruments as bells or could be based on a string orchestra, or a combination of different  
30 instruments. The important aspect is that the optical response of the gemstone can be used to produce a unique sound file or a sound file which accurately reflects the characteristics of a diamond, and thus a musical output can be derived, which reflects the characteristics of the  
35 gemstone.

Since the optical signature is unique and specific to a gemstone, the resulting sound is equally unique and

gem specific. As the sound is created from a binary file generated by the relative size and position of each "hot spot", special attention must be paid to the harmony of the music created. The conversation algorithm will process the sound created and insert additional notes to bridge less compatible notes in accordance with established conventions. This manipulation of input will not only improve the harmony of the music created, but will also allow for pseudo "Bach", "Mozart", etc. compositions. Further, the algorithm allows for modulating the tempo to produce more contemporary music such as jazz and blues type compositions, while choosing the appropriate sound generators.

The algorithm modifies or supplements the data in a predetermined manner and is therefore repeatable. The algorithm can also introduce notes or pairs of notes which are readily distinguishable from the music, which directly corresponds with the optical signature. Thus, the algorithm preferably translates the optical signature to music and also enhances the music in a predetermined manner.

Figure 2 shows a jewellery box 13 which will be used for storing of the gemstone. The box includes a base 32 and a hinge top 34. An actuator 36 determines when the lid of the box has been moved to an open position. This actuator then initiates the processing arrangement 40, preferably a sound chip, to produce an output signal which is fed to speaker 42 and speaker 42 plays the song of the gemstone which has been recorded with the processing arrangement 40. The actual song has been enhanced with musical overtones.

Figure 3 shows the actuator 36 which provides a start signal to the processing arrangement 40, having a battery 44, memory 46 for storage of the song of the gemstone, and the processor 48. The processor 48 produces

WH-10,709CA

the signal 50 which is fed to the speaker 42 and the song of the diamond is played.

To enhance the musical song of the diamond, the song can be played over a base song. The song of the diamond, based on the processed "hot spots", can be played on top of the base song, and with different instruments.

Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A gemstone recordal method comprising the steps of exposing the gemstone to a collimated light beam for reflection and refraction by the gemstone, capturing the pattern of reflected and refracted light beams which is unique to the gemstone, and processing said captured pattern to produce a unique musical equivalent of said captured pattern.
2. A jewellery box for a gemstone comprising a battery and a sound generating arrangement, said sound generating arrangement including a musical sequence derived based on an optical signature of said gemstone, said jewellery box including an actuator for playing of said musical sequence by said sound generating arrangement.
3. A gemstone recordal method as claimed in claim 1, wherein said step of processing said captured pattern consolidates "hot spots" in said gemprint in a manner to reduce orientation factors.
4. A gemstone recordal system as claimed in claim 2, wherein said captured pattern is subdivided from a control using a series of concentric circles, and hot points within each circle are counted and located to provide a unique sequence, and the approach continues for the further concentric circles.
4. A gemstone recordal method as claimed in claim 3, wherein each concentric circle is subdivided into a series of sectors and "hot spots" and sizes thereof, are counted for determining the musical sequence to correspond thereto.
5. A gemstone recordal method as claimed in claim 1, including copying said musical equivalent of said captured images and providing a copy with a jewellery box, including

WH-10,709CA

a processing arrangement for playing of said musical equivalent, said jewellery box when opened, having each processing arrangement playing said musical equivalent.

6. A gemstone recordal method as claimed in claim 1, wherein said recordal method provides an optical copy of the particular gemstone in combination with a song of the gemstone derived from the optical response of the gemstone.

Gemprint - Sound creation process

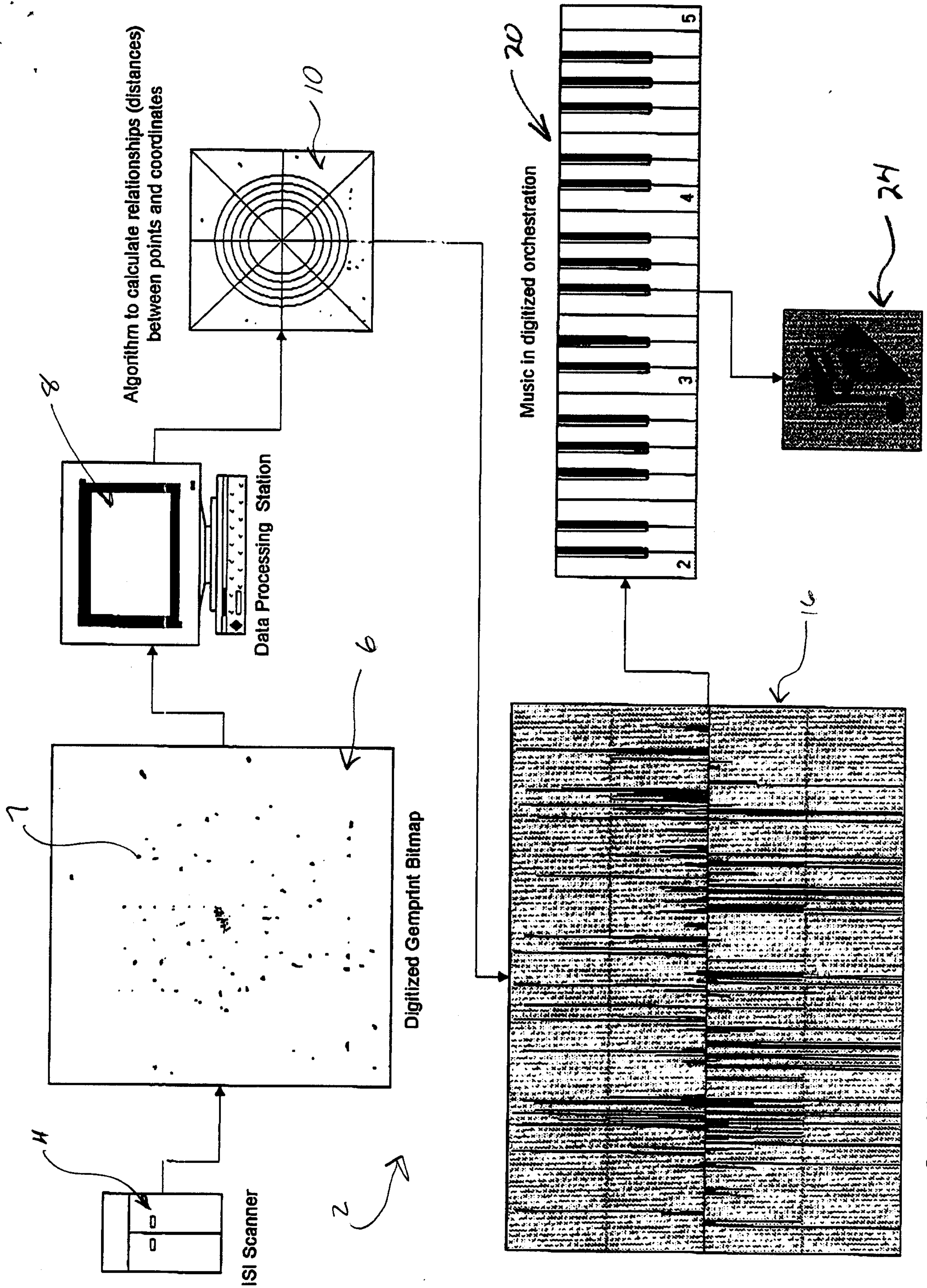


FIGURE 1

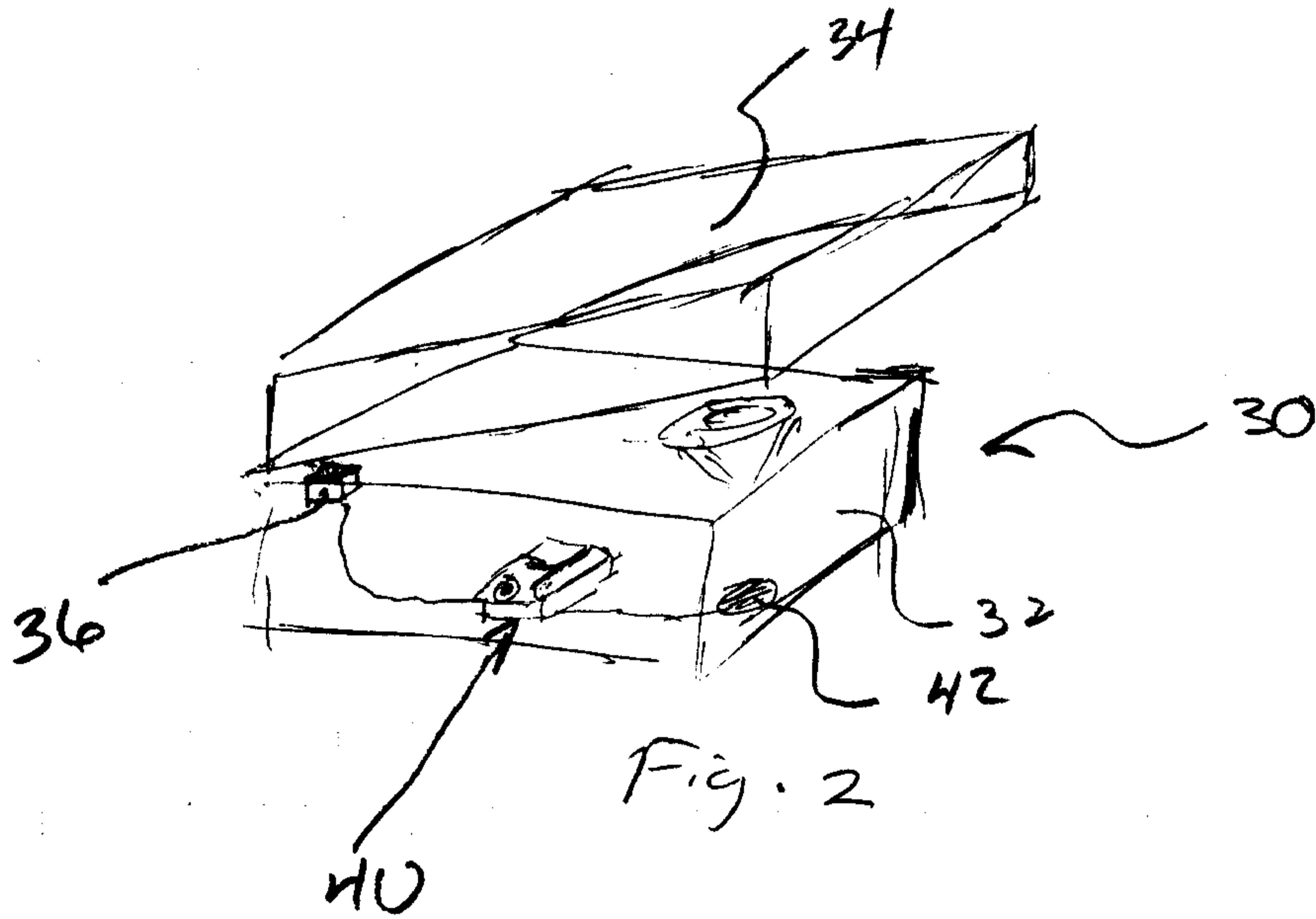


Fig. 2

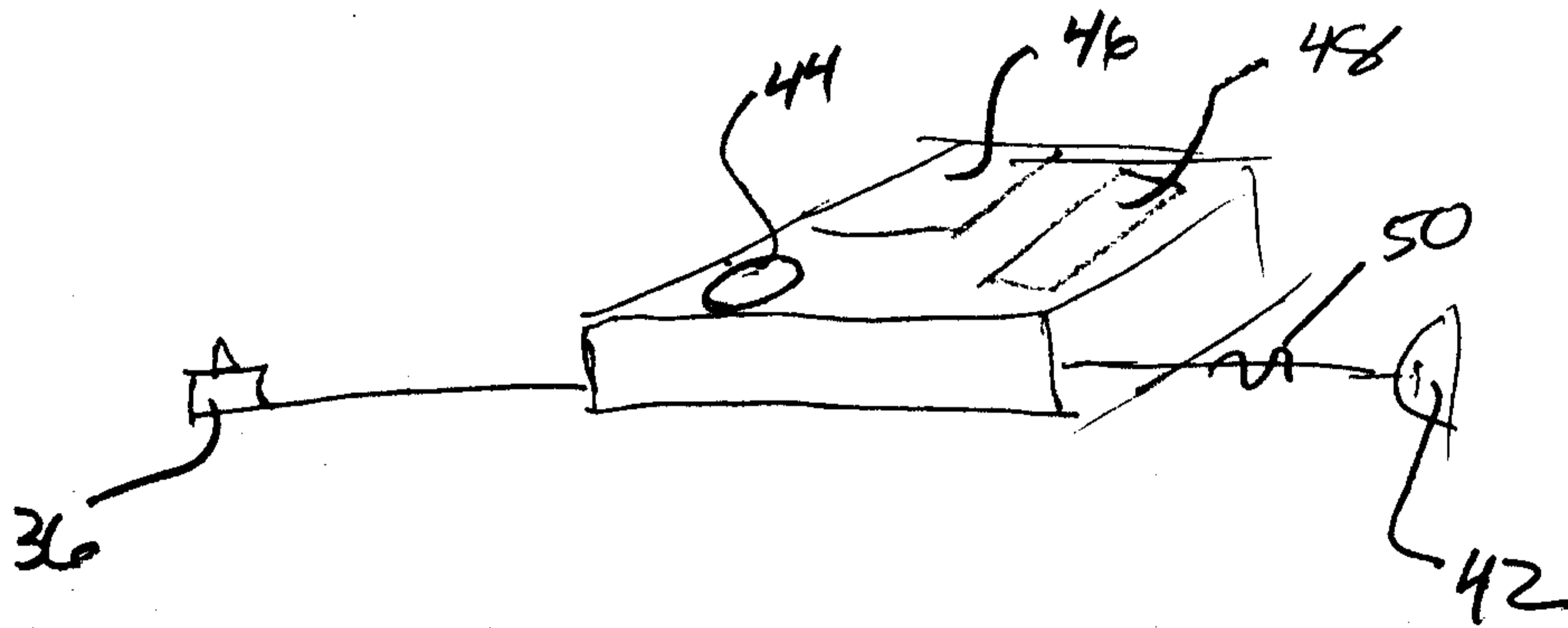


Fig. 3.

