

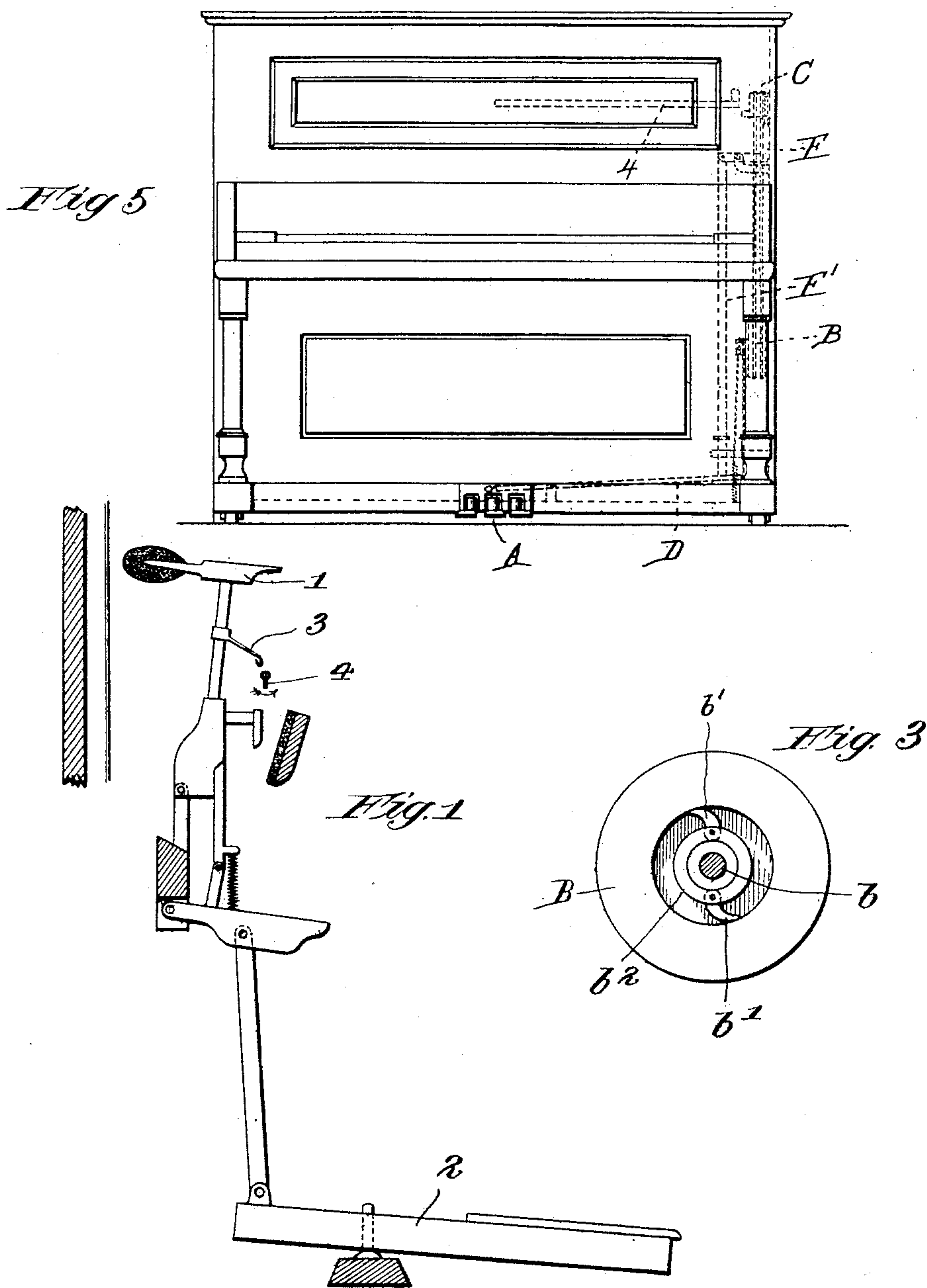
H. H. NORTHROP.

VIBRATO SOSTENUTO ATTACHMENT FOR PIANOS.

(Application filed Mar. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
 Robert F. Mayfield.
 Harvey L. Hanson.

Inventor:
 Henry H. Northrop
 By Arthur F. Leonard
 Atty.

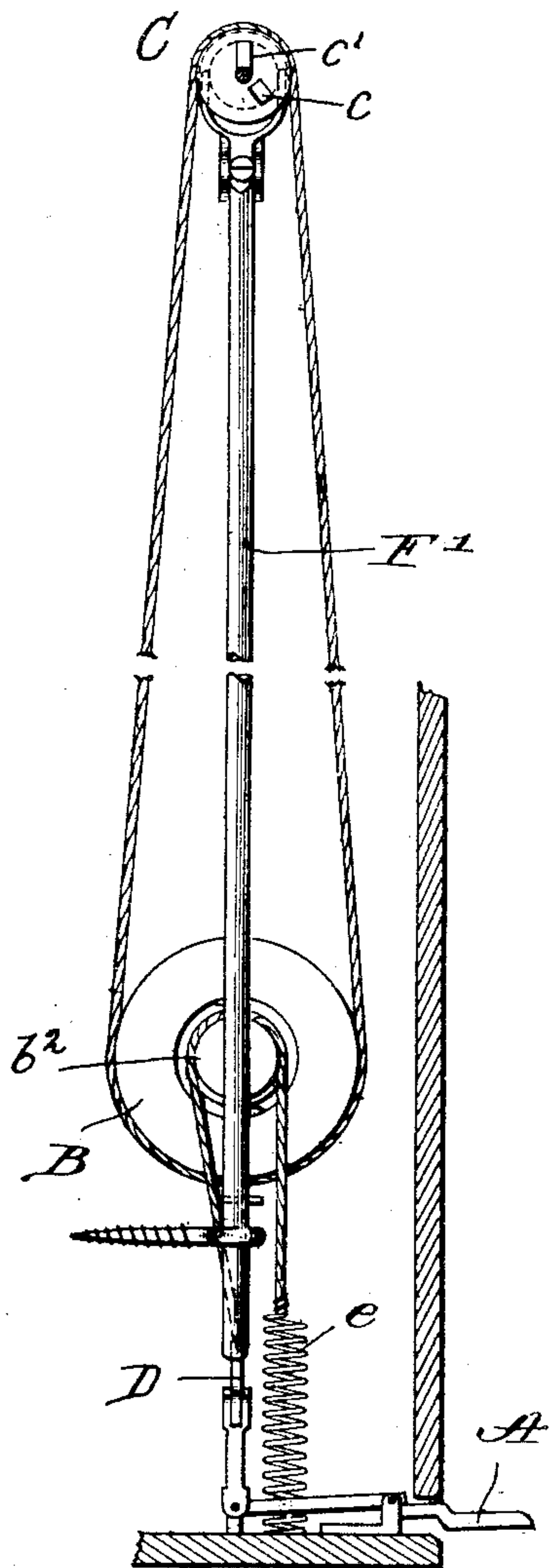
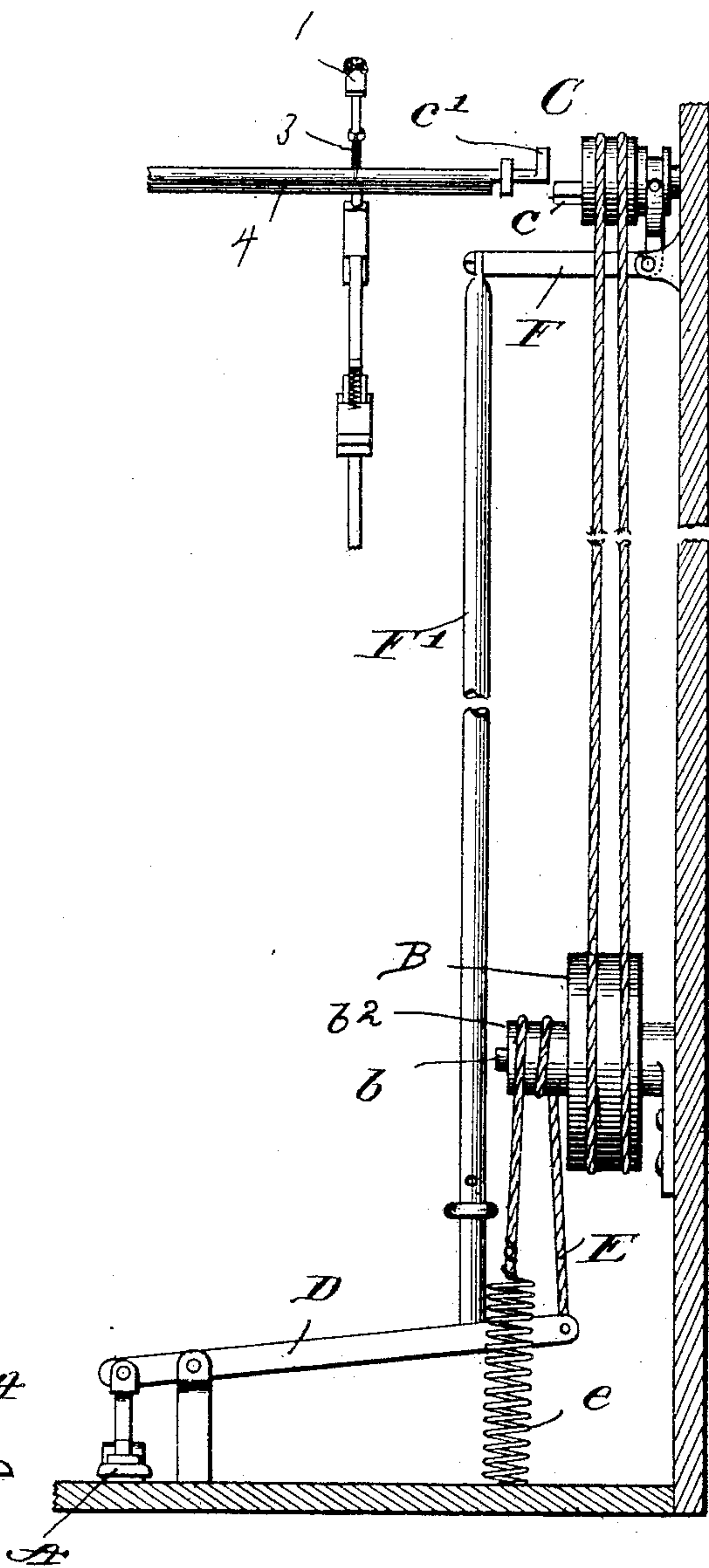
H. H. NORTHROP.

VIBRATO SOSTENUTO ATTACHMENT FOR PIANOS.

(Application filed Mar. 18, 1901.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 1*Fig. 2*

Witnesses:
 Hubert F. Osgood.
 Harvey L. Hanson.

Inventor:
 Henry H. Northrop
 By Arthur F. Leland
 Atty

UNITED STATES PATENT OFFICE.

HENRY H. NORTHROP, OF CHICAGO, ILLINOIS.

VIBRATO-SOSTENUTO ATTACHMENT FOR PIANOS.

SPECIFICATION forming part of Letters Patent No. 696,474, dated April 1, 1902.

Application filed March 18, 1901. Serial No. 51,669. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. NORTHROP, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have
5 invented a certain new and useful Vibrato-Sostenuto Attachment for Pianos, of which the following is a specification.

My invention relates to piano attachments for producing rapid vibration of the hammers, and has for its object the provision of a simple and inexpensive attachment of this character, but more particularly to provide an arrangement whereby the rapid vibration of the hammers can be caused and also controlled through the medium of a single pedal.

To the foregoing and other useful ends the attachment can comprise a rotary cam arranged in position to engage the hammers, and the power-transmitting connection between the pedal and said cam can include a clutch of such character that the rotation of the latter will be under the complete control of the player.

The nature and operation of my invention will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a side view of a piano-action, showing the position of the parts when the key is maintained in a depressed position and showing the arrangement of the rotary cam for engaging and vibrating the hammers. Fig. 2 is a front elevation of the cam, a hammer, and the motor or device for operating the cam. Fig. 3 is a side elevation of the momentum or driving wheel. Fig. 4 is a side elevation of the pedal and power-transmitting connection. Fig. 5 is a front elevation of a piano, showing the attachment in dotted lines.

As thus illustrated my invention is shown in connection with an upright piano. It will be readily understood, however, that my invention is applicable to either upright or grand pianos. Preferably, however, and particularly when my invention is to be employed in the form of an attachment, the piano is of the upright style or pattern and is provided with the usual well-known middle pedal; but, as stated, I do not limit myself in the application of my invention, and accordingly claim,
50 broadly, a pedal-operated and clutch-controlled vibrato-sostenuto attachment for pi-

anos, whether the said pedal is already in the piano or applied as part of the attachment.

In Fig. 1 the piano-action comprises the hammer 1 and key 2, connected in the usual manner. The hammer-shank is provided with an arm 3. A rotary cam 4, mounted in suitable bearings, is arranged in position to engage said arm when the hammer is in the position shown. The rotation of the cam causes the hammer to vibrate rapidly against the wire. In this way a rapid repetition of a note or practically a continuous tone is secured by simply pressing down on a key and by causing the cam to rotate.

The motor device for rotating the cam comprises, preferably, a pedal A, a momentum-wheel B, and a clutch C. The said wheel is preferably mounted upon a spindle *b* and is engaged by the rubber dogs *b'*, carried by the rotary hub *b*². The said pedal is mounted to act as a lever, its inner end being suitably connected with a second lever D. A cord or belt E is wound upon said hub, has one end secured to the lever D, and has its other end secured to a spring *e*, which is in turn secured to the floor of the piano. With this arrangement a vibration of the pedal will rotate the hub first one way and then the other, the rubber dogs, however, causing the wheel to rotate rapidly in one direction. The momentum-wheel of the rotary motor thus provided is of sufficient weight to drive the cam smoothly and steadily and is preferably of sufficient weight to rotate for a period of more or less duration after the operator has ceased to vibrate the pedal.

The clutch C can be of any suitable construction, but is preferably in the nature of a pulley, having a lug *c* adapted to engage an arm *c'* on the end of the cam. A belt or cord connects this pulley with the driving-wheel B. Said pulley is held normally out of engagement with the cam by a bell-crank lever F. This bell-crank is in turn maintained in such normal position by a rod F', having its lower end resting upon the lever D. In this way the clutch is open when the pedal is up and does not close until the pedal is slightly depressed. The rod F' is not connected at its lower end with the lever D, but merely rests upon the said lever, and with this construc-

tion it will be readily seen that said rod is practically or substantially a weight or weighted connection for closing the clutch. When the pedal is slightly depressed, rod or weight F' drops, and thereby closes the clutch, and the rotation of the wheel B will then cause the cam to rotate. When the clutch is closed, the said rod or weight moves downward only a short distance and not to an extent to interfere with the vibratory motion of the lever D. When the pedal is allowed to rise to its normal position, the free or distal end of the lever D also rises to an extent sufficient to lift the rod or weight F', and thereby open the clutch. It will be observed, therefore, that the clutch is only open when the pedal is in its normal position and that only a slight depression of the pedal is necessary to close the clutch, the vibration of the pedal at a lower point causing the desired rotation of the cam without reopening the clutch. In this way the rotation of the cam is under the complete control of the player—that is to say, the rotation of the cam can be started and stopped instantly—and both the operation and control of the attachment are thus effected through the medium of a single pedal. The said cam, it will be observed, only engages a hammer when the latter is in the position shown in Fig. 1—that is to say, when the key allotted to such a hammer is maintained in a depressed position. It will also be observed that the arrangement is such that the arm 3 on the hammer must pass the cam when the hammer is thrown forward against the string. In other words, the cam is arranged at a point intermediate of two points—namely, the point at which the end of the arm 3 stands at rest and the point to which the end of said arm moves when the hammer is thrown forward. For this reason it is desirable that the cam, or, more broadly speaking, the attachment, automatically adjust itself so as not to interfere with the movements of the hammers—that is to say, so as not to prevent a hammer from making its full forward-and-back stroke. This, it will be observed, is accomplished by providing the aforescribed clutch and by arranging the same in such manner as to automatically open and allow the cam to instantly stop when it is desired to discontinue the vibrato-sostenuto effect. As soon as the transmission of power between the motor and the cam is interrupted by the opening of the clutch the rotation of the cam ceases, and it then comes to an at-rest position, with its projection or node pointing downward. In this position the cam does not interfere with the natural forward-and-back or vibratory movement of the hammer, it being observed that the end of the arm 3 is now free to pass back and forth without touching the cam. By thus operating and controlling the cam from a single pedal the operator can start the vibrato-sostenuto effect quickly and easily and can then instantly stop the rotation of the cam, and thereby discontinue such effect, the

opening of the clutch allowing the cam to stop while the momentum-wheel is still running. In this way the cam can then be started again by merely depressing the pedal to an extent to close the clutch. In other words, with my improved motor and power-transmitting connection, including controlling mechanism, the motor can be allowed to run continuously without a continuous use of the vibrato-sostenuto effect. The momentum-wheel B of the motor can be started and the operator can then use and discontinue the use of the vibrato-sostenuto effect as often as desired and regardless of whether the said wheel is rotating or not. It will be seen, therefore, that my invention contemplates a motor and device for engaging and vibrating the hammers of a piano, the two being connected and arranged for more or less independent control and operation through the medium of a single pedal.

It is obvious that my invention is capable of extensive modification and change without departing from the spirit of my invention. I do not, therefore, limit myself to the construction shown and described.

What I claim as my invention is—

1. A vibrato-sostenuto attachment for pianos, comprising a device for engaging and vibrating the hammers, a rotary momentum-wheel, a pedal mounted to act as a lever, suitable power-transmitting connection between said pedal and said momentum-wheel, power-transmitting connection including a clutch between said wheel and said device for engaging and vibrating the hammers, and suitable connection between the said clutch and said pedal, whereby the latter can be employed for both rotating the wheel and opening and closing said clutch, substantially as described.

2. A vibrato-sostenuto attachment for pianos, comprising a device for engaging and vibrating the hammers, a pedal mounted to act as a lever, a power-transmitting connection between the said pedal and said device for vibrating the hammers, said power-transmitting connection including a clutch, and suitable connection between said clutch and said pedal, whereby the said pedal can be employed for both operating the power-transmitting connection and opening and closing said clutch, substantially as described.

3. In a piano, the combination of the hammers, a cam arranged back of said hammers and in position to engage arms on the same, a pedal mounted to act as a lever, power-transmitting connection between said cam and said pedal, said power-transmitting connection including a clutch for continuing and discontinuing the transmission of power, and suitable connection between said clutch and said pedal, whereby the latter is adapted for both driving the power-transmitting connection and opening and closing said clutch, substantially as described.

4. In a piano, the combination of the ham-

mers, arms on said hammers, a cam arranged back of the hammers and in position to engage said arms when the keys of the piano are maintained in a depressed position, a power-transmitting connection for driving said cam, said connection including a clutch, and means for operating said clutch so as to either continue or discontinue the rotation of said cam, the latter when at rest allowing the said arms on the hammers to swing back and forth for the full stroke of the hammers, substantially as described.

5. In a piano, the combination of the hammers, rearwardly-projecting arms on said hammers, a cam having a single projection or node and arranged back of said hammers in position to engage the ends of said arms, a power-transmitting connection for driving said cam, said power-transmitting connection including a clutch for continuing and discontinuing the rotation of said cam, the clutch when open permitting the cam to remain at rest while the said power-transmitting connection is still running, and the projection or node of the cam when the latter is at rest pointing downwardly, so as to permit the said arms on the hammers to swing back and forth for the full stroke of the hammers, substantially as described.

6. The combination in a piano with hammers, of a device for engaging and vibrating said hammers when the keys of the piano are maintained in a depressed position, a rotary motor for driving said device, and a pedal connected and arranged for both driving said motor and independently thereof controlling the operation of said device, said pedal having power-transmitting connection with said motor, said motor having a power-transmitting connection with said device for engaging and vibrating the hammers, and a device for controlling the transmission of power from said motor to said device for vibrating the piano-hammers, said controlling device having a separate and independent connection with the power-transmitting connection interposed between said pedal and said motor, whereby said pedal can be employed for both driving said motor and closing the power-transmitting connection between the motor and said device for vibrating the hammers, substantially as described.

7. In a piano, the combination of the hammers, arms on said hammers, a rotary cam arranged in position to engage said arms, means for driving said cam, a clutch arranged between said driving means and said cam and a pedal connected with said clutch and arranged for controlling the transmission of power from said driving means to said cam, the pedal when at rest rendering the power-transmitting connection inoperative, substantially as described.

8. In a piano, the combination of the hammers, a device for vibrating said hammers, a rotary momentum-wheel, power-transmitting connection including a clutch between said

wheel and said device, and a pedal connected with said clutch and arranged for controlling the transmission of power between said wheel and said device, the pedal when in its at-rest position rendering the said power-transmitting connection inoperative, substantially as described.

9. In a piano, the combination of the hammers, a device for vibrating the hammers, a rotary momentum-wheel, suitable power-transmitting connection between said wheel and said device, said power-transmitting connection including a clutch, a pedal adapted and arranged for both rotating said wheel and controlling said clutch, the pedal when at rest holding the clutch open and thereby rendering the said power-transmitting connection inoperative, substantially as described.

10. In a piano, the combination of the hammers, a cam for vibrating said hammers, a rotary momentum-wheel, suitable power-transmitting connection between said wheel and cam, said power-transmitting connection including a clutch, a pedal mounted to act as a lever, suitable power-transmitting connection between said pedal and wheel, said pedal being also connected and arranged for controlling said clutch, the pedal when at rest holding said clutch open and thereby rendering the said power-transmitting connection inoperative, and the said pedal when depressed and vibrated permitting the clutch to automatically close and operating to rotate the said wheel, substantially as described.

11. The combination in a piano, of the hammers, a cam for vibrating said hammers, a rotary momentum-wheel, suitable power-transmitting connection between said wheel and said cam, said connection including a clutch, a pedal for driving said wheel, suitable connection whereby the pedal when at rest will hold said clutch open and thereby render the said power-transmitting connection inoperative, a weight or weighted connection whereby, when the pedal is depressed, the said clutch will automatically close and thereby communicate power and motion from said wheel to said cam, substantially as described.

12. The combination in a piano, of the hammers, a device for vibrating said hammers, a rotary momentum-wheel, a hub provided with dogs arranged to engage said wheel, a pedal, power-transmitting connection between said pedal and said hub, whereby the vibration of said pedal will operate to oscillate the said hub and thereby drive the said wheel, power-transmitting connection between said wheel and said device for vibrating the hammers, said last-mentioned power-transmitting connection including a clutch, and suitable connection between said clutch and said pedal whereby the latter can be employed for both rotating the wheel or discontinuing the transmission of power from the wheel to said cam, substantially as described.

13. In a piano the combination of the strings, means for vibrating the said strings, a rotary

momentum-wheel for driving or operating the
said means for vibrating the strings, a hub
provided with dogs adapted and arranged to
engage said wheel, a vibratory lever, a cord
5 having one end attached to said lever and
wound upon said hub and having its other
end secured to a spring, said spring being se-
cured to the body or frame structure of said
piano, and a pedal connected and arranged
10 for vibrating said lever, the vibratory motion
of said lever operating to oscillate the said
hub, and thereby rotate the said wheel, sub-
stantially as described.

14. The combination of a piano and an at-

tachment therefor adapted and arranged for 15
operating upon the strings of said piano, a ro-
tary wheel having a suitable power-transmit-
ting connection with said attachment for op-
erating the strings of said piano, a hub pro-
vided with dogs adapted to engage said wheel, 20
a cord wound upon said hub, and a pedal suit-
ably connected with one end of said cord, the
other end of said cord being secured, substan-
tially as and for the purpose set forth.

HENRY H. NORTHROP.

Witnesses:

ARTHUR F. DURAND,
HARVEY L. HANSON.