

TRIGGER FINGER.

Also called spring finger, snap finger, jerk finger, stuck finger, doigt à ressort (French), schnellender Finger, federnder Finger (German), digitus recellens. Trigger finger is a condition in which a finger during flexion or extension, or both, is suddenly arrested in its movement, and then after the exercise of extra force is suddenly released and completes the movement of flexion or extension with a sudden jerk, resembling the action of a trigger or blade of a pocket knife.

This affection was first described in 1850 by A. Notta. Since then about a hundred and thirty or a hundred and fifty cases have been recorded and a comparatively voluminous literature on the subject been produced.

The characteristic feature of the disease is the impediment to motion, the abrupt arrest of movement of the finger and its subsequent trigger-like release and sudden completion of movement (the "ressort"). The arrest always takes place at a certain point and angle, and may occur during flexion alone, during extension alone, or more frequently during both. Up to the point of arrest flexion and extension proceed normally, but at that point the motion is abruptly arrested and the finger seems to become set or locked at a sharp angle, often an acute or right angle. Then by an extra muscular effort the finger is suddenly released and completes its movement of flexion or extension with a sudden sharp jerk. The muscular exertion required to free the finger varies, sometimes requiring extreme effort, or even assistance from the other hand; one patient had to sit on the finger before the movement could be accomplished. At the instant of release a distinct click or sound can often be heard. Flexion is usually (though not always) more easily accomplished than extension, owing partly to the greater strength of the flexor muscles.

Pain, variable in degree and location, usually occurs associated with the condition, though exceptionally it is absent. In intensity it ranges from slight to excruciating. It is most severe at the time of the "ressort," but in some cases is excited by any movement of the finger. Tenderness on pressure may also exist. The seat of maximum pain is usually in the vicinity of the metacarpophalangeal articulation, but it may extend into, or be felt in, other parts of the finger, the hand, or even the forearm. Occasionally there is crepitation on movement of the flexor tendons, and various paresthesiæ have been observed, especially in the earlier stages of the affection.

In the great majority of cases (upward of seventy-five per cent.) a nodule can be plainly felt on the flexor tendon of the finger, and movable with it, being manifestly attached to the tendons. This is in almost all cases situated near the metacarpophalangeal articulation, but in three or four cases such a nodule has been observed over the proximal or distal interphalangeal joint. In a very few cases a similar nodule has been perceptible, but did not move with the tendon, being connected with the tendon sheath. The nodosity plays an important part in the mechanism of the affection; still, in numerous cases it is not to be felt. The impediment to motion is sometimes overcome by pressure on the node; also by manipulation of the distal phalanx.

The affection is uncommon. It may occur at any age, having been reported at the age of three months (regarded as congenital), seventeen months, and two years, up to ninety years. It is much the most frequent in the adult period, however, from twenty to seventy years of age. It occurs in females rather more frequently than in males, in the proportion of about three to two. A similar trigger condition has been observed in the toes, knees, and other joints, and also in animals; and one or two cases have been reported in which lateral movements of the fingers exhibited the same kind of impediment.

Usually one finger alone is involved, but more than one may be affected, either at the same time or in succession. In one case all the fingers of both hands were involved. In some cases the abnormality occurs symmetrically on both hands. Of the two hands the right is much the

more liable to the affection, being involved in over twice as many cases as the left hand.

The middle finger, ring finger, and thumb are the ones much the most subject to the affection, in about the order named; the index and little fingers are much less frequently affected. In the left hand, the thumb and middle finger suffer less frequently than they do in the right hand.

V. Carlier, who in 1889 collected 105 cases of trigger finger, gives the following statistics as to the number of times each finger was affected:

	Right hand.	Left hand.	Total.
Middle finger	32	9	41
Ring finger	20	18	38
Thumb	26	7	33
Little finger	6	3	9
Index finger	8	1	9
	92	38	130

The joint at which the trigger condition is chiefly manifested is the interphalangeal articulation of the thumb and proximal interphalangeal joint of the other digits, the second phalanx in the position of arrested movement being flexed on the proximal phalanx. Sometimes, however, the distal interphalangeal joint is the one involved; rarely the metacarpophalangeal articulation.

The chief conditions associated with trigger finger as etiological factors in the reported cases are occupation, traumatism, rheumatism, and neurotic temperament.

The factor cited as causative of the condition in the greatest proportion of cases is occupation irritation, as in seamstresses, soldiers, brushmakers, etc. Pressure upon or irritation of circumscribed portions of the palm is supposed to cause the tendinous and other lesions that are responsible for the trouble. Thus, in the case of a tennis player the pressure of the racquet handle in the palm was supposed to have caused the development of a tendinous nodule that produced the trigger condition. This effect of occupation irritation is held to explain the greater liability of the right hand to the disease. Another explanation of the effects of occupation attributes the trigger condition to the excessive use of single fingers, in much the same manner as writer's cramp and other occupation neuroses are produced.

A considerable proportion of the cases originate distinctly from traumatisms of the affected part, the injuries producing the particular inflammatory or other lesions necessary to set up the trigger condition. Many cases have with greater or less probability been attributed to rheumatism and lesions of rheumatic nature, while the upholders of nervous theories of the affection state that neurotic conditions predispose to it.

It may be concluded that traumatisms and occupation irritation certainly, and perhaps rheumatism, are capable of producing trigger finger; but in some cases, as those in children and the bilateral cases, other causative factors must operate.

The disease usually has a gradual onset, varying in symptoms and duration. The cases produced by traumatism develop most rapidly, within a few days or two or three weeks after the injury. Other cases develop more slowly, over a period of weeks and months and even of years. The initiatory symptoms may be a slight inconvenience or awkwardness in movement of the finger; this difficulty gradually increases to the fully developed trigger condition. Vague pains appear in the affected part, increasing in intensity. Sometimes a rustling or grating movement of the flexor tendon is early felt, resembling the crepitation of tenosynovitis. In other cases paresthesiæ early appear in the region involved, as numbness, "going to sleep," formication.

The anatomical cause and mechanism of trigger finger have given rise to considerable discussion, and various explanations have been presented.

Most of the cases are undoubtedly due to lesions of the flexor tendons or their sheaths, especially those in which the nodule is perceptible. This nodule is in most cases attached to the tendon, near the metacarpophalangeal joint; it is of inflammatory, fibrous, or neoplastic (fibromatous, osteomatous, etc.) origin. As the tendon moves the nodule is caught at some point, as in transverse bands of the fascia or in constricted portions of the tendon sheath, so that motion is suddenly arrested; by further effort the nodule is forced past the obstruction and the movement is completed rapidly by the excessive muscular tension.

In a few cases it has been demonstrated that the lesions causing the trouble were situated in the tendon sheath, the tendon itself being normal. These lesions consist either of an annular or circumscribed constriction of the sheath, a thickening of the sheath, or a nodular growth in it, which interfere with the movements of the tendon within. Such lesions can be produced by inflammation, neoplasms, etc. In these cases a nodule may or may not be felt, but if present it does not move with the tendon. There may also be lesions of both the sheath and the tendon.

Thickening or stiffening of the synovial sac in such a manner as to interfere with its gliding-to-and-fro movement between the tendon and its sheath has been advanced as a cause of trigger finger, and may possibly be a factor sometimes. Intrasynovial floating bodies have also been suggested as a cause of the trouble.

Some authorities have considered abnormal conditions in the phalangeal articulations to be capable of causing trigger finger. The particular abnormalities that have been mentioned in this connection are (a) abnormal configuration of the joint, (b) short lateral ligaments, and (c) projections at the side of the joint. It is conceivable how a certain surface configuration of the joint, as a projecting nodule or ridge or abrupt curvature, could produce a trigger-like action. Shortened lateral ligaments would obstruct the motion of the phalanx at a given angle; but if the ligaments were sufficiently elastic to stretch enough to permit the phalanx to pass beyond the obstruction, the resiliency of the ligaments as well as muscular action would cause a quick jerking completion of the movement. The possibility of such a trigger action of short lateral ligaments I have been able to demonstrate in a dissection of a hammer finger. Bony projections at the side of a joint, by becoming engaged in the lateral ligaments, might also cause an impediment to motion. It is easily conceivable how articular changes of the character mentioned could cause a sort of trigger finger, and it is possible that they may exceptionally be the cause of the condition.

That some cases of trigger finger are of nervous origin and due to muscular spasm has been upheld by a few writers, especially Carlier. Thus, it is supposed that during extension the middle phalanx is suddenly arrested by spasm of the flexor sublimis digitorum; then more energetic contraction of the extensor muscle overcomes this spasm with a jerk. Arrest during flexion is attributed to a momentary impotence of the flexor or perhaps spasm of the extensor, which is followed by brusque contraction of the flexor. According to some views trigger finger is somewhat allied to writers' cramp and similar occupation neuroses, arising in various occupations requiring excessive use of particular fingers. While muscular spasm cannot be a common cause of real trigger finger, yet the affection may perhaps occasionally be of spasmodic nature.

The prognosis of trigger finger is generally favorable. Spontaneous recovery sometimes occurs, and the affection is quite amenable to treatment, though sometimes no improvement is obtainable.

Treatment of non-operative kind often produces good results, especially in the early stages of the affection. One of the most essential parts of the treatment is rest, by immobilization of the part on a splint. Counter-irritants like tincture of iodine, massage, electricity, poultices, etc., are also useful. In inveterate cases operation

is necessary. The seat of the trouble should be cut down upon; the nodule on the tendon or sheath should be removed and the sheath of the tendon should be slit open at any constricted portion. Simple incision of the tendon sheath in obscure cases may result in cure.

CIRCULATORY DISORDERS.

The distance of the hands from the heart gives rise to a relative weakness of the circulation in this member, which may become manifest whenever from cardiac or other causes there is a general lowering of the tone of the circulation. The feet suffer from the same cause, and even more than the hand, since in the lower extremities the effect of gravity is an additional embarrassment to the circulation. The hand may also suffer from obstructions anywhere in the course of the vessels of the upper extremity.

Congestion of the hand is frequent in heart disease and other conditions in which the circulatory forces are weakened. The hand is cold, slightly swollen, either dry or clammy, of a purple color; on pressure the blood is forced out, leaving a white spot into which the blood slowly returns after the pressure is removed. The congestion is also diminished by elevation of the hands. Hyperidrosis or excessive sweating is another consequence of weakened blood pressure or lowered vascular tone. Edema of the hands is common in conditions of general anasæra or under circumstances similar to those causing passive congestion. In systemic affections such vascular disturbances are bilateral; but where the obstruction to the circulation is local, as in trauma, obstructed vessels, aneurism, etc., of one side, the stasis or œdema is unilateral. Gangrene may be an extreme result of vascular obstruction. Clubbed or Hippocratic fingers in cases of cardiac and pulmonary disease may be partly due to passive congestion, partly to real trophic alterations. Angioneurotic œdema may occur on the hand. The treatment of these conditions is that of their cause.

MUSCULAR AFFECTIIONS.

The lesions of the muscles of the hand chiefly met with are the atrophies, paralyses, spasms, etc., caused by nervous lesions, considered below. Primary diseases of the muscles are rare here as elsewhere.

Unopposed action of a set of muscles, as after section of the tendons or paralysis of the opposing group, causes corresponding contractures.

Rarely the flexor muscles of the forearm are relatively shortened by arrested development. This causes a flexion of the fingers, not paralytic or spastic in character, but due entirely in a mechanical way to the shortness of the muscles and their tendons. It is manifested by inability to extend the fingers; strong flexion of the wrist, by relaxing the tendons, increases the range of extension of the fingers. The condition may develop alone without the coexistence of other abnormal conditions elsewhere, and becomes manifest during the growing or preadult period; it may also occur in infantile paralyses with other lesions. Attempt may be made to remedy the condition by division or plastic lengthening of the tendons.

Occupation muscular atrophy is an atrophy gradually developed in groups of muscles by continual use or over-use incident to the occupation pursued. It has been observed in the hand and elsewhere in a few cases. It affects especially the thenar muscles in lapidaries and others, and also the hands of writers. It is regarded as more of myopathic than neuropathic origin, and is quite amenable to treatment by rest, electricity, tonics, etc.

Ischæmic myositis or paralysis occasionally affects the hand from prolonged anæmia of the muscles of the forearm and hand, caused especially by pressure in this region from the use of tight bandages and splints. The long-continued anæmia causes degenerative and inflammatory changes in the muscle tissue, and sometimes in-

duration and contraction of the muscle. It is manifested by pain, swelling, impaired movement, and sometimes contractions of the hand. The condition should be prevented as far as possible by proper treatment of fractures of the forearm. When developed it can usually be overcome by massage, exercise, electricity, douching, etc.; but sometimes it results in permanent paralysis, contractures, and deformity.

Myositis (suppurative, tuberculous, syphilitic, interstitial, rheumatic, etc.) and gummata or other tumors in the muscles are rare causes of impairment of motility. After such inflammatory conditions contractions from shrinking of the endomyosial tissue and cicatrices may result. With ossifying myositis are often associated ankylosis of one or another joint of the thumb, smallness of the thumb, slight deflection of the thumb, and impairment of its motion.

Occupation or habit contractures sometimes occur in those whose occupation requires the hand to be held or exercised or overused in prolonged or habitual positions, as a flexion of the fingers in drivers, etc. Such cases demand change of occupation and appropriate local treatment.

NERVOUS AFFECTIONS.

The hand suffers severely and conspicuously in many nervous diseases, and so marked and characteristic are its functional and structural changes that its condition affords data valuable for diagnosis in various nervous affections. The primary nervous lesions causing the changes in the hand are seated in the nervous centres or in the nerve trunks of the upper extremity; only rarely in the hand itself, as in inflammation or injury of the nerves in the hand, or, perhaps, in occupation neuroses.

The functional and structural changes of neuropathic origin to which the hand is subject may be classified as follows:

1. Sensory disorders: Pain; disorders of common sensation.
2. Motor disorders: Paralysis; tonic spasm, contractures, etc.; clonic spasm, tremor, etc.; ataxia.
3. Trophic changes: atrophies, arthropathies, dermatoses, necrosis, etc.
4. Vascular phenomena.

These changes and symptoms do not usually exist singly, but the condition actually presented in given cases is ordinarily a mixture of various classes of symptoms, one nervous disease producing a complex of phenomena.

Pain or neuralgia in the hand occurs in connection with numerous conditions, as in neuritis, locomotor ataxia, Raynaud's disease, etc., besides being a result of gouty, rheumatoid, and inflammatory conditions.

The *disorders of sensation* of the hand include hyperæsthesia, paræsthesia, and especially local anaesthesia or hypæsthesia caused by injuries or lesions of the brachial plexus or its branches, besides more general and irregular anaesthetics from central nervous disease. In given nervous lesions sensory disturbances are usually less intense and more quickly recovered from than the corresponding motor paralyses.

Paralysis of any or all of the groups of muscles pertaining to the hand occurs in general paralytic conditions, as hemiplegia, anterior poliomyelitis, progressive muscular atrophy, and numerous others, and in inflammations or injuries of the nerves of the upper extremity. With the paralytic condition is usually associated atrophy, often extreme, of the affected muscles.

The primary effect of any paralytic condition is loss of the corresponding muscular function. Secondly, from the unopposed action of the muscles antagonistic to the paralyzed muscles, or from the unequal degree in which different groups are affected, muscular *contractures* arise, which may cause various deformities. The contractures are at first of the nature of continuous or tonic spasms, and can be overcome by passive force. Ultimately the prolonged malposition causes vicious secondary altera-

tions and ankylosis in the joints, with atrophic changes or arrested development in various structures resulting in disproportionate relations of the various parts of the member, so that finally the deformity becomes permanent and uncorrectible. Different nervous diseases produce different characteristic deformities of the hand, as the "claw hand" of ulnar paralysis, the "wrist drop" of musculo-spiral paralysis, the "preacher's hand" of cervical pachymeningitis, the club hand of infantile paralysis. *Tonic spasms* of the hand, not associated with paralysis, occur in tetany, tetanus, hysteria, and Thomsen's disease.

Some nervous affections are manifested in the hand by *tremors* and *clonic spasms*, as in multiple sclerosis, paralysis agitans, athetosis, chorea, epilepsy.

Ataxia, or inco-ordination of the movements, may affect the hands as a part of the symptom-ensemble of various central nervous diseases, as in multiple sclerosis, locomotor ataxia, general paresis, Friedrich's ataxia. The occupation neuroses are also largely manifested by ataxic phenomena. The inco-ordination is manifested by difficulty or inability to perform delicate movements or by spasmodic movements on attempting voluntary actions, and is not necessarily associated with any paralysis or decrease of motor strength.

Trophic changes in the hand resulting from morbid nervous impressions may cause great damage, and exhibit considerable variety, as muscular atrophies, skin changes, onychias, joint changes, ulceration, necrosis, hypertrophies. Atrophies of various muscles of the hand, in connection with paralytic and spastic phenomena, are characteristic, severe, and conspicuous lesions in various affections, as progressive muscular atrophy, nerve injuries, and other conditions. Trophic changes in the skin and nails occur, as in the condition termed glossy skin. In many paralytic conditions of the hand the skin is pale, cool, rather smooth, and exhibits a tendency to desquamation; and the subcutaneous tissues are slightly œdematous. Trophic changes in the joints occur rarely, exemplified by Charcot's arthropathy in locomotor ataxia. General hypertrophy of the hand has been noted in a few cases of syringomyelia. Dermatitis, the formation of vesicles and blebs, ulceration, and even necrosis of circumscribed areas occur in syringomyelia, the neuritis of leprosy, Raynaud's disease, and other conditions. In nervous diseases arising during the period of growth, as infantile paralysis and infantile palsies, arrested and irregular development may contribute toward contracture and deformity in later years.

Vascular Phenomena—flushing, pallor, etc.—occur in Raynaud's disease, erythromelalgia, hysteria, and other conditions.

Having briefly summarized the neuropathic functional and structural changes to which the hand is subject, the effects upon the hand of the various nervous diseases remain to be considered.

Occupation Neuroses.—These comprise a class of local functional nervous disturbances produced by the excessive use of definite groups of muscles in performing delicate and complicated actions necessitated in various pursuits, to which the hand from its usage is subject. These affections are characterized by tonic spasms or cramps, tremors, inco-ordination and ataxia, or pain, which are brought on when attempts are made to perform the habitual actions, so that these movements can be executed only with difficulty or not at all. As a rule, other acts requiring equal delicacy and complexity of co-ordination can be performed with ease, the neurosis operating only against the particular movements that produced it. The occupation neuroses present no menace to life or the general health, but they are financially and psychically serious in that they may prevent their subjects from continuing in their accustomed avocation.

No anatomical changes have been demonstrated in these cases. Neuritis is sometimes present, but it is a complication and not an essential feature. The condition is a functional motor disorder and is sometimes styled a local neurasthenia. The affection may develop

at any adult age; it is rare under twenty, a large proportion of cases develop between twenty and thirty, and many from thirty to fifty years. Occupation neuroses may attack persons in excellent physical condition,

changed. New sets of muscles should be brought into play, and the motions of writing should be altered as much as possible and carried on with the entire hand and forearm rather than with the fingers alone.

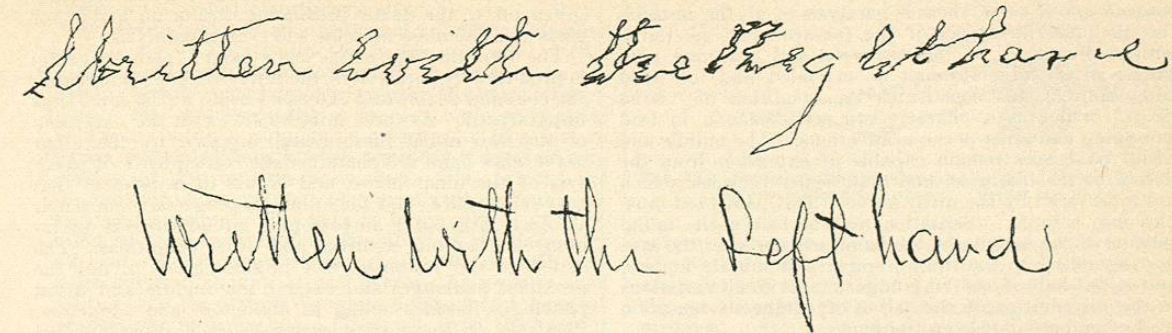


FIG. 2511.—Handwriting in a Case of Writers' Cramp (Tremulous Variety) of the Right Hand. The patient was a clerk and had been a good penman with the right hand; after the invasion of the neurosis he learned to write with the left hand. (Original.)

though those of a neurotic tendency or debilitated state are more subject. They develop insidiously, the first symptoms being a certain amount of stiffness, tremulousness, uncertainty, jerkiness, dull aching pain, fatigue, or weakness, during the acts at fault. These troubles slowly increase, until the neurosis is fully established, when on attempting to execute the customary movements the hand is seized with a cramp or tonic spasm, or involuntarily goes into jerky spasmodic or choreic movements, or its movements cannot be co-ordinated, or it becomes tremulous, or parietic, or the seat of a deep dull aching pain. The affection is chronic in its course. The prognosis is unfavorable so far as cure is concerned, as the neurosis is very difficult or impossible to eradicate. The symptoms can be easily ameliorated by rest and change of occupation, but even after long intervals the trouble almost invariably recurs upon resumption of the occupation that caused it.

The commonest and best known of the occupation neuroses is *writers' cramp*, which typifies the whole group. Analogous neuroses occur or have been observed in connection with many other occupations, of which the commonest are telegraphers' cramp, typewriters' cramp, musicians' (pianists', violinists') cramp, sewers' cramp, hammer cramp.

The diagnosis of well-marked cases of occupation neuroses usually presents no difficulty. The earlier stages may not be easily distinguishable from the vague incipient symptoms of other nervous affections. A local neuritis may present symptoms simulating occupation neuroses; but in neuritis the motor or ataxic trouble is not so closely related to one particular set of movements, and the electrical reactions may be altered. The prognosis of neuritis is also more favorable.

If symptoms of approaching writers' cramp appear, prophylactic treatment is important. The act of writing should be made as comfortable as possible, by the use of an easy-writing pen (as a gold pen), a penholder that can be held with ease, smooth paper, and the adoption of such arrangements and position as are easiest for writing. The pen should be held lightly and grasped with as little force as is possible. The manner in which the penholder is held by the fingers should be

The best treatment of incipient or fully developed occupation neuroses is rest and suspension or change of the occupation. The symptoms readily yield to such treatment, but unfortunately these measures are not always practicable. General neurotic or debilitated conditions should receive appropriate treatment. Local massage, gymnastics, and electricity are useful. The unaffected hand may be used, after practice and training, to execute the movements impaired in the other hand, though in such cases the second hand often becomes itself affected by the neurosis. Various forms of apparatus have been devised for use in writers' cramp, for immobilizing the fingers involved, for holding the penholder and so relieving the fingers of the effort of pen-prehension, and for bringing new muscles into play in the act of writing (Figs. 2512, 2513). Such devices may be of service in these cases, but the substitution of type-writing machines for the pen would be far more efficacious.

Diseases and Injuries of the Nerves.—Inflammation of the nerves supplying the hand presents the usual phenomena of neuritis, tenderness over the affected nerve, pains, hyperæsthesia, hypæsthesia, or paræsthesia of the area supplied, motor paralysis, trophic changes, altered electrical reactions. The symptoms vary in their character, location, and intensity in different cases and in different varieties of the disease, as in the traumatic, multiple, rheumatic, gouty, toxic (lead, alcohol, etc.), leprosy, and other forms of nerve disease. Neuritis sometimes exists with and complicates occupation neuroses; and an occupation neuritis may be induced in the member by the occupation pursued. Degeneration of the nerves produces corresponding paralytic, spastic, and trophic phenomena.

In chronic *lead poisoning* the extensor muscles of the hands are often paralyzed, producing the "wrist drop" characteristic of this condition; sometimes there is also in plumbism a swelling or ganglion on the back of the wrist. In *alcoholic polyneuritis* wrist drop may also occur, but less frequently than foot drop.

Injury or disease of the *brachial plexus*, produced by rheumatic inflammation, by rheumatoid disease of the cervical vertebrae, in connection with dislocations of the shoulder, from the pressure of crutches, or other causes, results in motor paralysis,

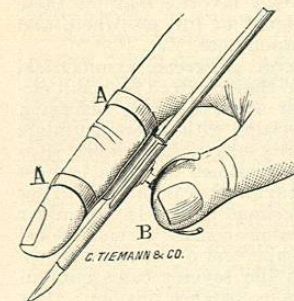


FIG. 2512.—Mathieu's Apparatus for Writer's Cramp. (After Dana.)

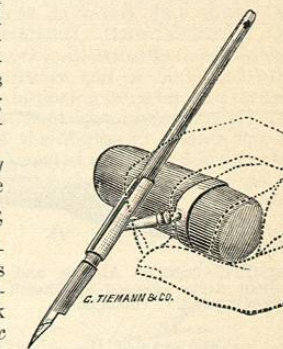


FIG. 2513.—Apparatus for Writers' Cramp. (After Dana.)